Ageing Int (2019) 44:300–317
https://doi.org/10.1007/s12126-017-9311-9

The Impact of Bathroom Design on Privacy for Users with Special Needs

Jeanne Boge[1] · **Staf Callewaert**[2] · **Karin Anna Petersen**[2]

Published online: 27 November 2017

Abstract The aim of this article is to gain an understanding of the relations between the design of bathrooms and the use of the toilet with privacy when residents are unsteady, visually impaired and/or have dementia. The background is that earlier studies and own experiences in Norway indicate that the way bathrooms are designed is crucial for users to be as independent as possible when using the toilet. This article does not include studies on the access to toilets and washbasins for residents who are able to stand on their own. Neither have we studied the use of diapers. The scientific approach includes historical analyses of the rise of privacy when toileting and analyses of bathroom design practices in 20 Norwegian nursing homes. Our investigations show that the expectation that individuals should rid themselves of urine and faces in locked, private rooms arose in connection with the industrialization, democratization and hygienic modernization of Western countries. Analyses of contemporary nursing homes show that many institutions do not have design to facilitate privacy: there are no adjustable toilets, no crutch or walking stick holders, no flushing mechanisms within reach from a sitting position, no toilets that are visible from the residents' bed, poor contrasts; the toilet paper, soap dispensers and paper towels are out of reach from a sitting position; there are few handles, few adjustable sinks and more than 70 cm between the toilet and the sink.

✉ Jeanne Boge
jhb@hvl.no

Staf Callewaert
staf.callewaert@gmail.com

Karin Anna Petersen
Karin.Petersen@uib.no

[1] Institute of nursing, Faculty of Health and Social Sciences/ Centre for Care Research West Norway, Western Norway University for Applied Sciences, P.O. Box 7030, Bergen, Norway

[2] The Department of Global Public Health and Primary Care, University of Bergen, Bergen, Norway

Keywords Bathroom · BANO · Disabled · Design · Nursing home · Toilet

Introduction

Like most of us, Arne preferred to be alone when he was using the toilet, and he managed on his own while living in a Norwegian nursing home for some weeks, although he was unsteady, visually impaired and had dementia. After a while he was given a permanent place in a different nursing home where the bathroom design made him dependent of the nursing staff when using the toilet and washing his hands afterwards.

In this article we have examined the relation between bathroom design and privacy when residents are unstable, have cognitive failure and/or are visually impaired. Our experience from clinical practice – guiding nursing students - and as visitors in nursing homes, shows that the bathroom's design is crucial for maintaining the resident's independence and privacy. We have also analyzed the history of toileting in order to find out why privacy is the norm when toileting.

Limitations

This article does not include studies of the access to toilets and sinks for residents who are able to stand up on their own. Neither have we examined the use of diapers.

Norwegian Nursing Homes

Nursing homes have been a steady service in Norway from about 1850 (Hauge 2004). At the time, a sharp distinction occurred between the medical treatment and the care of the elderly. This distinction came about in the extension of the possibilities to perform medical interventions in modern society. In the mid-1950s institutions for old people were known as "sick homes" to make associations with disease and treatment. At that time, extensive work was carried out in Norway to give households running water, and this made the installation of WCs possible. Norwegian nursing homes that we know from that period had a few WCs in the public area. In the 1970s a large-scale development of "sick homes" took place in the whole country, built with hospitals as ideal, with long corridors and a lot of twin bedrooms where four residents at times shared one bathroom/toilet.

In the 1980s the Norwegian politicians realized that the people living in the nursing homes were frail elderly people who only to a small degree could be treated for their old age ailments, and in 1988 it was decided that nursing homes should be homes as well as places for medical treatment (Hauge and Heggen 2007). Many institutions changed their name to living -and treatment centres or something similar that did not include the concept of "sick home". At the same time "patient" was replaced with "resident" or "user". Since 1997 the political intentions have been to build nursing homes and care homes that look like private homes, where the residents have their own sleeping/sitting room, their own

bathroom, and where a resident should be able to live for the rest of her or his life (Government 2013). Only the most needy get access to Norwegian nursing homes. Approximately 80% of the residents have dementia. Many of the residents are unable to stand. The majority of the residents who are able to walk need a stick, walker and/or an arm to hold on to when walking. Most of the residents have poor eyesight and need help in their personal hygiene. They are, in other words frail (Kirkevold et al. 2014).

The Politics of Bathroom Design in Nursing Homes

The Norwegian Labor Inspection Authorities guidelines indicates that concern for the staff is the main issue. The focus is less on how the bathrooms can be designed to be functional for the residents. But although the main focus in the guidelines seems to be the staff's working conditions, staff may find it difficult to work in nursing home bathrooms that are in accordance with national guidelines (Nesbit 2014). The Norwegian State Housing Bank that provides loans to the construction of nursing homes, are in accordance with the Labor Inspection Authority. In addition, the bank argues for locating the bathroom door in full view from the bed because it will make it easier for the resident to see the toilet. This would be an advantage for residents who may forget where the toilet is (Husbanken 2009).

