

Post-occupancy evaluation of small-scale group-living in larger scale nursing homes

Pauline Mourits, Msc

Researcher

Company:

TNO

Dutch Centre for Health Assets

Kampweg 5

3769 DE Soesterberg

The Netherlands

pauline.mourits@tno.nl

Post-occupancy evaluation of small-scale group-living in larger scale nursing homes

Abstract: Long term, institutional care in the Netherlands is increasingly organised in small-scale homelike care concepts. Ideally, a group-living home is located in an archetypical house and both the physical environment and the care offered combine to create a homelike setting. Nursing home administrators often choose to realize group-living home care within larger scale nursing homes because of cost effectiveness and the ease with which indoor facilities can be provided. Studies investigating small-scale living facilities have mainly focused on its effects compared to traditional nursing homes. However, little research has been done on the experiences with small-scale group-living in larger scale nursing homes and the design of these new care settings. The aim of this study was to evaluate how the physical environment was experienced by residents, family members of residents, and staff, in nursing homes where small scale group-living care is provided. A post-occupancy evaluation of two nursing homes was undertaken, using interviews with management, floor plan analyses, document studies, and a questionnaire survey among residents, their family members, and staff. Results indicate that the *grand café* in both nursing homes is highly valued by residents, family of residents and staff. However, although the users value the group homes within the nursing homes, there were concerns about the design and layout of the buildings. In order to combine the advantages of small-scale group-living and larger scale nursing homes, the emphasis during the building process should be on a homelike character for residents with dementia and more privacy for residents with chronic diseases and disabilities. Within the context of this study, post-occupancy evaluation appears to be a useful instrument to gather valuable information from, sometimes frail, users of healthcare facilities to inform future design decisions.

Keywords: architecture, group-living, nursing home, physical environment, post-occupancy evaluation, small-scale care environments

Introduction

The population of the Netherlands is ageing rapidly. The majority of older people, even with chronic diseases, disabilities, and dementia, live at home. Although most older people want to live at home as long as possible, institutional care is sometimes the best, or indeed the only solution. In 2008 a total of approximately 165,000 older people in the Netherlands lived in residential care or nursing homes, about 100,000 in care homes and 65,000 in nursing homes. This is equivalent to around 6% of the Dutch population aged over 65. The dependency level of older people living in residential homes has been rising; with an increase in average age of residents and amount of care they received (de Klerk 2011). The physical environment is particularly important to older people living in residential and nursing homes because their life is largely spent within the walls of the home and some never get outdoors (den Draak 2010). Because residents of care homes depend on the surrounding environment to provide home comforts for all aspects of everyday life, the design of care buildings is of crucial importance to them.

Both scientific research and professional practice literature now acknowledge the influence that architecture and design can have on both the well-being of the residents and the quality of care by staff in residential and nursing home settings (Barnes, 2002). Therapeutically designed environments can improve residents' quality of life and staff morale (Parker, et al., 2004), as well as reduce neuropsychiatric symptoms (Bicket, et al., 2010) and, as shown in a dementia care setting, may be conducive to visiting (Cioffi, et al., 2007). Nursing homes have traditionally followed a medical model. In recent decades these care settings have moved towards a psychosocial model, including efforts to deinstitutionalize the environment (Dröes, et al., 2006). In the Netherlands, nursing home

design has moved away from long, double-loaded corridors and multi occupancy resident rooms. The government of the Netherlands actively stimulates the construction of small-scale group-living homes, at most 24 residents, especially for people with dementia. The vast majority of new homes are being built to this pattern. Small-scale homelike facilities are facilities in which a small number of residents live together in a homelike environment, residents participate in daily household chores and the nursing staff is part of the household (Verbeek, et al., 2009). Ideally, a group living home is located in an archetypical house (te Boekhorst, et al. 2009). Nursing home administrators often choose to realize group-living home care within larger scale nursing homes because of cost effectiveness and the ease with which indoor facilities, activities and services can be provided.

