



## **The impact of the physical environment for caregiving in ordinary housing: Experiences of staff in home- and health-care services**

Downloaded from: <https://research.chalmers.se>, 2021-08-31 11:41 UTC

Citation for the original published paper (version of record):

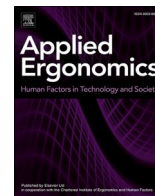
Pettersson, C., Nilsson, M., Andersson, C. et al (2021)

The impact of the physical environment for caregiving in ordinary housing: Experiences of staff in home- and health-care services

Applied Ergonomics, 92

<http://dx.doi.org/10.1016/j.apergo.2020.103352>

N.B. When citing this work, cite the original published paper.



# The impact of the physical environment for caregiving in ordinary housing: Experiences of staff in home- and health-care services

Cecilia Pettersson<sup>a,b,\*</sup>, Martin Nilsson<sup>c</sup>, Morgan Andersson<sup>a</sup>, Helle Wijk<sup>a,d</sup>

<sup>a</sup> Department of Architecture and Civil Engineering, Chalmers University of Technology, Gothenburg, Sweden

<sup>b</sup> School of Health Sciences, Örebro University, Örebro, Sweden

<sup>c</sup> City of Gothenburg, Gothenburg, Sweden

<sup>d</sup> Institute of Health and Care Sciences, The Sahlgrenska Academy at Gothenburg University, Gothenburg, Sweden

## ARTICLE INFO

### Keywords:

Older people

Ordinary housing

Working environment

## ABSTRACT

The strong driving forces for ageing in place demand sustainable solutions for the housing and care of older people and the health and safety of home- and health-care staff. The aim of the study was to elucidate staff experiences of providing home- and health-care to older people living in ordinary housing. This study was part of a larger project investigating the relation between home design and conditions for care in ordinary housing. The data were gathered through focus group interviews with staff in home- and health-care. Three main themes were found according to staff experiences of particular rooms' sizes and proportions, spatial configurations, and aspects to consider when designing new housing. This study contributes important knowledge about essential features of the physical environment for staff providing home- and health-care for older people in their own homes and to aid the development of functionally sustainable housing to minimise injuries to staff.

## 1. Introduction

Residential health care for older people is increasing, and the physical environment has a significant impact on their health and safety and those of staff. Long-term adaptability to changing living conditions is important, and the properties of the home are critical and decisive factors in the quality of future care. To understand and identify the requirements of in-home care and to develop innovative solutions to in-home challenges, decision makers, architects, and planners need more knowledge about the consequences of 'ageing in place' in ordinary housing not designed to support caring services or protect personal privacy. In 2016 almost one in five people in Sweden were over 65 years old (Statistics Sweden, 2020), and almost 400 000 people received care from the municipality (Swedish Association of Local Authorities and Regions, 2020). By 2060, the ratio of people over 60 is expected to rise to one in four (Statistics Sweden, 2020). This will have a great impact on planning and economy in the municipal sector, which is most often responsible for home and health-care.

On a more personal level, family living with people in need of home- and health-care may feel their home has been transformed into a health-care facility, full of medical equipment and staff coming and going (Borgstrand and Berg, 2009). More knowledge about design features is

needed to ensure both a supportive and functional work environment for staff and an age-friendly home environment for older people. A recent scoping review (Pettersson et al., 2020) aimed to explore enablers and barriers to care in the environment of ordinary housing for older people revealed two recurring themes: safety and accessibility. Safety concerns included transferring older people from shower or bathtub during home rehabilitation. Caregivers also mentioned that narrow working spaces and physical barriers in ordinary homes hindered the use of safe work techniques and assistive devices and equipment. Accessibility was highlighted in terms of insufficient space for walkers and wheelchairs to turn around and the need for height-adjustable toilet seats and hand basins. Further, shower seats and grab bars in the shower and near the toilet were considered important additions to a safe home. Another systematic review focused on safety risks associated with physical interactions between patients and caregivers in home-care settings (Hignett et al., 2016). Based on the 42 publications identified and reviewed, the authors found some evidence that permanent or temporary factors could create risk in the physical care environment. Referring to the studies related to the home environment in these reviews, Beer et al. (2014) found that home layouts could entail time-consuming transfers of people between the bedroom and bathroom. In other studies, staff in home care reported problems with the home space in

\* Corresponding author. School of Health Sciences, Örebro University, Örebro, Sweden.

E-mail address: [cecilia.petterson@oru.se](mailto:cecilia.petterson@oru.se) (C. Pettersson).

<https://doi.org/10.1016/j.apergo.2020.103352>

Received 29 June 2020; Received in revised form 23 December 2020; Accepted 25 December 2020

Available online 2 January 2021

0003-6870/© 2020 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

which they worked (Craven et al., 2012), such as narrow bathrooms and toilets (Kalman and Andersson, 2014).