Earlier Studies on Bathrooms

Toileting is a topic that concerns everybody, but a topic that tends to be avoided in everyday conversation. It is taboo (Lawler 1991). That may be the reason why relatively few studies on the design of toilets and bathrooms are published.

The American professor of architecture Alexander Kira was the first of very few to perform serious studies on bathrooms (Kira 1976). His study was first published in 1966 and revised in 1976. The study was considered ground-breaking and controversial when first published. Kira's study is on the ergonomics of bathrooms, and he argues that the bathroom is probably the most important and most ill-designed part of any building.

The English professor of architecture Clara Greed has studied public toilets, and argues that there are too few public toilets in English cities and that the existing toilets are ill-suited for the disabled. The public toilets are especially ill-suited for women who have to sit when using the toilet (Greed 2004, 2012).

The Dutch industrial designer Johan Molenbroek and other researchers from different European countries examined a series of technologies that could make it easier for elderly and disabled people to use the toilet in their own homes (Molenbroek et al. 2011). They stressed the importance of the squat position and argued that this was the most natural and most healthy way of sitting on the toilet. It may, however, be difficult for a disabled person to sit in a squat position. The Danish nurse Gerd Johnsen (2007) who has specialized in helping people with constipation, also argues for a squat position when defecating, as such positions will straighten out the anorectal angle and the excrements can more easily slip into the toilet (Johnsen 2007). Giulia Enders' book on the

importance of the intestines, also argues that one should try to squat when using the toilet (Enders 2015).

The Norwegian industrial designer Brit Furu's (2008) interviews with nursing staff in seven nursing homes in Trondheim municipality, showed that some toilets were too high, so the residents' feet did not reach the floor. Other toilets were too low and it was difficult to get up from the toilet. An innovative study on bathrooms in Norwegian hospitals showed that toilets that could be raised and lowered were essential in to what extent residents were able to manage on their own in the bathroom (Lunde and Eek 2014).

When patients did not use a wheelchair or other kinds of unwieldy equipment, and when patients did not need help from the staff, the best bathroom size was 4,9 m2. A bathroom of that size made it easy for the patients to reach and support themselves by using the walls and handles, and thus keep steady. Patients that needed assistance and big equipment should have a bathroom that was about 5,9 m2. The study also showed that patients were more self-reliant in functional bathrooms and carers spent less time helping them. The physiotherapist Halvor Lunde's (2010) study of bathrooms in Norwegian nursing homes showed that it was much better for the nursing staff to work in bathrooms that were in accordance with the BANO concept than it was to work in other bathrooms (Lunde 2010).

BANO is a commercial company that has specialized in creating functional bathroom solutions in health institutions. BANO emphasizes the importance of adjustable sinks and toilets, lots of handles, contrast and no more than 70 cm between the toilet and the sink (BANO 2014).

Based on guidelines and studies (cf. above), bathrooms in nursing homes should have the following qualities in order to facilitate privacy when toileting: Adjustable toilets and sinks, several handles, not more than 70 cm between toilet and washbasin, good contrasts, the toilet visible from the bed and a size of about 4,9 m2. Our experience from nursing homes indicates that the following elements can also contribute to independence and privacy when toileting: Flushing mechanism, soap dispensers and paper towels within reach from a sitting position, and crutch and stick holders.

We have not found any systematic analyses of the actual design of bathrooms in nursing homes and as far as we know there is no analysis of the relationship between the design of bathrooms in nursing homes and the possibility of independence and privacy for residents who are unsteady, visually impaired and/or do not remember where the toilet is.

Purpose

The aim with this article has been to gain an understanding of the relationship between the design of bathrooms and the use of toilets with privacy when residents are unsteady, are visually impaired and/or have dementia.

Methodology

The study is based on investigations of the historical emergence of privacy in toileting and on descriptions of contemporary practices of bathroom design.

Examining the Historical Emergence of Privacy in Toileting

In our study the historical analysis has been carried out in response to the following questions:

- *When did the privatization of toileting arise?*
- *What political circumstances made the rise of private toileting possible?*
- *How was the privatization of toileting done?*

The historical part of this study is based on an analysis of nursing textbooks and on studies on cleanliness in Norway, Sweden, Paris, Germany and England. The analysis is done in accordance with norms for source investigation. Such norms include investigating who the author is, the time and context of the emergence of the text, examining the purpose of the text, if the text is a public or private document, and if it is based on firsthand or secondary data (Kjeldstadli 2003).