To date, there has been little systematic research into the design of residential and nursing homes for older people. Assessing the outcomes of building design and establishing how it is working in practice can also be referred to as a post-occupancy evaluation (Barnes, 2002).

A post-occupancy evaluation, POE, is the process of evaluating buildings in a systematic and rigorous manner after they have been built and occupied for some time (Preiser, Rabinowitz and White, 1988). Lessons learned from a post-occupancy evaluation may be used by the organization to improve the building itself but also in the planning stages of future projects. A post-occupancy evaluation should ideally be part of the building process. After a building has been taken into use, the evaluation results can be used to inform the brief and the design of new buildings. This is particularly important for large organisations that develop multiple buildings of the same type. POEs are particularly informed by users' needs, preferences and experiences (van der Voordt and van Wegen, 2002). When designing a new nursing or care home, users' needs are almost always taken into account. In the Netherlands, all healthcare facilities have a patient's advisory council. Through a POE, users experiences can be collected in a systematic manner. To collect useful feedback from users of the building, the processes used should contain a mix of quantitative and qualitative data collection and analysis (Carthey, 2006). According to van der Voordt and van Wegen (2002) relevant evaluation themes found in literature are:

- functional aspects, i.e. accessibility, effectiveness, social safety, spatial orientation, privacy and social contact, physical well-being;
- aesthetic aspects i.e. beauty, originality;
- technical aspects, i.e. fire security, sustainability;
- and economic and judicial aspects, i.e. budget, costs of investment, running costs.

Post-occupancy evaluations of nursing homes are scarce (Cutler and Kane, 2009) and little is known about the experiences of residents, relatives and staff with these modern large scale facilities.

This paper is concerned with the architectural design and physical environment provided by nursing homes for older people, and the satisfaction of residents, staff and family members with their living and working environment.

Setting

The study was performed in two nursing homes in the Netherlands, the *Zonnehuis* in Zwolle and the *Ingelanden* in Utrecht. The *Zonnehuis* has been in use since 2007 and is a 3 storey, 172 bed nursing home. The new *Zonnehuis* replaced an older nursing home at another location. Residents and staff moved from the old home to the new one. The *Ingelanden* was completed in 2008 and is a 5 storey building for 96 residents. All residents and staff were new to the nursing home after its construction. Both nursing homes provide dementia care, nursing care, rehabilitation and day care.

Methods

In this study, interviews with management, floor plan analysis and document studies and a questionnaire survey among residents, family members of residents and staff, were used. The management of the *Zonnehuis* requested the involvement of visitors and volunteers in the questionnaire survey, because of their importance to the functioning of the nursing home.

Data collection and analysis

Data were collected via questionnaires, semi-structured interviews, floor plan analysis and document studies.

Questionnaires

The questionnaires for residents, family of residents with dementia, staff and, in the *Zonnehuis*, volunteers and visitors contained questions regarding their satisfaction with their physical environment. The environment was defined to include the building, the outdoor spaces and the location of the building in the neighbourhood. The questionnaire for residents and family members contained 81 questions, for staff and volunteers 85 questions and for visitors 58 questions. Items were clustered around the main themes based on the themes mentioned by van der Voordt and van Wegen (2002): accessibility of the location, accessibility of the building, effectiveness, safety, spatial orientation, privacy and social contact, indoor climate and aesthetic aspects. All items were rated on a five-point Likert scale, ranging from totally disagree (1) to totally agree (5). All themes ended with the opportunity for respondents to comment to the theme. Further open questions were used to ask participants to name their most and least favourite part of the building. Participants were also asked to grade the building on a scale from 1 (very poor) to 10 (outstanding). Finally, background characteristics of age, gender, and for staff their position (nursing, paramedical, secretarial, food service and maintenance and managerial) were collected.

In total, 475 users of both buildings completed the questionnaire. The questionnaire survey was held among residents (n=37), next of kin of residents (n=81), staff (n=228), volunteers (n=72) and people who visited the nursing home to visit a friend or relative, to use the restaurant, or for physical therapy (n=57). Means were calculated for each item. Answers to the open ended questions were grouped into categories to reveal common patterns, similarities and themes. The results of the qualitative data analysis are discussed in this paper, the results of the quantitative data analysis are published elsewhere.