Evidence-based knowledge of the effect of the physical environment on the health and safety of older people and home- and health-care staff is scarce. Wipfli et al. (2012) argued for further research on effective strategies to improve safety care and injury prevention interventions for home- and health-care staff. According to Markkanen et al. (2014), the challenges of implementing new equipment in the home, (e.g., costs, space, and structural considerations) could be overcome by improving the architectural design of new buildings. Based on the above, it can be assumed that it would be of great value to address hazards in the physical environment to be able to eliminate them as early as possible to minimise injuries to staff. The aim of this study, therefore, was to explore staff experiences and challenges in performing home- and health-care for older people living in ordinary housing.

## 2. Method

This study is part of a larger project investigating the impact of the physical environment of ordinary housing on older people and the relation between design in ordinary housing and conditions for care (Pettersson et al., 2019). The term 'ordinary housing' refers to a variety of private homes ranging from apartments to villas. To deepen knowledge of architectural enablers and barriers to home- and health-care, the study design used mixed methods (Groat and Wang, 2002; Patton, 2002; Freshwater, 2007). Qualitative and quantitative methods were combined with empirical material such as registrations and annotations of layouts of the homes observed by the researchers and experienced by residents and staff. The participants in the larger project were recruited from different areas in Gothenburg, Sweden, to mirror the range of individual variations within a geographically delimited area with similar organisational and political regimens, values, and policies. The executive director for the social support and care of older people assisted in selecting two representative areas of the city with sufficient variation in building types. The larger project was conducted from 2016 to 2018; for a detailed description, see Pettersson et al. (2019).

### 2.1. Material and method

For this specific study, data were gathered through focus groups with staff in home care and home-health care (nurses, occupational therapists, and physiotherapist).

### 2.2. Participants

To capture different staff experiences and opinions, four focus groups were constructed providing home- care (nursing assistants and unskilled staff) and two providing home- and health-care in the two geographic areas. The staff had worked in their respective occupations for varying lengths of time. Thus, the composition of the focus groups followed both homogenous and heterogeneous principals (Krueger and Casey, 2009). For details, see Table 1.

### 2.3. Data collection

Data were collected with explicit attention to group interactions in

which the staff discussed their own perceptions and experiences on the topic and were considered experts on the issue in focus (Krueger and Casey, 2009). The focus group were conducted once in places familiar to the staff. The moderators and co-moderators were all experienced in interviewing and familiar with focus groups. Each focus group was conducted in the same way. The moderator began by explaining the aim of the interviews and participants were invited to ask questions. An interview guide (Patton, 2002), used to ensure that participants discussed issues related to the aim of the study, included questions about the staff's experiences of providing home- and health-care in different rooms with different sizes, proportions, and spatial configurations and what they considered important aspects in the design of new housing. The focus groups lasted from 45 to 59 min and were audio recorded and transcribed verbatim.

### 2.4. Analysis

Applying a thematic analysis, the first author analysed the focus groups according to a method described by Krueger and Casey (2009). Thus, the data were analysed according to the interview questions described in the data collection section. First, the transcripts were read and listened to several times to get an overall sense of the material. Sections that were relevant to the interview questions were identified and categorised, focusing on the meaning emerging from the discussions rather than on individual comments. Finally, all authors agreed on the findings.

### 2.5. Ethical considerations

This study is a part of a larger project approved by the Ethical Review Authority (no. 724–16). The researchers were aware of the ethical dilemma for staff in talking about their work environment considering their loyalty to their employers. All participants signed their informed consent and were assured that all data were confidential and would be presented only on a group level, and not according to a specific workplace.

## 3. Results

The analysis of the focus groups generated rich descriptions of staff experiences according to the aim of the study. The data analysis resulted in three themes: experiences of the rooms' sizes and proportions; experiences of the rooms' spatial configuration; and important aspects to consider in designing new housing, see Table 2.

### 3.1. Experiences of the rooms' sizes and proportions

Across all focus groups, staff described how the rooms' sizes and proportions often caused problems with care interventions that could lead to risks for injuries. Such problems included working in cramped rooms and having to crawl on their knees.

*Experiences of small problematic bathroom* Home-care staff reported that small bathrooms were often problematic work environments. Interventions such as changing diapers and dressings were difficult, and residents using mobility devices were not able to enter with their devices. The one advantage of a small bathroom was that residents could

**Table 1**

Characteristics of participants in six focus groups (n = 25).

Focus group	1	2	3	4	5	6
Number of participants	6	4	5	2	5	3
Gender (women)	6	3	5	2	5	2
Staffs' profession	Home- care	Home- care	Home- care	Home- care	Home-health-care: nurse (1) occupational therapist (2) physiotherapist (2)	Home-health-care: nurse (2) occupational therapist (1)