Description of Contemporary Bathroom Design Practices

In addition to the historical analysis, we mapped bathrooms in 20 nursing homes in a Norwegian municipality in order to get empirical material for an analysis of the possibility for privacy when using the toilet for residents who are unsteady, have dementia and/or are visually impaired. The analysis was done in response to the following question:

- *How does the design of bathrooms impact the possibility for privacy when using the toilet for residents in nursing homes who are unsteady, forget were the toilet is and are visually impaired?*

The bathrooms studied were used by about 1000 residents. Approximately 170 bachelor-level nursing students at the University College of Bergen were research assistants. As all the bathrooms in each nursing home were made after the same template, it was sufficient to study one bathroom in each nursing home and the following data were collected in each bathroom: The bathroom's size in square meters, contrasts in decoration, the location and the regulation of the sink and WC, as well as access to toilet paper, flush mechanism, handles, pegs, paper towels and soap, and to stick and crutch holders. The survey included photos, sketches of the units, measurements of area and measurements of the distance between the washbasin and the WC.

After the data collection a five-hour seminar was arranged in which students and project manager/first author presented and discussed the results with the leader of health and welfare in the community, engineers, architects and consultants who were responsible for (re)building nursing homes in the municipality. A commercial bathroom specialist and a specialist on ceiling-mounted lifts were also present during the seminar and they participated in the debates. The project manager/first author subsequently returned to some of the nursing homes to check some measurements and take some new photos. In the end, a 119 page report was assembled, with the presentation of each of the bathrooms in the 20 nursing homes. The reference list has a link to the report and

the layout and the design of each bathroom, pictures of sanitary equipment, measurements and analysis of functionality and suggestions for improvement (Boge 2014).

Below we first present the analysis of the emergence of the privatization of toileting. Next, we present the analysis of the possibility for privacy when using the toilet for residents who are unsteady, have dementia and/or are visually impaired.

Toileting in Privacy

In Western societies, we commonly rid ourselves of urine and faeces using a water closet (WC) in a private room behind locked doors. WC was invented in England, and has been in use there since the 1820s. Although the first Norwegian WC was introduced in 1850, it is unlikely that residents in Norwegian nursing homes had access to WC when the nursing homes were established around 1850, as only a few wealthy Norwegian citizens had access to such luxury at the time. The first WC was installed in Bergen in 1905 (Lundström et al. 1978; Økland and Høiås 2000). Bergen has been and is one of the biggest and most important towns in Norway with around 300,000 inhabitants.

Depositing your urine and faeces alone in a locked room is, however, a modern phenomenon. According to the German sociologist Nobert Elias, it was common practice to leave urine and faeces anywhere and everywhere in Western societies in the Middle Ages: in the corner of a room, under stairs, on tapestries on the castle wall, right outside the front door, in the streets, etc., and there was no shame attached to being watched doing this (Elias 1989). The French historian Georges Vigarello's study, *Cleanliness,* shows that neither French men nor women in the Middle Ages felt shame at being naked in full view of other people (Vigarello 1988).

The acceptance of the body and its functions as a public phenomenon slowly disappeared in Europe during the sixteenth century and the tendency to privatization of such functions accelerated during the 17th, 18th and nineteenth century. Admonitions to leave urine and faeces in certain designated places emerged, and after a while toilets were built. The argument was that the new habits were important for health, but the main reason was new attitudes to what was considered decent. The modernization of the body started in the upper classes and had a slower development in the lower classes. It looks like the modern bodily norms had not broken through in the countryside of the Nordic countries at the end of the nineteenth century. The ethnologist Jonas Frykman's studies on cleanliness in Sweden between 1880 and 1910, show that Swedish farmers were not ashamed to rid themselves of urine and faeces within the sight of other people. This would often be done on the garbage heap just outside the house. The fact that women did not use any kind of trousers at the time, but wore thick warm dresses and long socks, made it easy for them to rid themselves of urine and faeces. Some would sit in a squat position, while others would stand, holding their skirt a bit away from them. They would use the skirt to wipe their crotch clean or use grass, moss, wood chips or snow. Using the index finger was not unusual. A strong smell would probably have emanated from persons with such habits, but when everybody smells the same, it is less noticeable. Eilert Sundt's study from 1869 on bodily cleanliness in Norway supports Elias and Frykman's studies (Frykman 1994; Sundt 1869; Elias 1989). Sundt's study shows that as an alternative to the garbage heap,

the peasants may sit down behind the barn and the goats would eat the faeces. In the latter half of the 1800s, however, extensive political campaigns were initiated to get people to build separate small houses for a toilet. Hygiene was used as an argument for privatization of the new elimination practices, but people disliked the foul-smelling toilets. They preferred to leave their excrements in the open; such practices, however, were not in accordance with the intensive Norwegian modernization programme during the second half of the 1800s.