Interviews

Semi-structured interviews were held with administrators (n=2) and managers (n=5). Interviews were held after the results of the questionnaire were known to verify important outcomes. A topic list was used to structure the interview. All interviews were transcribed afterwards and answers to the same questions were combined and could be compared to each other and to the results of the questionnaire.

Floor plan analysis and document studies

The briefs, floor plans and photographs were systematically studied, assessing the surroundings of the building, building layout, entrances, spatial configuration, room sizes, use of colour and materials etc.

Results

First, the results of the floor plan analysis and document studies are presented. Subsequently, results from the questionnaires and interviews are presented. Participants' characteristics are given and participants' satisfaction with aspects of the environment is given, clustered around the main themes.

Site

The old *Zonnehuis* was located between an access road and a highway and was not embedded in a residential area. The organization wished to integrate the nursing home into a residential district, so that nursing home residents could stay in contact with normal daily life, and the neighbourhood could share the facilities of the nursing home. Searching for a new location led to a new suburb, an expansion area to meet regional needs for housing. Most houses in this neighbourhood are occupied by young families. The old location was sold with a profit but because of high land prices the new location is much smaller. There is a car park in front and behind the building.



Figure 1. The entrance to the nursing home Zonnehuis, Zwolle

The *Ingelanden* is located in a more urban district, an extension of the city of Utrecht and the largest housing and industrial development site in the Netherlands. Each neighbourhood of this district will have its own identity according to the urban development plan made by the municipality. The neighbourhood in which the *Ingelanden* is situated is located next to the railway. The neighbourhood will have an urban look due to a high building density, on average 5 to 8 stories high. The municipality assigned a small lot to the organization, which was to include both the building and the parking facilities. To maximize space, indoor parking was realized with a roof terrace on the first floor.



Figure 2. Façade of the Ingelanden, Utrecht

Both sites still served as large construction areas during the POE. Because of the financial crisis construction projects were delayed and some sites in the immediate surrounding were still barren.

Building

The *Zonnehuis* consists of two intersecting buildings enclosing two courtyard gardens. Lifts and stairwells are found at the intersections. The intersecting building components create a relatively large amount of surface area. The position of the window takes into account the sun's position. Horizontal windows in the façade facing the south and southwest provide a view but regulate incoming sunlight. The windows in the façade facing the northeast are vertical allowing for as much daylight as possible. The complex has two residential wings, one for residents with dementia and one for rehabilitation, long term care and palliative care (further on referred to as somatic care). The residential wings are divided into 'houses'. There are 14 houses for people with dementia, most designed with 8 private rooms along a single corridor, a living room with open kitchen and two bathrooms. The houses are accessed from the intersections, where most living rooms are located, making them quite dark. Residents can freely exit their house to the hallway, an electronic key is necessary to enter into the building. An office and a multifunction room can also be found at the intersections. Most living rooms, but not all, have direct access to a terrace. The main entrance gives access to the central area. This combines the reception area, a café and a restaurant with different seating areas. This area is open to the public. Other facilities include a hairdresser, a shop and a therapy pool. The adjoining church is accessible to residents, even if they are bedridden. To facilitate way finding, each wing of the building, and within these each house, has its own colour floor, chosen by the architect. The doors of the service areas are grey, and the doors of the residents' rooms feature the specific 'house colour'. The façade of the building consists of grey/brown slate and light cream stucco. The building is heated and cooled by means of concrete core activation. Further, the building is equipped with a sprinkler system, which is exceptional in an elderly care facility.