**Table 2**  
Themes and sub-themes.

Theme	Subtheme	Quotations (examples)
Experiences of the rooms' sizes and proportions	Experiences of small problematic bathroom	<p>P1: Sometimes people with a stair climber or wheelchair go to retirement homes [to] shower ... because there are many [home] bathrooms you can't enter with walking aids [or] a wheelchair; there are often differences in levels.</p> <p>P2: Just like [P1] says, very high thresholds ... very narrow entrances. But it can be advantageous if the bathroom is small, because if patients leave their walking aids outside ... they [use] the furniture and walls for support. So, then it's better to have the bathroom very, very narrow than to have it very big ....</p> <p>P3: Then sometimes it can be a good thing ... if you can't get your walking aid ... into the bathroom, you can put it outside ... and still be close to the toilet and wash basin .... When it's small and a bit narrow, there is something to hold on to ....</p> <p>P1: Of course, it can be difficult if ... the person who's supposed to help has ... no room ...</p> <p>P3: Yes, sometimes it works, but it's not optimal.</p> <p>P1: No.</p> <p>P2: And it's worse if the person needs help from two other people [in] a narrow space.</p> <p>P4: Exactly. (Focus group 5)</p>
	Experiences of equipment in bedroom	<p>P1: ... it might be this thing with uncomfortable beds ... when your working position is bad ... You try to make it as good [as possible] for yourself, too, and [hope] that the patients don't suffer from sitting uncomfortably or laying uncomfortably ... beds are often low ... they don't get higher ...</p> <p>P2: ... I'm thinking of people who have a double bed ... and lie in the middle of the bed.</p> <p>P1: Yeah, yeah.</p> <p>P2: They're not lying to one side, but in the middle ... then 'Okay, but could you move a bit this way?' That becomes more difficult for them, especially when they are affected by fractures or ... with a low bed, is a very uncomfortable working position.</p> <p>P3: ... quite problematic if you come to someone who has a double bed and the equipment ... only works for a single bed.</p> <p>P3: ... The most common is a floor lift, but we ... needed a ceiling lift instead, and in that case it's a housing adaptation. But then there is this thing with the space around the bed, lift, wheelchair. Yes, those things take up space ... at the same time they don't want to make it too much into a care</p>

**Table 2 (continued)**

Theme	Subtheme	Quotations (examples)
Experiences of the rooms' spatial configuration	Experiences of rooms' proportion	<p>environment, but more like it is still their home. (Focus group 6)</p> <p>No quotation for this theme</p> <p>Interviewer: Is there anything you think needs to be close to another, any rooms?</p> <p>P1: Bedroom and bathroom, definitely.</p> <p>P2: Bathroom, bedroom, living room ...</p> <p>P1: ... because it's either the bathroom they go to, or they sit watching TV. No one wants to sit in the kitchen ... those three rooms would be great to have close together.</p> <p>P1: ... if they feel worse, they might not get to the bathroom as often ... it's very easy to become dependent on diapers ... there is nothing else, if you don't install a portable [toilet].</p> <p>P1: Because they don't have the strength to go to the loo.</p> <p>P3: Or they can't fit inside the bathroom.</p> <p>P4: Or they can't.</p> <p>P1: Or yes, they can't. (Focus group 1)</p>
	Important aspects to consider in designing new housing.	<p>P1: ... none of those narrow shower cabins. No, [they] should be about the same as in retirement homes.</p> <p>P2: ... then you can help to wash their hair and scrub their backs without getting wet in the shower cabin.</p> <p>P1: The showers are very tough, really.</p> <p>P3: You have to stand diagonally and wiggle yourself in and then you get wet and ...</p> <p>P1: Alone.</p> <p>P4: Yes, mostly. (Focus group 3)</p>

rely on walls and furnishings for support, which often worked, but only until residents needed care interventions, which is described in the following quote from focus group 5.

P1: Sometimes people with a stair climber or wheelchair go to retirement homes [to] shower ... because there are many [home] bathrooms you can't enter with walking aids [or] a wheelchair; there are often differences in levels.

P2: Just like [P1] says, very high thresholds ... very narrow entrances. But it can be advantageous if the bathroom is small, because if patients leave their walking aids outside ... they [use] the furniture and walls for support. So, then it's better to have the bathroom very, very narrow than to have it very big ....

P3: Then sometimes it can be a good thing ... if you can't get your walking aid ... into the bathroom, you can put it outside ... and still be close to the toilet and wash basin .... When it's small and a bit narrow, there is something to hold on to ....

P1: Of course, it can be difficult if ... the person who's supposed to help has ... no room ...

P3: Yes, sometimes it works, but it's not optimal.

P1: No.

P2: And it's worse if the person needs help from two other people [in] a narrow space.

P4: Exactly.  
(Focus group 5).

Home-care staff and occupational therapists described the importance of having enough room for a shower chair. They explained that many residents needed assistance with showering, and sometimes, because space for the shower in bathroom was too small, staff showered the resident sitting on the toilet instead, despite the risk of slipping. Occupational therapists discussed problems with installing assistive devices, such as toilet chairs with armrests, in small bathrooms. They explained that residents might have to use a portable toilet in the bedroom if it could not be placed less visibly. They also mentioned that although home adaptations could lower thresholds into shower cabins, such adaptations would only work if the outer flooring were waterproof.

