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EVALUATION OF DESIGN INTERVENTIONS FOR HOSPITALITY AND PRIVACY AT INPATIENT WARDS

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Abstract

Objective – Inspired by the strong vision of the hospital organization on hospitality, a new hospital was built with the intention to provide an open environment which supports privacy and interaction between the occupants. This study evaluates the satisfaction of patients, visitors and nursing staff with shared and single bedrooms, regarding privacy and interaction with others.

Background – The hospital organization and the architecture firm, responsible for the design of the new hospital, initiated the study in order to receive high quality feedback on design interventions. The design intended to support both social and professional interaction while safeguarding sufficient privacy for the patients. Privacy of patients was evaluated as one of the aspects which may affect the experience of hospitality.

Research question – To what extent do layout aspects of single and shared bedrooms support privacy and social interaction of the patients, visitors and staff?

Methods – The study was an observational study comparing evaluations of three types of users of the hospital building: patients, visitors and nursing staff. A questionnaire was developed consisting questions about personal characteristics of the respondents, satisfaction with building and care related aspects and a number of statements that had to be rated on a 5-point scale. The study was approved by the Medical Ethical Test Committee of the hospital.

Results – 195 nurses, 154 patients and 150 visitors completed the questionnaire. Generally, all three groups were satisfied with the level of privacy and interaction, supported by layout aspects of the single and shared bedrooms; patients were most satisfied. Differences in the rating of importance of privacy related aspects were statistically significant between patients, visitors and staff.

Conclusion – The findings contribute to improvement of design interventions in future hospitals. Layout related aspects as well as organizational aspects contribute to improve satisfaction with privacy and interaction. Generally, staff was less satisfied than patients and visitors; more involvement of nurses in future design processes is most valuable.

1 Introduction

It is well known that the built environment affects comfort and satisfaction of occupants in hospitals (1-4). Therefore, it is relevant to take evaluations of previous design interventions into account during the programming and design phase. In order to receive high quality feedback on design interventions, which may affect comfort and satisfaction, it is necessary to perform objective measurements (5). The hospital organization and the architecture firm, responsible for the design of the new hospital, initiated this study in order to evaluate design interventions regarding the patients' privacy at inpatient wards. This study intends to provide information for future hospital design, as well as for the hospital organization.

According to Woogara (2001) "privacy is vital for patient's physical, mental, emotional and spiritual wellbeing" (6). As patients experience many interactions with physicians, nurses and visitors, loss of privacy may affect their perception of hospitality (7). In designing the building, it was therefore important that patients and visitors would experience an open and hospitable environment with ample opportunity to interact as well as sufficient privacy. For the staff it was essential to be able to easily communicate with patients and to have sufficient space and privacy with the patient to provide the necessary care. Traditionally, privacy was seen as a personal process; this was challenged by Altman (8) who defined privacy as an intrinsically social process, involving people's interaction, their social world and environment. He argued that the desired privacy level changes with time according to environment. Information is scarce about the relationship between the spatial structure of hospital wards and patient preferences for privacy. In the literature, a number of design characteristics that may affect privacy in relation to the social environment are mentioned, such as noises, the possibility to talk without being overheard, to interact with others and to be seen or

unseen (9,10). Privacy in this study is defined by two of the four aspects of patients' privacy in hospitals stated by Woogara (2001): first, "the right to expect treatment with dignity during intimate care", second "the right to control one's personal space and territory" (6). Both aspects relate to the lay-out of the rooms and the perception of personal privacy. Due to differences in duration of stay, health status and performed activities, the perception and needs of patients may differ from those of visitors and staff (11). Few studies have been conducted with both patients, staff and visitors (12). Therefore, this study compared privacy and satisfaction with layout aspects of patients, visitors and staff at inpatient wards in a Dutch hospital.

2 Methodology

2.1 Study design

The observational study was conducted in February and March 2016 in a teaching hospital in The Netherlands.

The participants in the study were patients of nine different inpatient wards, their visitors and the nursing staff providing care to these patients. Excluded were patients and their visitors who did not speak or read Dutch. 195 Nurses, 154 patients and 150 visitors of the hospital participated in the study.