Figure 3. Ground floor of the Zonnehuis Zwolle

The *Ingelanden* is a 5 storey building. Located on the ground floor are a large foyer with the reception, a shop and seating area, a day care centre and indoor parking. From the foyer a single staircase leads to the *grand café* with an adjoining roof terrace. The upper storeys are identical, accommodating 2 houses for dementia care and 2 houses for somatic care. Most houses consist of 8 private rooms along a double corridor and a living room with an open kitchen. Bathroom provision varies; there are 2 bathrooms in the houses for people with dementia and 3 bathrooms in the houses for somatic care. The building is divided into two wings, each with a lift. On the upper storeys, the lift opens into a hallway with front doors to two houses. Residents can enter into this hallway, but use of the lift by residents with dementia is discouraged as two buttons have to be pushed simultaneously. Because the location is close to a highway and the railway, the eastern and southern façade are ‘deaf’. The windows in this façade may not be opened. The upper storeys form an L, protecting the roof terrace and the corridors at the back of the building from the noise. All rooms have a French balcony. The façade consists of dark brown masonry. The building is heated and cooled by means of concrete core activation.



Figure 4. First floor and floors 2 to 4 of the Ingelanden Utrecht

Rooms

In the *Ingelanden*, all residents rooms are 15 m², which was the minimum according to building codes at the time of the planning stage. Residents with dementia are encouraged to bring their own furnishings. High/low beds are provided by the nursing home. The bedrooms for somatic care are completely furnished. The *Zonnehuis* has different bedroom sizes for residents with dementia; 16 m² and somatic care; 18 m². All bedrooms feature a built-in closet and a washbasin. High/low beds are provided. Residents can bring their own chair and some small furnishings. The bedrooms in the rehabilitation units are completely furnished.

Table 1. Characteristics of the nursing homes

	<i>Zonnehuis</i>	<i>Ingelanden</i>
Ground area	16.100 m ²	2.700 m ²
Gross floor area	14.300 m ²	7.300 m ²
Living rooms	50-60 m ²	54-57 m ²
Living room area per resident	6.5 m ²	7 m ²
Bedrooms	16-18 m ²	15 m ²
Bathrooms	2 per 8 residents and 1 per 2 residents	2 per 8 residents and 3 per 8 residents

Table 2. Participants characteristics for questionnaires. In the *Ingelanden* visitors and volunteers were not included in the questionnaire survey.

<i>Residents</i>	<i>Zonnehuis</i>			<i>Ingelanden</i>	
	Residents with dementia	Somatic clients	Visitors	Residents with dementia	Somatic clients
Average age	82	71	76	85	61
Female	66%	63%	61%	85%	50%
Uses a	39%	30%	26%	60%	20%

walking frame					
Uses a wheelchair	53%	81%	18%	40%	100%
Staff and volunteers	Zonnehuis			Ingelanden	
	Staff		Volunteers		Staff
Average age	41		62		37
Female	92%		67%		89%

Results of the questionnaires on satisfaction with the aspects of the nursing home environment are presented around the main themes.

Accessibility of the location

Aspects of this theme were the accessibility of the nursing home, parking facilities and public transport. Staff was asked how they came to work, as this might influence their opinion on the accessibility of the location. Staff most often come by car, second by bicycle and third by public transport. In general, respondents were positive about the accessibility of the nursing homes. Because of the location of the buildings in a new suburb, comments were made about both the buildings being hard to find. The location cannot, yet, be found by car navigation systems. Suggestions were made for signs alongside the roads, to show the way. Staff in both facilities regarded the accessibility by public transport to be inadequate, which may be a reason why most staff come by car. Among users of the *Ingelanden*, criticisms were made about the building being unrecognizable, with no name on the building. The entrance of the *Ingelanden* is at the back of the building and cannot be seen from the road. It is not obvious for visitors where to enter the building. A sign by the road leading to the nursing home was missed. At the *Zonnehuis*, parking facilities were regarded as inadequate by all users, but especially by family members of residents with dementia. It is hard to find a parking space, especially in the afternoon. Users indicate the car park behind the building is poorly indicated. According to management, parking facilities are adequate. Staff should park behind the building, although they do not always do so.

Lastly, comments were made about a bicycle park, which is altogether missing at the *Ingelanden* and without shelter at the *Zonnehuis*.