At the same time as a huge political effort was made to get Norwegian peasants to use outdoor toilets, modern nursing emerged in England and Norway. In the world's first textbook on nursing, *Notes on Nursing,* published in 1860, Florence Nightingale (Nightingale 1992/1860) put great emphasis on the conditions that contribute to the hygienic handling of patients' urine and excrements. Modern nursing developed in the wake of the *Sanitation Movement* where Nightingale had a central position (Sydnes 2001). This organization initiated health legislation in England (Martinsen 2003). The first Norwegian health law, from 1860, is more or less a copy of the English (Schiøtz 2003). Hygiene has a very central position in both health laws and in modern nursing. Hygiene was to contribute to changing pre modern dirty individuals into clean, healthy, obedient, productive and disciplined inhabitants of liberal, modern societies. Dirty individuals were considered uncivilised. The French historian Georges Vigarello (Vigarello 1988) has accounted elaborately for the central position of hygiene in the political development of modern Paris. The hygienic norms that were developed in connection with the modernization of Western societies are still valid, and the norms for the handling of urine and faeces have an even greater place in nursing textbooks of our times (Mekki and Holter 2011) than they had in the world's first textbook in nursing (Nightingale 1992/1860). The textbooks emphasize the importance of privacy when toileting but do not problematize the design of bathrooms when users are unsteady, have dementia and/or are visually impaired. Our analysis of bathrooms in nursing homes, below, can provide knowledge that is not currently available in contemporary nursing textbooks.

The Impact of Bathroom Design on Privacy when Using the Toilet

As we have seen above, privacy when toileting is a modern norm. We will see below that bathrooms in Norwegian nursing homes are frequently constructed in such a way that using such rooms in private is difficult when residents are unsteady, have dementia and/or are visually impaired. Such bodily challenges are common when individuals are so disabled that they get a permanent place in Norwegian nursing homes (Kirkevold et al. 2014).

Nowhere to Place Crutches and Walking Sticks

Although many nursing home residents are able to walk, they may be unsteady, and use a walking stick, a walker and/or handles of various kinds (Kirkevold et al. 2014). When they use the toilet, they have to put the crutches or sticks somewhere. This may pose a

problem as none of the bathrooms in the 20 nursing homes had walking stick or crutch holders.

No Adjustable Toilets

Earlier studies show that height adjustable toilets can contribute to a squat position when defecating, as such positions will straighten out the anorectal angle and the excrements can more easily slip into the toilet (Enders 2015; Johnsen 2007; Molenbroek et al. 2011). Adjustable toilets would also make it easier for residents to keep their feet placed on the floor, and thus contribute to stability (Furu 2008), and toilets that can be raised and lowered can be essential with respect to the extent to which residents are able to manage on their own in the bathroom (Lunde 2010). None of the toilets in the 20 nursing homes we studied could be adjusted for height (Boge 2014, cf. Fig. 1). As there was no possibility for regulating the height of the toilets, and as there was no ceiling-mounted lift between the bed and the bathroom, some of the residents used a toilet chair (cf. Fig. 2).

Toilet Paper and Flushing Mechanisms out of Reach

When you are unsteady or you cannot stand on your feet, it can be of importance to reach the toilet paper and the flushing mechanism without having to stand up. In 11 of 20 nursing homes it would be difficult for residents to reach the toilet paper when sitting on the toilet, as the paper was located out of reach on the wall behind or beside the toilet and the flushing mechanisms were placed on the cistern (Boge 2014, cf. Fig. 3).

The Lack of Adjustable Handles at the Toilet

Earlier studies show that handles on the toilets can be quite helpful for disabled and unsteady persons when using the toilet without help from the staff (Eek and Lunde 2014). Our analyses show that 19 of the 20 nursing homes had handles by the toilet, but the design of the handles varied a lot. The four nursing homes that were designed in accordance with the BANO concept had adjustable handles attached to the wall by the toilet, and these handles could also be used to hold toilet paper. Some of the other bathrooms did also have adjustable handles by the toilet but these were shorter than the BANO handles. The handles attached to the toilet could not be adjusted (Boge 2014).

Sinks without Handles, without Height Adjustment and out of Reach from the Toilet

Lunde's (2010) study showed that it was difficult for unsteady residents to move from the toilet to the sink on their own if the distance between toilet and sink was more than 70 cm, if the sink did not have handles, and if the sink's height was not adjusted for the residents.