Instrument

For the study, a questionnaire was created based on previous questionnaires, such as the Pembury questionnaire for staff at inpatient wards (13), European OFFICAIR (14) and a pilot study in an academic hospital in the Netherlands. In addition, the wards were visited before and during occupancy. The project architect of the hospital provided information about the design of the building as well. The first and second author created the questionnaire in 2015. Five nursing students were involved and added a few questions.

The language of the questionnaire was Dutch, the national language of the hospital. A small pilot was conducted, before the study started.

The questionnaire consisted of different parts: satisfaction with environmental conditions (such as the location of the bathroom, or place around the bed to provide care), personal questions (such as gender, age) and questions about care (such as the importance to have a view on patients, while entering the bedroom). The participants had the opportunity to add remarks, suggestions or an explanation at the end of each part. Questions were formulated as neutral as possible, in order to avoid bias. The comparison of satisfaction with comfort, appearance, layout and control between staff, patients and visitors is presented in another paper (10). This paper focusses on privacy and satisfaction with single and shared bedrooms, related to the layout of the rooms.

Questions used for rating satisfaction or importance had a five-point rating scale (very unsatisfied, unsatisfied, neutral, satisfied, very satisfied, or, strongly disagree, disagree, neutral, agree, strongly agree). If participants considered the question unsuitable for their situation, they could choose 'not applicable'. Examples of questions are: 'To which extent are you satisfied with the available place for the visitor?' or, 'To which extent are you satisfied with the location of the bathroom?' An example for a statement about importance is: 'I consider it important to have a view on handhygiene'. The questionnaires for patients, visitors and staff were similar, except for questions related to the work performance of the nurses.

2.2 Hospital building

The hospital building studied was delivered in March 2015 and since August 2015 operational (Figure 1). The hospitals' vision was to provide a safe, comfortable and hospitable environment for all users with opportunity for both social and professional interaction while safeguarding sufficient privacy for the patients. The building comprised of outpatient and treatment areas and inpatient wards (480 beds). A combination of single bedrooms and shared bedrooms was realized at the inpatient wards on the upper three floor levels of the building. Both types of patient rooms had all sorts of orientation: north, east, south, and west (Figure 2).



Figure 1. Exterior of the building



Figure 2. Fragment of inpatient ward

The views from the single bedrooms and shared bedrooms varied from a wide view to a view on another wing of the hospital building, mostly at a distance of 28 m, incidental at 21 or 15 m. The colours, finishing materials and furniture in all bedrooms were similar, intended to provide a warm and professional appearance (Figure 3). Finishing of the cupboards and bed panel had a light coloured, wood-like appearance.

Patients in the single bedrooms had their own, direct accessible bathroom. Patients in the shared bedrooms accessed the bathroom from a niche in the corridor. The cupboards for personal items were located near the entrance of both bedrooms. The shared bedrooms comprised two cupboards, both divided vertically in two. For every bed, half a cupboard was available. The single bedroom comprised one cupboard, half the width from the one in the shared bedroom, over the full height. The sink, soap and alcohol dispenser were located parallel to the beds, in order to provide a view on hand hygiene from the patient beds. In both rooms the beds were positioned parallel to the window (Figure 4). The surface area of the single bedroom was approximately 17 m², the shared four bed bedroom was approximately 42 m²; both exclusive the bathrooms.



Figure 3. Colours in the patient room



- 1 = bathroom
- 2 = sink
- 3 = cupboard staff
- 4 = cupboard patient
- 5 = bedcurtain
- 6 = bed

Figure 4. Layout of the single and shared bedroom

2.3 Procedure

A week before the study started, the hospital organization published an announcement and explanation of the study on the Intranet, which is accessible to the complete hospital staff. Additionally, the team leaders received an email in order to motivate the nurses to participate. The questionnaires for patients and visitors were distributed at nine different inpatient wards (e.g. neurology, lung care). Hardcopies of the questionnaire were distributed personally to patients and visitors by the research assistants; a digital version was sent to the staff (nurses) using Survey Monkey. During distribution, the researchers informed the nurses of each ward before they started to invite participants. The researchers invited all patients and visitors personally to participate. Patients who were sleeping or had their bedcurtains closed, were not disturbed. The participants needed 10-15 minutes to complete the questionnaire.