Accessibility of the building

Respondents were asked if they were of opinion that people, even when disabled, could easily move through the building. The accessibility for wheelchair and walking frame users was assessed. In general, respondents were satisfied with the accessibility of the buildings, though there were comments in both facilities. In the *Zonnehuis*, the terraces are not accessible for wheelchairs or beds. Staff has to push people over the threshold, which is difficult. Staff was most concerned with this aspect. Terraces could be slippery when wet. In the *Ingelanden* the terraces were viewed as hard to reach for disabled people, especially for residents with dementia. These residents cannot go outside independently. Respondents of the *Ingelanden* indicated that the doors to the houses are too heavy and cannot be opened by residents without assistance from others. But even for someone pushing a wheelchair it can be difficult to open the door. In the *Zonnehuis* the doors were also mentioned. When using an automatic key and doors coming towards users, this could be a problem for people in a wheelchair.

Effectiveness

This theme aimed to establish whether the building suited the purpose for which it was intended, i.e. housing of older people and providing care for them. Staff was asked whether the building allowed them to do their job properly. All users were asked their opinion on the availability and size of spaces. Staff commented positively on the building as a working environment.

Living rooms and residents' rooms were, in general, assessed as being adequately sized, although a large proportion of staff thought the living rooms in both facilities were too small if many of the residents needed to use wheelchairs. The manager of the *Ingelanden* added that in houses with many wheelchair users, all homely furnishings had to be removed from the living rooms. In the *Zonnehuis* comments were made about the living rooms not providing enough space for bedridden residents. An exception to the general satisfaction was somatic residents and nursing staff in the *Ingelanden*, judging residents' rooms as being too small. In both facilities comments were made about the total living space of residents with dementia, most of whom may not move around inside the building freely. Some respondents thought residents with dementia could have profited from more space.

The respondents were satisfied regarding the provision and size of bathrooms. Though management of the *Ingelanden* would have liked to provide private bathrooms, the sharing of bathrooms does not seem to be a concern for users.

According to the participants, there are ample spaces inside the building for activities. The somatic residents in the *Ingelanden* were especially positive.

Staff from the *Zonnehuis* missed having a garden. They felt nostalgic for the garden at the old nursing home. Some participants in the *Ingelanden* would have preferred people with dementia to be housed on the ground floor, to facilitate easy access to the outdoors and several respondents would like more garden space. In both nursing homes, participants complained about the lack of shops in the surroundings.

Safety

Respondents were asked if they felt safe in and around the nursing home. A special point of interest was the perceived safety in evenings and nights. The participants were also asked their opinion on exit routes in case of an emergency. Most participants did feel safe in and around the building, although the location of the *Zonnehuis* next to a facility for psychiatric care made some staff feel uneasy. Patients of this facility would populate the benches behind the building, especially on summer evenings. Several staff members mentioned they would not park their car behind the building in the evening. Since the surroundings of both buildings were still under construction, participants felt a lack of public safety.

There were concerns about what to do in case of a fire, not knowing how to get out of the building, not knowing whether locked doors would open and worrying about staffing levels. In both facilities, comments were made about residents walking into each other's rooms.

Spatial orientation

Aspects of this theme were way finding and walking distances. Both respondents in the *Zonnehuis* and the *Ingelanden* experienced issues with way finding but in the *Zonnehuis* issues were more problematic. Both buildings are complex, with the reception area giving way to corridors in different directions. Being the largest building, way finding in the *Zonnehuis* seemed to be more difficult, especially for visitors. According to some respondents, the nursing home feels like a maze. Signage

was inadequate. The colour coding, as applied by the architect, did not seem to work, because some respondents suggested the use of colour or points of recognition to facilitate orientation. Walking distances were considered too long by staff.

Being a much smaller building, management had not provided signage in the *Ingelanden* because it would make to facility feel to institutional. Although staff and residents could find their way around the building, they felt signage would be beneficial to visitors.

Privacy and social contact

This theme revolved around privacy for residents and staff, opportunities to receive visitors and to meet others. Both residents and staff felt they have enough privacy. Family and residents were satisfied with the opportunities to receive visitors and to meet other residents, although among residents of the *Ingelanden*, criticism were made about bedrooms being too small to receive visitors and living rooms being crowded with multiple families visiting at the same time. Family members of the *Zonnehuis* did question the bedroom doors that were frequently left open. Cognitively impaired residents would walk in to each other's rooms which was sometimes felt as an invasion of privacy.