Fig. 1 A common toilet design. Picture from a Norwegian nursing home built in 2003 (Boge 2014, page 36)

Lunde's results are in accordance with the BANO ideas on bathrooms in health institutions. Our study showed that only four of 20 bathrooms had adjustable sinks with

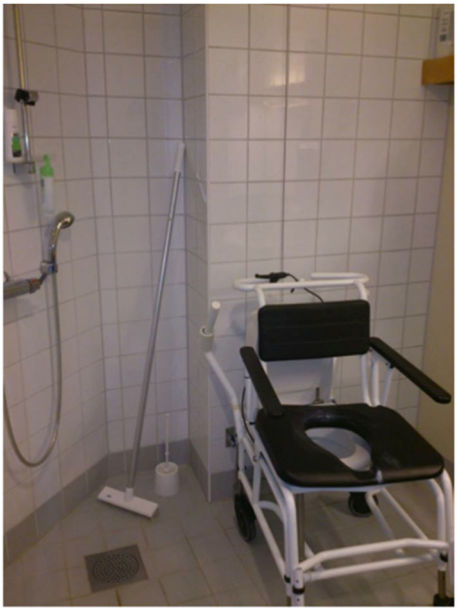

Fig. 2 Toilet chair + WC. Picture from a Norwegian nursing home built in 2008 (Boge 2014, page 39)

Fig. 3 A common location of toilet paper and flushing mechanisms. Picture from a nursing home built in 1997 (Boge 2014, page 62)

handles and a distance of less than 70 cm between the toilet and the sink. The sink and the toilets were often placed on opposite sides of the room (cf. Figs. 4 and 5).

Soap and Paper Towels out of Reach

In modern societies washing one's hands after using the toilet is common. Those who are unsteady might prefer to sit while washing their hands. Our study shows that in 16 of 20 nursing homes reaching the soap dispenser from a sitting position is relatively easy, whereas reaching the paper towels is more difficult, as the equipment were out of reach in 11 of 20 bathrooms for a person from a sitting position. In the absence of paper towels, residents could dry their hands on cloth towels, but only nine out of 20 nursing homes had pegs placed so that the towel could be reached from a sitting position by the sink. It is a paradox that the residents could reach the soap but not the towel (Boge 2014, cf. Fig. 6).

No Handles on the Walls

In addition to handles by the toilet, frail and unsteady residents may need handles along the walls for support when sitting down or getting up from the toilet. The four nursing homes that were built/rehabilitated in the extension of the BANO concept, had a lot of vertical and horizontal handles on the walls. Three of the other nursing homes also had a fair number of handles on the walls. The remaining 13 nursing homes had few handles on the walls (Boge 2014).

In order to reach the handles on the wall by the toilet and elsewhere in the bathroom, the size of the bathroom is of importance. According to earlier studies, a BANO bathroom of 4,9 m2 was optimal for residents who did not need help from the nursing staff in the bathroom (Eek and Lunde 2014). In our

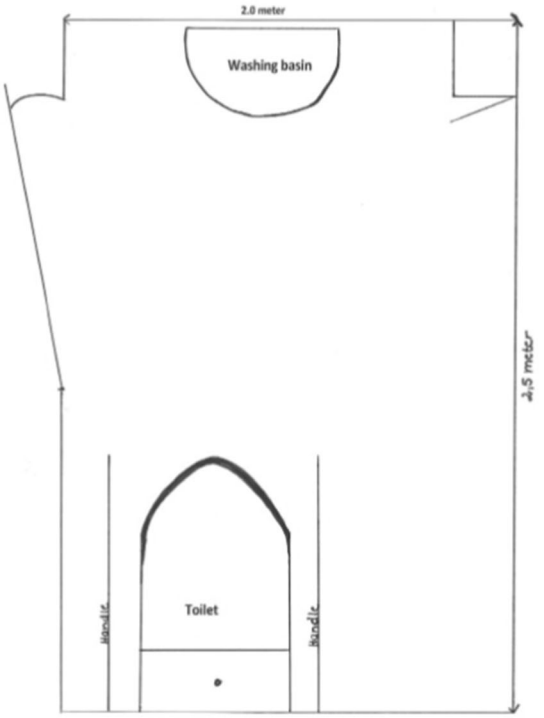

Fig. 4 A common location of toilets and sinks. First author's sketch of a common bath

study seven of the 20 bathrooms were 5 m2 (Boge 2014), a size that corresponds well with the recommended 4,9 m2 (Eek and Lunde 2014). The majority of the other bathrooms were smaller, but size alone does not facilitate privacy if the sanitary equipment is not placed and adjusted to the frail elderly who are unstable, have poor eyesight and/or dementia.

Toilets out of Sight

As mentioned above, 80% of the residents in Norwegian nursing homes suffer from dementia (Government 2013). For these residents it may be difficult to remember the

Fig. 5 The most common sink. Picture from a nursing home built in 1997 (Boge 2014, page 62)

location of the toilet. To help cognitively impaired residents to find their way to the toilet, the Norwegian State Housing Bank (Husbanken 2009) argues for placing the

Fig. 6 A common placement of soap dispensers and paper towels. Picture from a nursing home that was built in 1992 (Boge 2014, page 78)

bathroom door in a position that makes it visible from the resident's bed. The toilet door was not visible from the bed in the 20 nursing homes in our study (Boge 2014).