2.4 Data management and analysis

The data from the questionnaires of the patients and visitors were manually fed in SPSS 25.0. A second person systematically checked the input of the data. The digital questionnaires of the nurses were imported in SPSS from Survey Monkey. Section 3 provides an overview of differences between the groups and rooms for each question regarding privacy and social interaction. Therefore, the tables in section 3.2 report the numbers of participants as well as the numbers and percentages of dissatisfaction, reported as “-” (based on very unsatisfied and unsatisfied), neutral, reported as “0”, and satisfaction, reported as “+” (based on satisfied and very satisfied). A chi-square was calculated for the differences in importance between the three groups of participants for layout related aspects, as the number of participants of each group was sufficient. All data collected were anonymous.

2.5 Ethical aspects

In autumn 2015 study was approved by a Medical Ethical Test Committee.

3 Results

3.1. Participants

The number of respondents was 532. Exclusion of incomplete questionnaires (<30%), resulted in 499 participants (195 nurses, 154 patients, 150 visitors).

The distribution of gender and age of nurses was different from patients and visitors (see Table 1). More than 94% of the nurses was female, which is representative for the complete nursing staff in the hospital. As the language of the questionnaire was Dutch, for nearly all participants (up to 98%), Dutch was 'the language most used at home'. In line with the ageing society and the generally increasing care needs related to age, more than half of the patient population was older than 65 years.

	Nurses	Patients	Visitors
n	195	154	150
Female	94.3%	53.3%	63.3%
Age			
18-40 years	50.0%	5.1%	18.3%
40-65 years	50.0%	39.7%	40.4%
>65 years	0%	55.1%	41.3%

Table 1. Satisfaction of patients with single and multiple bedrooms

3.2 Comparison of satisfaction with layout related aspects of single and shared bedrooms

The average satisfaction of patients on a scale of 1 to 10 with the single bedroom was 8,4 (sd1,29) and with the shared bedroom 7,7 (sd 0,70). Visitors were less satisfied than patients, for single bedrooms 7,8 (sd 0,95) and for multiple bedrooms 7,3 (sd 1,17).

Although patients and visitors were generally more satisfied with single rooms than with shared rooms, less than 9 % was dissatisfied with all layout related aspects of the shared rooms, except the place for personal items in single as well as shared rooms. Additionally, more than 9% of the visitors was unsatisfied with privacy during visits in the shared rooms (see Table 2). Both patients and visitors stated that privacy (80,7%, 79,9%) and place for the visitor (83,7%, 88,6%) were important. Contact with other patients was for patients less important (60,7%) than privacy and place for a visitor. Visitors were equally satisfied with the place for providing care in single and shared bedrooms, as shown in Table 3. Visitors were more satisfied with all other layout related aspects of single bedrooms than in shared bedrooms. Patients were more satisfied with place for personal items (cupboards) in the shared bedrooms, visitors were more satisfied with the cupboards in the single bedrooms.

Staff members were working in both single and shared bedrooms; therefore, satisfaction with the rooms was not reported for both room types separately. 52,2% of the respondents disagreed with the statement that there is no difference in working in a shared bedroom or a single bedroom, 19,2% was neutral about this statement, and 28,2% agreed (Table 4). Staff was less satisfied with the ability to keep privacy of the patient while providing care, compared to patients and visitors in single and shared bedrooms.

	Single bedroom n (%)				Multiple bedroom n (%)			
	n	-	0	+	n	-	0	+
Place for personal items	17	3 (17,6)	3 (17,6)	11 (64,7)	91	13 (14,3)	13 (14,3)	65 (71,4)
Place for the visitor	17	1 (5,9)	2 (17,6)	14 (78,3)	92	6 (6,5)	15 (16,3)	71 (77,2)
Privacy while receiving visitor	17	0 (0,0)	1 (5,9)	17 (94,1)	88	5 (5,7)	25 (28,4)	58 (65,9)
Place for care	17	1 (5,9)	4 (23,5)	12 (70,5)	96	2 (2,1)	17 (19,8)	77 (80,2)
Privacy while receiving care	18	0 (0,0)	1 (5,6)	17 (94,4)	94	4 (4,3)	14 (14,9)	76 (80,8)
Safety	18	0 (0,0)	1 (5,6)	17 (94,4)	92	3 (3,3)	24 (26,1)	65 (70,7)
Privacy curtains	18	0 (0,0)	1 (5,6)	17 (94,4)	94	4 (4,3)	14 (14,9)	76 (80,8)
Location bathroom	18	1 (5,3)	1 (5,3)	16 (88,9)	95	3 (3,2)	19 (20,0)	73 (76,8)
Place for personal items in bathroom	18	0 (0,0)	1 (5,6)	17 (94,4)	92	3 (3,3)	24 (26,1)	68 (70,7)