Experiences of equipment in bedroom Home-care staff explained that although they get training in patient transfer, the technique they learn is often impossible to use if the bedroom is too small. It did not appear in the interviews that the staff had been affected by work-related injuries. Along with a bed, residents often need a lift and a wheelchair in the bedroom, which further limits the available workspace. Floor lifts are the most common, but rooms are often too small for these; to install a ceiling lift, however, usually requires a home adaptation that must be approved by the municipality. In the focus groups, it became clear that bedrooms were problematic, which is clarified in the following quote from focus group 6.

P1: ... it might be this thing with uncomfortable beds ... when your working position is bad ... You try to make it as good [as possible] for yourself, too, and [hope] that the patients don't suffer from sitting uncomfortably or laying uncomfortably ... beds are often low ... they don't get higher ...

P2 ... I'm thinking of people who have a double bed ... and lie in the middle of the bed.

P1: Yeah, yeah.

P2: They're not lying to one side, but in the middle ... then 'Okay, but could you move a bit this way?' That becomes more difficult for them, especially when they are affected by fractures or ... with a low bed, is a very uncomfortable working position.

P3: ... quite problematic if you come to someone who has a double bed and the equipment ... only works for a single bed.

P3 ... The most common is a floor lift, but we ... needed a ceiling lift instead, and in that case it's a housing adaptation. But then there is this thing with the space around the bed, lift, wheelchair. Yes, those things take up space ... at the same time they don't want to make it too much into a care environment, but more like it is still their home.

(Focus group 6).

The home-care staff described how technical equipment such as a ceiling lift or a height-adjustable bed facilitated work such as transferring older people. They explained that when the bedroom is too small for such equipment, it is impossible to perform care interventions properly. When residents also have a wheelchair in the room or need in-bed care interventions requiring two staff, an even larger bedroom is necessary.

Home-care staff said that residents with a single bed placed close to a wall or a double bed in the middle of the room it was difficult to assist older people to get out of bed. Many residents kept their double bed even if they lived alone or kept their own bed even if a hospital bed was installed, using the other bed as temporary storage. Bedrooms that are too small might also lead to difficulties using mobility devices. Home-care staff emphasised that relatives had an important role in explaining necessary changes and staff needs to residents. For example, when residents need a hospital bed, their own bed must be removed to make room for it, and this is not possible for staff to arrange.

Experiences of room proportions Across all focus groups, staff discussed room proportions and how they sometimes could not perform care interventions in the intended room. For example, when staff had to assist residents with their hygiene and were unable to enter the bathroom, since the best way to overcome such a situation would be to enlarge the bathroom, which was not possible due to the high expenses, the staff were forced, often against the residents' wishes, to help them in

their beds or to use a larger living room as the bedroom. Using a living room as a bedroom also made care interventions requiring water difficult to perform. No matter the room, however, some residents collected so many things such as piles of newspapers, boxes, and extra furniture in their homes, that led to less space and further obstacles were created. In all focus groups, staff said that residents with relatives to help remove furniture facilitated their work in the home.

### 3.2. Experiences of the rooms' spatial configuration

Staff discussed how different rooms should be placed in relation to each other depending on the resident's functional status. Home-care staff expressed the importance of having the bathroom close to the bedroom, because sleeping and going to the toilet are residents' most important tasks to manage. They said that bathrooms are often placed too far from bedrooms, so residents cannot always get to the toilet in time. An example of a bad floor plan was described as a one-room apartment with a sleeping alcove. In such an apartment, the sleeping alcove is often placed as far as possible from the bathroom and entrance. In the focus groups, it became clear that some rooms were more central than others, which is clarified in the following quote from focus group 1.

Interviewer: Is there anything you think needs to be close to another, any rooms?

P1: Bedroom and bathroom, definitely.

P2: Bathroom, bedroom, living room ...

P1: ... because it's either the bathroom they go to, or they sit watching TV. No one wants to sit in the kitchen ... those three rooms would be great to have close together.

P1: ... if they feel worse, they might not get to the bathroom as often ... it's very easy to become dependent on diapers ... there is nothing else, if you don't install a portable [toilet].

P1: Because they don't have the strength to go to the loo.

P3: Or they can't fit inside the bathroom.

P4: Or they can't.

P1: Or yes, they can't.

(Focus group 1).

Home-care staff described the importance of being able to transfer a person between different rooms, for example, transferring a resident who uses wheelchair between the bedroom and the hall or the bathroom. All focus groups agreed that both the bedroom and the bathroom should be close to the entrance. They emphasised their wish to avoid going through the whole apartment to get to the resident in the bedroom. They also explained that staff passing through all the rooms could disturb the residents' relatives. They described bedrooms as very private. Although they performed several interventions in bedrooms, staff recognised those rooms as very private and recommended that there be a second bedroom for the resident's partner to withdraw to. It became clear that passing different rooms was problematic as discussed in focus group 4.

P1: Then you have to go through the whole house.

P1: ... you have to go through it all and then maybe up to the second floor, because the person is up there in the bedroom ... through the hall and kitchen and living room ...

P2: That entails then ... you are very respectful, like how you act as staff, that you pay attention to it.

P1: Yes, but some can be far off from the bedrooms, too, yes.

(Focus group 4).