Staff of the *Zonnehuis* complained about the lack of privacy because they would fill in residents' files in the living room. In both facilities, staff would have liked an extra space to have private conversations with family members of residents.

Indoor climate (light, temperature, ventilation)

This theme received the most comments. The use of daylight inside the buildings was highly praised, although staff in the *Zonnehuis* think some living rooms are too dark. They also suggest it would be nice to be able to vary the brightness of the lights in the living rooms and corridors to create a homelike atmosphere in evenings and nights.

Staff felt the temperature in the buildings is uncomfortable. It is either too hot or too cold. All participants had problems regulating the temperature. Ventilation was thought to be inadequate and users criticized the ability to regulate ventilation. In both buildings concrete core activation is applied for cooling and heating. This means users can only adjust the temperature to a small degree. Because of the cooling system, staff was asked by facility managers not to open windows or doors on a hot day, letting the hot air in. Staff do not like this, they want to be able to open windows to ventilate rooms.

Aesthetics

Users were asked their opinion on the appearance of the building, the use of colours and materials, and the views from the building. They were also asked whether the building is pleasant to live and work in.

All respondents in the *Zonnehuis* think it's a beautiful the building, that fits well with the environment and users like the use of colours and materials. Criticisms were about the colours of doors and floors in the houses; they were seen as not appropriate for elderly people. Management considered the use of colour and material on the exterior and in the central area a success, but thought the group homes were still too institutional.

Most participants in the *Ingelanden* think it's a nice building and appreciate the colours and materials used on the outside. Many comments were made though; some participants think the building looks

like an office building and think it's too inconspicuous. Almost all users of the *Ingelanden* are positive about the use of colour and material inside the building. The interior is modern and light according to respondents, although some staff think it's too modern for elderly people, who might like a more old fashioned interior. The corridors could use more colour, to facilitate orientation, i.e. bathroom doors and bedroom doors in different colours.

The nursing homes were both appreciated as a pleasant living and working environment.

Comments about both buildings included the relation between inside and outside, for residents with dementia it's not easy to go outside. According to participants, the view from both buildings would be improved if there were more plants and trees in the surroundings. In the *Zonnehuis* the smell inside the houses was sometimes unpleasant according to staff and family of residents with dementia.

Most favourite part of the building

In response to the open ended question 'what do you like most about the building' many different answers were given but there was agreement in both buildings on the central area as the most favourite part of the building. In the *Ingelanden*, the *grand café* was mentioned most often, but the entrance hall received high praise as well. The roof terrace, sometimes in combination with the *grand café*, was also mentioned. Other aspects in the *Ingelanden* that were appreciated by users were the daylight inside the building, the spaciousness, de group homes, residents' rooms and the living rooms.



Figure 5. Grand café in the Ingelanden

Private rooms are only mentioned by staff in the *Ingelanden*. Apparently they compare the new building to other nursing homes, where private rooms are not always standard.

In the *Zonnehuis* the central areas, i.e. the restaurant, the grand café and the shop, were mentioned as most favourite parts of the building. Users appreciate the sociable and welcoming atmosphere. The façade of the building, the use of materials and especially the slate, were often mentioned by staff and volunteers, but not by residents. Staff also appreciates the appearance of the building, the colours and the spaciousness.



Figure 6. Central area in the Zonnehuis

Private rooms are often mentioned by staff in the *Ingelanden*, and a number of times by family of residents with dementia and somatic residents.

Least favourite part of the building

Participants were asked what they would like to change in the building. There were many different answers to this question and there was less agreement. Some remarks were made more than once. In the *Ingelanden* the name on the building is seen as a great improvement. The nursing home looks like an office building and is not recognized as a care home and therefore hard to find. The need for a larger lift, or more lifts was also mentioned. The building is regarded as quite sombre and could use a more cheerful appearance.