Few Contrasts

Contrasts can make orientation easier for the visually impaired. We found strong pink colors on the alarm devices in four of the five newest bathrooms. Both new and older bathrooms had black toilet lids that gave contrast to the white toilet, but otherwise there were few contrasts in both old and new nursing home bathrooms. The visually impaired were given minimal contrasts for orientation (Boge 2014).

Differences between Bathrooms Built at Different Times

The analysis of 20 Norwegian bathrooms shows that toilets and washbasins in nursing homes to a small degree are adapted to unsteady residents with dementia and visual impairment, but we have also noticed differences between bathrooms built at different times. Since the summary (cf. Fig. 7) does not illuminate the differences between bathrooms built at different times, we will take a closer look at such variations.

The bathroom from 1972 was the oldest, it was 3 m2 and located in the only nursing home where two residents shared a bathroom (cf. Fig. 8). In the other 19 institutions the residents had their own sleeping −/living room and their own bathroom.

The major change in bathroom design occurred in 2006. At that time bathrooms with adjustable sinks were introduced, and the sinks had handles within easy reach when the resident was sitting on the toilet and needed something to hold on to in order to reach the sink after having used the toilet. Furthermore, several handles were in place by the toilet, by the sink, on the walls, and elsewhere. The changes were probably due to the municipality's use of the BANO (2014) concept. Only five of 20 nursing homes were

Bathroom design that can hinder toileting in privacy when residents in nursing homes are unsteady, forget were the toilet is and/or are visually impaired:

- No adjustable toilets
- No crutch or walking stick holders
- No flushing mechanisms within reach from a sitting position
- Few toilet rolls within reach from a sitting position
- None of the toilets were visible from the residents bed
- Poor contrasts
- Paper towels out of reach from a sitting position in 9 of 20 nursing homes
- Soap dispensers out of reach from a sitting position in four of 20 nursing homes
- No adjustable sinks in 15 of 20 nursing homes
- Distance between the toilet and the sink in 16 of 20 nursing homes was too long
- No handles in 15 of 20 nursing homes

Fig. 7 Summary of the results from the analysis of bathrooms in 20 nursing homes

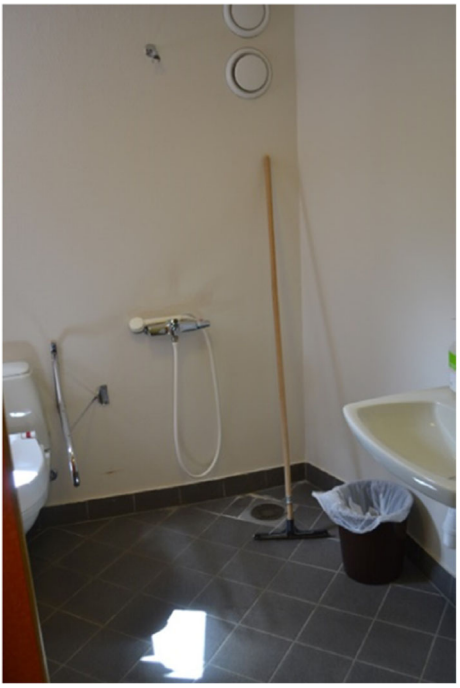

Fig. 8 The oldest bathroom. Picture from the bathroom that was built in 1972 (Boge 2014, page 86)

designed in accordance with the BANO concept, and the majority of residents had to use bathrooms that were not very functional (Boge 2014).

Fig. 9 The newest bathroom. Pictures from the bathroom that was built in 2012 (Boge 2014, page 13)

Although the recently built or rehabilitated bathrooms were better suited for the bodies of frail elderly people than older bathrooms (cf. Figs. 7 and 9), the newest were not optimal as they did not have an adjustable toilet. There were also few contrasts in the newest bathroom, no walking stick or crutch holders, soap dispensers and paper towels were often out of reach and toilets were not visible from the resident's bed (Boge 2014).

Further Studies

Our next article will be an analysis on privacy and the use of diapers and toilets when residents in nursing homes are able to stand on their own.

Conclusion

The aim of this article has been to gain an understanding of the relationship between the design of bathrooms and privacy when using the toilet when residents are unsteady, are visually impaired and/or have dementia. The historical analysis shows that toileting in privacy is the norm in modern societies (cf. above). Contemporary analysis shows that the design of bathrooms and sanitary equipment can make toileting in privacy difficult in nursing homes due to a lack of adjustable toilets. That may make it difficult for the disabled to sit steadily on the toilet and to get up from the toilet without the help from the staff. Lack of crutch- and stick-holders can also contribute to dependency, as the crutches and sticks may have to be placed out of reach. Flushing mechanisms and toilet paper out of reach may make the residents dependent of nursing staff when using the toilet. Toilet and sink placed too far apart and no handles on sinks makes it difficult for unsteady residents to get from the toilet to the sink on their own. Residents who are unsteady may prefer to sit when washing their hands after toileting, but soap dispensers and paper towels out of reach from a sitting position make them dependent on the staff. Toilets out of sight from the resident's bed may make it difficult for cognitively impaired residents to find the toilet without help from the staff. Poor contrasts can also contribute to helplessness in the bathroom. When residents cannot manage on their own they need help from the staff, and poorly designed bathrooms thus contribute to higher costs in the nursing homes, as salary of personnel is the greatest cost in such institutions.