Describing some aspects of spatial layouts, home-care staff preferred an open layout, since fewer thresholds facilitated their work and residents using a rollator could walk around freely. Another advantage cited of an open layout was that it made it easier for a person with dementia to find the toilet, as described in the following quote from focus group 1. These advantages, however, were sometimes negated when residents put up shelves and other objects to create walls.

P1: ... the way you say that it ought to be, maybe more open floor plans to make it easier.

P2: I think some of the older people would benefit from that too ... I can speak for mine [care recipients], who can sometimes forget where the toilet is. It would have been simpler if it was easy to see it [the toilet]. Not having it in a corridor and two doors away, but more that it shows.

(Focus group 1).

Across all focus groups, staff described having problems with important rooms such as bedrooms, bathrooms, and kitchens being located on different levels. The frequent location of the laundry room in the basement was another hurdle, making staff run up and down stairs with the washing.

### 3.3. Important aspects to consider in designing new housing

Home-care staff reported that large bathrooms designed for people with disabilities have enough space for both residents and staff, which in turn facilitates their work. Narrow shower cabins were described as awkward, and staff wanted these to be as large as they are in nursing homes, which is clarified in the following quote from focus group 3.

P1: ... none of those narrow shower cabins. No, [they] should be about the same as in retirement homes.

P2: ... then you can help to wash their hair and scrub their backs without getting wet in the shower cabin.

P1: The showers are very tough, really.

P3: You have to stand diagonally and wiggle yourself in and then you get wet and ...

P1: Alone.

P4: Yes, mostly.

(Focus group 3).

Home-care staff said both residents and staff have problems entering bathrooms or toilet rooms with high thresholds, especially when residents use wheelchairs. They also recommended requested larger halls to accommodate their outerwear and described problems with narrow elevators with inadequate space for wheelchairs and staff. They feared people who use large wheelchairs risked getting stuck in such elevators and recommended 10–20 cm extra space in the elevators of future housing. They also found that code locks to entrance doors in newly built houses were difficult for both staff and residents. They recommended that balconies or patios have wide door openings for wheelchairs or walkers because many residents used the alarm when they had fallen on the balcony. Convenient storage for assistive devices such as rollators is important for residents to be able to get out by themselves. Rollators were sometimes stored in staircases or landings outside the apartment; when this was not allowed, some residents stored them in the basement, meaning that staff had to carry the equipment up and down stairs. Home-care staff also described the importance of having powered wheelchairs stored in a specific accessible garage to allow residents to get out independently.

Home-care staff felt that insufficient electrical outlets in residents' homes made it difficult to carry out their work. For example, several assistive devices require outlets, and when they are missing or distant, staff must use extension cords, which make cleaning more difficult and may lead to a risk for stumbling. Home-care staff and nurses also discussed insufficient lighting in bedrooms, halls, and living rooms, which added to the difficulty of performing care interventions. Mobile floor lifts in use could also easily bump against hanging ceiling lights. Staff suggested built-in lighting as a good solution.

Slippery floors were especially problematic in bathrooms; staff also suggested that hard floors could be covered with shock-absorbent material. Home-care staff feared stumbling on loose carpets, tripping at entrances, and falling on slippery stairs. Home-care staff described problems with stairs and emphasised the importance of rails on both sides and the greater ease of using straight stairs than curved.

Staff reported that although housing adaptations to lower kitchen counters enabled residents to perform activities, as residents' abilities declined, staff were left to carry out kitchen activities at an uncomfortable height. Physiotherapists also said that they often used stable

kitchen counters as training equipment. Staff emphasised that custom kitchens should be height-adjustable. Home-care staff also recommended self-flushing toilets to support residents' ergonomic posture, standard door dimensions to ease difficulties passing through with wheelchairs, and sliding doors or mobile doors that could be removed if necessary. At the same time, they understood that heavy doors are necessary in case of fire. In the focus groups, it became clear that door were problematic, which is clarified in the following quote from focus group 3.

P1: I would really like that kind of door ... going inwards that there used to be before.

Everyone: Sliding doors.

P1: Yes, instead of regular doors. Because they take up quite a lot of space. They [sliding doors] do exist for bathrooms, too.

P2: I also think that's good.

P1: And also for closets it's often needed now, sliding doors for newbuilt.

P3: The only thing I've heard about sliding doors is that if you have dementia, then you have some difficulties understanding the function, then you stand there and pull the sliding door.

P4: ... if you think 50 years ahead .... then you don't know how to open a regular door.

P4: Then you try to slide the doors up instead, when it doesn't work. (Focus group 3).

Across all focus groups, staff described lack of storage as a common problem and said some homes looked like hospitals, with diapers and health-care materials piled up in the bedroom. Residents usually received diapers in larger quantities than they wanted to have at home and had difficulty storing these packages; putting them under the bed, however, made cleaning difficult. The nurses also emphasised the lack of storage surfaces important for performing wound dressing in bedrooms, which they saw as an aesthetic issue. Staff suggested built-in wardrobes with the capacity to store all the materials, as discussed in focus group 2.