In the *Zonnehuis*, participants feel the direct surroundings of the building could be improved. There is a need for gardens, trees and natural elements outside the building. Participants would like a garden to walk in, but also different seating areas, in the sun, or under the trees. Staff would like better access to the terraces for residents, so it would be easier for them to go outside. They would also like direct access to a terrace from every living room. According to staff the courtyard gardens have several shortcomings; there is nothing to see or do, the gardens are not as accessible and because of that, they are underused. Family members of the residents with dementia would like to get rid of the urine odour in the houses. The living rooms could be more homely, less sterile-looking and more in agreement with the preferences of older people.

Other aspects that were mentioned by several participants were better signage, more parking space, and larger lifts.

The most important improvement for staff would be a more comfortable indoor climate and temperature. A wish for better ventilation and the opportunity to open as many doors and windows as they like, is also often expressed. Living rooms should be larger, because of wheelchair users. Staff also would like an office and some even mentioned a nurse's station. The corridors of the houses should have different or more colour to be more distinctive.

Grading

Participants were asked to grade their general satisfaction with the buildings on a scale from 1 (very poor) to 10 (outstanding). The average grade given to both the *Ingelanden* and the *Zonnehuis* was a 7.5.

Discussion

This study shows that residents, staff, family, visitors and volunteers have mainly positive experiences with large scale nursing homes and that their experiences show many similarities with each other. Though the nursing homes were commissioned by two different organisations, designed by two different architectural firms and built in different towns on locations with different characteristics, the experiences of users exhibit remarkable similarities. All participants highly appreciate the facilities the nursing homes have to offer. The central areas function as meeting places, more so in the *Zonnehuis* than in the *Ingelanden*. The grand café and restaurant in the *Zonnehuis* are heavily used by members of the public, elderly residents of the adjoining apartment buildings who come to the *Zonnehuis* to have a meal, but even passers-by who come in for a cup of coffee. The presence of different groups of users create a lively atmosphere which makes the building more accessible and may even lead to more visitors for the residents. Though the grand café of the *Ingelanden* is open to the public, the surroundings of the *Ingelanden* were still completely barren during this study, and the facilities were only used by residents, staff and relatives. Among these participants, the grand café was most appreciated by family members of residents with dementia. They enjoy the possibility of bringing their relative somewhere else, providing a change of scenery.

The group homes within the nursing homes were considered to be still too institutional. The corridors, (see figure 7 and 8), resemble the traditional nursing homes' corridors. The outside spaces in the nursing homes were considered inaccessible and sometimes underused. Much research has been done on the subject of providing an environment that promotes quality of life in long-term care (Calkins and Brush, 2009), and though the evidence is still weak, there is growing evidence that the design of the environment has an effect on the well-being and functioning of residents (Barnes, 2002). Most research has focused on people with dementia, first investigating the role the environment can play in reducing challenging behaviour, and later also including more positive outcomes like quality of life (Calkins 2009). Though there is limited empirical support for design features such as non-institutional character and the provision of outside space, literature suggests that they are an important component of long-term care settings (Day and Stump, 2000, Fleming and Purandare, 2010). The nursing home administrators seemingly encounter practical or other obstacles in translating research findings into practice. More work has to be done on this subject.



Figure 7. Corridor in the Ingelanden



Figure 8. Corridor in the Zonnehuis

One limitation of this study is the small size of it. Only two recently build nursing homes were included. Outcomes may be different for other large scale nursing homes in other towns or cities. To generalize the conclusions, more research in care settings of different sizes and shapes is necessary. Another limitation of this study is that residents with dementia were not included in the questionnaire survey. The family members of residents with dementia were asked to consider the needs of the resident when filling out the questionnaire, but may have expressed their own needs. Observation of people with dementia and their use of space may be a valuable addition to the research methods.

POEs are particularly important for large organisations that develop multiple buildings of the same type, like the elderly care organisations who operate the *Zonnehuis* and the *Ingelanden*. Both organisations are in the process of building new nursing homes. Lessons learned from this POE are applied in the construction of these buildings. Results are also implemented into the existing buildings. This project has shown a POE can generate an enormous amount of useful information. Planning and building in the health care industry can take years. Frail older people are not always able to inform designers of future projects. A POE is a relatively easy method to gather valuable information.