The Transfer Value

The study has transfer value to bathroom design in many kinds of buildings in most countries; sick and disabled people everywhere must rid themselves of urine and faeces.

Implications

Contemporary textbooks in nursing emphasis the importance of privacy when toileting but do not problematize the way the design of bathrooms can inhibit privacy when

individuals are unsteady, have dementia and/or are visually impaired (Mekki and Holter 2011). Our analysis of the connections between bathroom design and privacy can contribute to a rewriting of nursing textbooks. The article can also be used by nursing staff, engineers, architects, sanitary equipment designers and politicians involved in the (re)building of health institutions and public toilets and thus contribute to the construction of buildings that promote privacy when disabled are toileting.

Funding The study is funded by Bergen University College.

Compliance with Ethical Standards The study is in compliance with ethical standards.

Conflict of Interest There are no competing interests to declare in relation to this manuscript.

Informed Consent The study did not require ethics committee approval since no personal data were analyzed. When we researched the bathrooms, the head of the nursing homes had asked the residents for permission. Research assistants/bachelor's students in nursing were not allowed to take identifiable photos or data with them when leaving the nursing home. All data were controlled by the project manager/first author before publication. The interviews on the resident's use of the toilet did not include personal, identifiable data.

Ethical Treatment of Experimental Subjects (Animal and Human) This article does not contain any studies with human or animal subjects performed by any of the authors.

References

BANO (2014). Designed for care. http://www.bano.no/company. Accessed 15 June 2017.

Boge, J. (2014). Funksjonaliteten til baderom i sjukeheim/The functionality of bathrooms in nursing homes. https://brage.bibsys.no/xmlui/bitstream/handle/11250/278230/1/Rapport11_14_web.pdf. Accessed 15 June 2017.

Eek, E., & Lunde, P. (2014). Fremtidens baderom på sykehus/the future of the bathroom in the hospital Bergen: Helse Bergen HF, Bano AS, Innovest AS. http://www.bano.no/pdf/FINAL%20Bano%20fremtidens%20baderom_read_.pdf, Accessed 15 June 2017.

Elias, N. (1989). *The Civilizing Process, Vol. I. The History of Manners Vol. I*. Stockholm: Atlantis.

Enders, G. (2015). *Sjarmen med tarmen/gut: The inside story of our Body's most underrated organ*. Oslo: Cappelen Damm AS.

Frykman, J. (1994). Hel og ren/whole and clean. In J. Frykman & O. Löfgren (Eds.), *Det kultiverte menneske* (pp. 131–221). Oslo: Pax Forlag.

Furu, B. (2008). Fremtidens eldreboliger. Toalettproblematikk for eldre og funksjonshemmede/The future homes for old people. Elderly and the disabled's toilet issues. Trondheim: Trondheim kommune http://innomed.no/uploads/09-Toalettproblematikk-for-eldre-og-funksjonshemmede_161019_120334.pdf. Accessed 15 June 2017.

Government. (2013). Tomorrow's care. Oslo: Norwegian Ministry of Health and Social Care https://www.regjeringen.no/en/dokumenter/meld.-st.-29-2012-2013/id723252/. Accessed 15 June 2017.

Greed, C. (2004). Public toilets: The need for compulsory provision. University of the West England, Bristol. http://eprints.uwe.ac.uk/24155/1/muen157-077.pdf. Accessed 15 June 2017.

Greed, C. (2012). *Incusive urban design*. Hoboken: Taylor & Frances.

Hauge, S. (2004). *Jo mere vi er sammen, jo gladere vi blir?*, Institutt for sykepleievitenskap og helsefag, Universitetet i Oslo, Oslo.

Hauge, S., & Heggen, K. (2007). Nursing home as a home. *Journal of Clinical Nursing*. https://doi.org/10.1111/j.1365-2702.2007.02031.

Husbanken (2009). Rom for trygghet og omsorg/guidelines for the design of residential homes and nursing homes. Oslo: Norwegian State Housing Bank. http://www.husbanken.no/omsorgsboliger/viktig-veileder-om-utforming-av-omsorgsboliger-og-sykehjem/. Accessed 15 June 2017.

Johnsen, G. (2007). Den optimale defekasjons stilling giver succes/the optimal elimination position is a succes. *Sygeplejersken, 9*, 41-44, https://dsr.dk/sygeplejersken/arkiv/sy-nr-2007-2009/den-optimale-defaekationsstilling-giver-succes. Accessed 2015.2006.2017.