P1: They have them [bandage material, diapers] at home, in the closets.

P2: We threw them in some closet somewhere ...

P2: ... but it also depends completely on how much care the care recipient needs ... you try to put it away to avoid having it all out. But then it comes out anyhow and then there are lots of things ...

P1: It would be better with built-in closets.... It would look better, too, aesthetically.

P2: Yes, absolutely.

(Focus group 2).

## 4. Discussion

As aimed to be explored by the present study, the findings reveal staff experiences of challenges in performing home- and health-care for older people living in ordinary housing. Ageing often reduces people's functions and activities (Day et al., 2000; Wahl et al., 2012) and may lead to increasing accessibility problems and subsequent home- and health-care needs for residents in ordinary housing. Rather than move all ageing people into assisted living residences, often against their will, it seems preferable to allow as many ageing people as possible to age in place in their own homes.

This descriptive study revealed several problems faced by staff in home- and health-care when performing care interventions for older people living at home. Different room layouts, particularly of bedrooms and bathrooms, led to difficulties in providing care. Although small bathrooms were described as helpful for residents who could be supported by the walls, they were disadvantageous for people using mobility devices and staff providing care interventions. People who use mobility devices often start by using a cane and later move to more advanced devices (Pettersson et al., 2012). Small bathrooms then become inaccessible to people as they begin using rollators or wheelchairs, which may force staff to perform care interventions elsewhere,

such as in the bedroom. Since most bedrooms are not designed for care interventions, this may complicate care administration.

Staff discussed problems with using lifts in bedrooms and suggested that ceiling lifts would be helpful in smaller bedrooms. This is particularly notable, since according to the Swedish legislation on housing adaptation (SFS 1992:1574), if the need can be met with equipment from the municipality or county council according to the *Health and Medical Act* (SFS1982:763), the resident cannot be granted a housing adaptation. This is problematic since a ceiling lift is considered a work environment issue, while housing adaptations are aimed to assist residents. In addition, although home-care staff are trained in lifting and transfer techniques, the techniques they learn are often impossible to use in bedrooms as small as those usual in ordinary housing. This evidence is important for decision makers, architects, and planners to understand the consequences of the ageing-in-place principle. Ahrentzen and Tural (2015) state that architects, housing providers, and policy makers need valid and reliable information on which to construct their plans and policies. A report on safer personal transfers recently published by the Swedish Work Environment Authority (Wåhlin et al., 2019) for health-care employees concluded that health-care staff perform fewer manual lifts and use equipment such as ceiling lifts if they get the proper training. However, the findings demonstrate that room size is vitally important; small overfurnished bedrooms and two or more staff in the same room can lead to problems with using lifts. To enable a safe working environment, it is important to facilitate interventions by creating conditions such as larger bedrooms or installing ceiling lifts rather than floor lifts.

More health-care activities now take place in ordinary homes. However, as early as 2008, the National Board of Health and Welfare stated in an evaluation that home and health care was suffering a shortage of skilled staff (National Board of Health and Welfare, 2008). The increasingly ageing population in most developed countries requires multiple solutions to ensure the health and safety of home- and health-care staff. Society has much to gain from efforts directed towards ordinary housing to enable ageing in place and prevent moves to assisted living. The findings make an important contribution towards the development of functionally sustainable housing that minimises occupational injuries in home- and health-care for older people.

The findings show that residents often keep their own bed even if they get a hospital bed, leading to staff difficulties in providing care interventions due to insufficient space in bedrooms. Since many residents do not wish to remove the old unused bed or do not have relatives who can assist in its removal, it would be valuable if municipalities could provide this service. The findings also show that relatives have an important role in explaining necessary changes, such as refurbishing, to residents. However, Taylor and Donnelly (2006) found that some relatives do not accept the changes that home- and health-care staff ask for. This highlights the importance of informing residents and relatives about staff work conditions and environments. According to the *Law on Working Conditions* (SFS, 1977:1160), the employer is responsible for the employees' safety and health in any specific working environment, while other laws regulate the individual's right to home- and health-care in ordinary housing. Hence, the employer in the home- and health-care is responsible for finding solutions that consider both employee safety and individual rights.

Staff do not want to disturb relatives by walking through the home to get to the resident. This is in line with Borgstrand and Berg (2009), who argued that receiving care at home strengthens residents' privacy and integrity more than living in an institution. Relatives, however, may feel that their home now looks like a health-care facility. According to Lindahl et al. (2010), it can be difficult to maintain a normal family life in a home full of technical equipment and staff coming and going. Hauge and Heggen (2008) point out privacy and control as the main positive characteristics of a home, and both of these are negatively affected in a home-care situation. On the other hand, it is common to relate a place to home, even in hospital environments (Lindahl and Bergbom, 2015;

Andersson et al., 2019).