Conclusion

This study shows that modern large-scale nursing home can offer a pleasant living and working environment though adaptations in interior design can improve the homelike character, especially important to older people with dementia.

References

- Barnes, S., 2002. The design of caring environments and the quality of life of older people. *Ageing & Society*, 22, pp.775-789.
- Bicket, M.C. et al., 2010. The physical environment influences neuropsychiatric symptoms and other outcomes in assisted living residents. *International Journal of Geriatric Psychiatry*, 25(10), pp.1044-1054.
- Calkins, M.P., 2009. *Evidence-based long term care design*. *NeuroRehabilitation*, 25, pp.145-154.
- Calkins, M.P., Brush, J., 2009. *Improving Quality of Life in Long-Term Care*. Perspectives on Gerontology vol. 14 no. 2, pp.37-41.
- Carthey, J., 2006. Post Occupancy Evaluation: Development of a Standardised Methodology for Australian Health Projects. *The International Journal of Construction Management*, pp.57-74
- Cioffi, J.M. et al., 2007. The effect of environmental change on residents with dementia. The perceptions of relatives and staff. *Dementia*, 6(2), pp.215-231.
- Cutler, L.J. and Kane, R.A., 2009. Post-occupancy evaluation of a transformed nursing home: the first four green house settings. *Journal of Housing For the Elderly*, 23(4), pp.304-334.
- Day, K., Carreon, D. en Stump, C., 2000. The therapeutic design of environments for people with dementia: A review of the empirical research. *The Gerontological Society of America, The Gerontologist*, 40(4), pp.397-416.
- De Klerk, M., 2011. *Zorg in de laatste jaren (Care in recent years)*. Den Haag: Sociaal en Cultureel Planbureau
- Den Draak, M., 2010. *Oudere tehuisbewoners (Older home residents)*. Den Haag: Sociaal en Cultureel Planbureau
- Dröes, R.M., et al., 2006. Quality of life in dementia in perspective. An explorative study of variations in opinions among people with dementia and their professional caregivers, and in literature. *Dementia*, 5, pp.533-558.

Fleming, R. and Purandare, N., 2010. Long-term care for people with dementia: environmental design guidelines. *International psychogeriatrics*, 22(7), pp. 1084-1096

Parker, C. et al., 2004. Quality of life and building design in residential and nursing homes for older people *Ageing & Society* 24, pp.941-962.

Preiser, W.F.E., Rabinowitz, H.Z. and White, E.T., 1988. *Post Occupancy Evaluation*. New York: Van Nostrand Reinhold.

Te Boekhorst, S. et al., 2009. The effects of group living homes on older people with dementia: a comparison with traditional nursing home care. *International Journal of Geriatric Psychiatry* 24, pp. 970-978.

Torrington, J. 2007. Evaluating quality of life in residential care buildings, *Building Research & Information*, 35(5), pp.514-528.

Verbeek, H. et al., 2009. Small, homelike care environments for older people with dementia: a literature review. *International Psychogeriatrics* 21(2), pp.252-264.

Van der Voordt, D.J.M. and van Wegen, H.B.R., 2002. Ex post evaluation of buildings. In: T.M. de Jong and D.J.M. van der Voordt, eds. 2002. *Ways to study and research architectural, urban and technical design*. Delft: Delft University Press, pp.151-158.

List of illustrations

Figure 1. The entrance to the nursing home Zonnehuis, Zwolle

Figure 2. Façade of the Ingelanden, Utrecht

Figure 3. Ground floor of the Zonnehuis, Zwolle

Figure 4. First floor and floors 2 to 4 of the Ingelanden, Utrecht

Figure 5. Grand café in the Ingelanden

Figure 6. Central area in the Zonnehuis

Figure 7. Corridor in the Ingelanden

Figure 8. Corridor in the Zonnehuis