Kira, A. (1976). *The bathroom*. New York: Penguin Books.

Kirkevold, M., Brodtkorb, K., & Ranhoff, A. H. (2014). *Geriatrisk sykepleie/Geriatric nursing*. Oslo: Gyldendal Akademisk.

Kjeldstadli, K. (2003). *Fortida er ikke hva den en gang var/The past is not what it once was* (2. utg. ed.). Oslo: Universitetsforlaget.

Lawler, J. (1991). *Behind the screens: nursing, somology and the problem of the body. Sydney*. Sydney: University Press.

Lunde, P. (2010). Erfaringer med baderom på sykehjem - og fra sykehus/experiences with bathrooms in nursing homes - and in hospitals. Oslo: Forflytningsteknikk AS. http://docplayer.me/252857-Erfaringer-med-baderom-pa-sykehjem-og-fra-sykehus.html. Accessed 15 June 2017.

Lunde, P., & Eek, E. (2014). Fremtidens baderom på sykehus/the future bathrooms in the hospitals. Bergen: Helse Bergen HF, BANO AS, Innovest AS http://www.bano.no/pdf/FINAL%20Bano%20fremtidens%20baderom_read_.pdf. Accessed 15 June 2017.

Lundström, I., Hermansen, R., & Kellmer, I.-H. (1978). *Om renslighet: Hygienen gjennom tidene/about cleanliness: A historic perspective*. Bergen: Bryggens museum.

Martinsen, K. (2003). Den engelske sanitation-bevegelsen, hygiene og synet på sykdom/The English sanitation movement, hygiene and the understanding of the disease. In *Omsorg, sykepleie og medisin: historisk-filosofiske essays* (2. utg. ed., pp. 169–181). Oslo: Universitetsforlaget.

Mekki, T., & Holter, M. (2011). *Sykepleieboken 1/Nursing Book 1*. Oslo: Akribe.

Molenbroek, J., Mantas, J., & de Bruin, R. (2011). Friendly rest room : Developing toilets of the future for disabled and elderly people. Amsterdam, Assistive Technology Research Series, IOS press. http://www.iospress.nl/book/a-friendly-rest-room-developing-toilets-of-the-future-for-disabled-and-elderly-people/. Accessed 15 June 2017.

Nesbit, R. (2014). Universell utforming av baderom i bo - og behandlingssenter/Universal Design of Bathrooms in Nursing Homes. Norges miljø- og biovitenskapelige universitet, Oslo. https://brage.bibsys.no/xmlui/bitstream/handle/11250/217917/Nesbit_Rebecca_2014.pdf?sequence=1. Accessed 15 June 2017.

Nightingale, F. (1992/1860). *Notes on Nursing: What It Is and what It Is Not*. Philadelphia: Lippincott Williams & Wilkins.

Økland, B. G., & Høiås, K. (2000). *Bare boss? /only rubbish?* Bergen: Bryggens Museum.

Schiøtz, A. (2003). *Folkets helse - landets styrke/public health - the country's strenght. 1850–2003*. Oslo: Universitetsforlaget.

Sundt, E. (1869). *Om renligheds-stellet i Norge /about cleanliness in Norway*. Oslo: Gyldendal.

Sydnes, T. (2001). Centrale ideer i Florence Nightingales sykepleiefilosofi /Cental ideas in Florence Nightingales nursing philosophy. In R. Birkelund (Ed.), *Omsorg, kald og kamp. Personer og ideer i sykepleiens historie*. København: Gyldendal.

Vigarello, G. (1988). *Concepts of cleanliness:Changing attitudes in France since the middle ages*. Cambridge: Cambridge University Press.

Dr. Boge 's research has mainly been on bodily cleanliness in a contemporary and historical perspective and on working conditions in nursing homes. Her scientific perspective is influenced by Foucault and Bourdieu. She is a Norwegian nurse with clinical experience from hospitals and nursing homes and she has been teaching nursing on bachelor, master and PhD levels.

Dr. Callewaert has extensive experience with sociology of education, educational policy and planning, curriculum development, participatory learning methods and methodological development and has during the last 20 years been a leading person concerning development of theoretical understanding of learning processes. A good understanding of developing countries has been obtained during working experiences in Guinea-Bissau, Mozambique, Namibia, Ethiopia and Tanzania with development fieldwork, research and research education on Masters and PhD levels on site in these countries and in Copenhagen/Uppsala/Bergen.

Dr. Petersen 's core competence is the sociology of knowledge and studies of semiprofessional knowledge production, i.e. theories in, for and about social practices in the practical (primary, secondary and tertiary health services), as well as the theoretical (in education and in science), and specifically in Nursing. She has also worked with curriculum and teacher training qualification of several educational institutions over more than 20 years. Since 2009 she has been professor in nursing at Bergen University.