Staff in the present study emphasised the importance of having the bathroom close to the bedroom to support the essential functions of independent sleeping and toileting. They noted, however, that bathrooms are often placed far from bedrooms, making it difficult for residents to get to the toilet in time and leading to the use of either unnecessary containment products at night or a portable toilet in the bedroom. This is particularly notable in light of the world-wide implementation of a person-centred approach to improve quality of care and quality of life for residents (Wijk et al., 2018) while improving the quality of working life for staff (Edvardsson et al., 2011). As explained by Clapton and Kendall (2002), autonomy involves the ability to choose one's own activities. The findings in the present study show that staff moving throughout the home raises concerns about the privacy and integrity of the home's residents.

The findings revealed important improvements to be made when renovating existing housing or designing new housing. For example, since many residents needed assistance in the shower, the shower area must accommodate at least one but preferably two, staff members as well as the resident. The ability to help residents shower at home may prevent trips to a nursing home for showering, avoiding both inconvenience for the resident and extra costs for travelling and staff. If enough space in the shower area is included in plans for renovations or housing adaptations, additional adaptations may not be necessary.

Turning to methodological issues, different aspects of homogeneity and heterogeneity were accounted for in the recruitment process (Krueger and Casey, 2009). By describing experiences among nurses, occupational therapists, physiotherapists, and home-care staff, the present study generated a deeper understanding of various experiences among different staff groups. Although some evidence was found for different experiences, the findings should not be generalised to all staff groups. However, given the careful sampling procedure and the consideration of homogeneity and heterogeneity in constructing the different focus groups, the findings might be transferable to similar populations. A limitation of the study might be the small focus groups, which could have limited the range of experiences elucidated (Krueger and Casey, 2009); however, the discussions were lively, as shown by the quotations, which is more important than the number of participants (Ivanoff et al. (2002). The moderator and co-moderator represented the same disciplines as some of the participants in the focus group; therefore, the pre-understandings of the researchers must be considered when interpreting the findings.

#### 4.1. Future studies

This paper suggests some directions for further research. Researchers must gain greater access to care situations in ordinary housing. More research is needed into the forces driving older people to either stay or move and which features in the physical environment finally determine their decisions. More research is also needed into how organisational factors affect staff working conditions and how the regulatory system can reasonably adapt to create better work environments. Finally, more research into patient-centred care in relation to organisational cooperation, synergies, and systemic health-care issues is urgently called for.

## 5. Conclusion

The present study showed that staff have several difficulties providing home- and health-care to older people living at home. Nurses, occupational therapists, physiotherapists, nurse assistants, and home-care staff described their problems with the physical environment. The study contributes new knowledge on health-care architecture valuable to decision makers, architects, and planners in understanding the consequences of the ageing-in-place principle in ordinary housing. Such knowledge is vitally important to ensure a safe workplace for staff in home- and health-care as well as age-friendly ordinary housing for older

people.

## Funding

This study was supported by the Formas 2016–17 [2015-3493-29465-112], Integrative Ways of Residing: Health and Quality of Residence Architectural Inventions for Dwelling, Ageing and Healthcaring at Chalmers University of Technology and Örebro University.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Acknowledgement

The authors thank the participants in this study for taking the time to participate in the focus groups discussions.

## References

- Ahrentzen, S., Tural, E., 2015. The role of building design and interiors in ageing actively at home. *Build. Res. Inf.* 43, 582–601.
- Andersson, M., Fridh, I., Lindahl, B., 2019. Is it possible to feel at home in a patient room in an intensive care unit? Reflections on environmental aspects in technology-dense environments. *Nurs. Inq.* 26, 1–10.
- Beer, J.A., McBride, S.E., Mitzner, T.L., Rogers, W., 2014. Understanding challenges in the front lines of home health care: a human-systems approach. *Appl. Ergon.* 45, 1687–1699.
- Borgstrand, I., Berg, L., 2009. Next-of-kin experiences from a palliative home nursing team [in Swedish: Närstående erfarenheter av ett palliativt hemsjukvårdsteam. *Vård i Norden* 95, 15–19.
- Clapton, J., Kendall, E., 2002. Autonomy and participation in rehabilitation: time for a new paradigm? *Disabil. Rehabil.* 24, 987–991.
- Craven, C., Byrne, K., Sims-Gould, J., Martin-Matthews, A., 2012. Types and patterns of safety concerns in home care: staff perspectives. *Int. J. Qual. Health Care* 24, 525–531.
- Day, K., Carreon, D., Stump, C., 2000. The therapeutic design of environments for people with dementia: a review of the empirical research. *Gerontol.* 40, 417–421.
- Edvardsson, D., Fetherstonhaugh, D., McAuliffe, L., Nay, R., Chenco, C., 2011. Job satisfaction amongst aged care staff: exploring the influence of person-centered care provision. *Int. Psychogeriatr.* 23, 1205–1212.
- Freshwater, D., 2007. Reading mixed methods research: contexts for criticism. *J. Mix. Methods Res.* 1, 134–146.
- Government of Sweden, 1977. Law on working conditions 1977:1160 [in Swedish: arbetsmiljölagen: 1977:1160]. [https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/arbetsmiljolag-19771160\\_sfs-1977-1160](https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/arbetsmiljolag-19771160_sfs-1977-1160).
- Government of Sweden, 1982. Swedish health and medical services act 1982:763 [in Swedish: hälso och sjukvårdslagen 1982:763]. [https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/halso-och-sjukvardslag-1982763\\_sfs-1982-763](https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/halso-och-sjukvardslag-1982763_sfs-1982-763).
- Government of Sweden, 1992. Swedish act concerning housing adaptation grants 1992:1574 [in Swedish: lagen om bostadsanpassningsbidrag 1992:1574]. [https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-1992-574-om-bostadsanpassningsbidrag-m-m\\_sfs-1992-1574](https://www.riksdagen.se/sv/dokument-lagar/dokument/svensk-forfattningssamling/lag-1992-574-om-bostadsanpassningsbidrag-m-m_sfs-1992-1574).
- Groat, L., Wang, D., 2002. *Architectural Research Methods*. Wiley.
- Hauge, S., Heggen, K., 2008. The nursing home as a home: a field study of residents' daily life in the common living rooms. *J. Clin. Nurs.* 17, 460–467.
- Hignett, S., Otter, M.E., Keen, C., 2016. Safety risks associated with physical interactions between patients and caregivers during treatment and care delivery in home care settings: a systematic review. *Int. J. Nurs. Stud.* 59, 1–14.
- Ivanoff, S.D., Sonn, U., Svensson, E., 2002. A health education program for elderly persons with visual impairments and perceived security in the performance of daily occupations: a randomized study. *Am. J. Occup. Ther.* 56, 322–330.
- Kalman, H., Andersson, K., 2014. Framing of intimate care in home care services. *Eur. J. Soc. Work* 17, 402–414.
- Krueger, R.A., Casey, M.A., 2009. *Focus Groups: A Practical Guide for Applied Research*. Sage Publications.
- Lindahl, B., Bergbom, I., 2015. Bringing research into a closed and protected place: development and implementation of a complex clinical intervention project in an ICU. *Crit. Care Nurs. Q.* 38, 393–404.
- Lindahl, B., Lidén, E., Lindblad, B.M., 2006. A meta-synthesis describing the relationships between patients, informal caregivers and health professionals in home-care settings. *Health Risk Soc.* 8, 239–256.
- Markkanen, P., Quinn, M., Galligan, C., Sama, S., Brouillette, N., Okyere, D., 2014. Characterizing the nature of home care work and occupational hazards: a developmental intervention study. *Am. J. Ind. Med.* 57, 445–457.
- Patton, M.Q., 2002. *Qualitative Research & Evaluation Methods*. Sage Publications, London.
- Pettersson, C., Malmqvist, I., Gromark, S., Wijk, H., 2020. Enablers and barriers in the physical environment of care for older people in ordinary housing: a scoping review. *Journal of Aging and Environment* 1–19.
- Pettersson, C., Malmqvist, I., Gromark, S., Wijk, H., 2019. Study protocol: the physical environment and home healthcare services: the development and content of a study protocol to explore enablers and barriers for the delivery of home healthcare services. *Nordic Journal of Architectural Research* 31, 105–122.
- Pettersson, C., Löfqvist, C., Fänge, A.M., 2012. Clients' experiences of housing adaptations: a longitudinal mixed-methods study. *Disabil. Rehabil.* 34, 1706–1715.
- Statistics Sweden. The future population of Sweden 2016–2060 [in Swedish: sveriges framtida befolkning 2016-2020]. [https://www.scb.se/contentassets/776c88485b1d4d34bf33c36a1bde4565/be0401\\_2016i60\\_sm\\_be18sm1601.pdf](https://www.scb.se/contentassets/776c88485b1d4d34bf33c36a1bde4565/be0401_2016i60_sm_be18sm1601.pdf).
- Swedish Association of Local Authorities and Regions [in Swedish: Sveriges kommuner och landsting]. <https://skl.se>.
- Wahl, H.W., Iwarsson, S., Oswald, F., 2012. Aging well and the environment: toward an integrative model and research agenda for the future. *Gerontol.* 52 (3), 306–316.
- Wählin, C., Stigmar, K., Nilsing Strid, E., 2019. Safe patient handling. Interventions in the working environment for employees in healthcare [in Swedish: kunskapssammanställning 2019:6 Säkrare personflyttningar Åtgärder i arbetsmiljön för medarbetare inom hälso- och sjukvård samt omsorg]. <https://www.av.se/globalassets/filer/publikationer/kunskapssammanstallningar/sakrare-person-flyttningar-rap-2019-6.pdf>.
- Wijk, H., Corazzini, K., Kjellberg, I.L., Kinnander, A., Alexiou, E., Swedberg, K., 2018. person-centered incontinence care in residential care facilities for older adults with cognitive decline: feasibility and preliminary effects on quality of life and quality of care. *J. Gerontol. Nurs.* 44, 10–19.
- Wipfli, B., Olson, R., Wright, R., Garrigues, L., Lees, J., 2012. Characterizing hazards and injuries among home care workers. *Home Healthc. Nurse* 30 (7), 387–393.