Table 2. Satisfaction of patients with single and multiple bedrooms

	Single bedroom n (%)				Multiple bedroom n (%)			
	n	-	0	+	n	-	0	+
Place for personal items	34	5 (14,7)	8 (23,5)	21 (61,8)	92	16 (17,4)	28 (30,4)	48 (52,2)
Place for the visitor	37	0 (0,0)	6 (16,2)	31 (83,8)	102	6 (5,9)	16 (15,7)	80 (78,4)
Place for care	30	1 (3,3)	7 (23,2)	22 (73,3)	75	4 (5,3)	16 (21,3)	55 (73,3)
Safety	36	0 (0,0)	8 (22,2)	28 (77,7)	99	3 (3,0)	26 (26,3)	67 (72,7)
Privacy during visits	37	0 (0,0)	2 (5,4)	35 (94,6)	98	13 (13,3)	27 (27,6)	58 (59,2)
Privacy curtains	29	1 (2,7)	5 (17,2)	23 (79,3)	94	7 (7,4)	24 (25,5)	63 (67,0)
Location bathroom	35	1 (2,7)	2 (5,7)	32 (91,4)	81	7 (8,6)	18 (22,2)	56 (69,1)
Attractive for visit	36	0 (0,0)	5 (13,9)	31 (86,2)	94	7 (6,4)	24 (25,5)	63 (67,0)

Table 3. Satisfaction of visitors with single and multiple bedrooms

	n (%)			
	n		0	+
Place for visitors	186	53(28,5)	55 (29,6)	78 (42,0)
Place to provide care	194	44 (22,7)	38 (19,6)	112 (57,7)
Able to keep conversation of physician or nurse with patient private	187	96 (51,3)	30 (16,0)	61 (32,7)
Able to keep visual privacy for patients in shared rooms	185	32 (17,3)	38 (20,5)	115 (62,2)
Able to provide visual privacy with bedcurtains	190	33 (17,4)	49 (25,8)	108 (56,8)
No difference working in single or shared bedroom	177	93 (52,5)	34 (19,2)	50 (28,2)

Table 4. Satisfaction of staff with single and multiple bedrooms

3.3 Importance of layout related aspects, supportive to privacy or social interaction

The possibility to have the door of the bedroom open or closed enables staff to regulate the extent of privacy and visual contact with patients from the corridor to the bedroom. Staff (87,2%) and visitors (84,0%) stated that this was more important than patients did (62,5%) ($p < .000$), as shown in Table 5. The position of the sink was similar in both bedrooms and enables staff to look aside towards the patients in the room, while they are cleaning their hands. Additionally, the position of the handbasin enables patients to see staff cleaning their hands. More patients (76,5%) than staff (63,1%) and visitors (67,0%) stated that a view on hand hygiene of staff was important ($p < .01$). For staff it was more important to see the patient at the entrance, than providing a view on hand hygiene.

	n	n (%)			p-value
		-	0	+	
View on hand hygiene					
Staff	182	12 (6,6)	55 (30,2)	115 (63,1)	p<.01
Patients	145	1 (0,7)	33 (23,4)	111 (76,5)	
Visitors	127	13 (10,2)	29 (22,8)	85 (67,0)	
Ability to have the door open					
Staff	180	8 (4,4)	15 (8,3)	157 (87,2)	p<.000
Patients	136	16 (11,8)	35 (25,7)	85 (62,5)	
Visitors	137	5 (3,6)	17 (12,4)	115 (84,0)	
See patient at the entrance					
Staff	184	36 (19,6)	19 (10,3)	129 (70,1)	

Table 5. Perception of importance

4 Discussion

4.1 Strengths and limitations

The aim of this study was to gain more insight into which extent layout related aspects of shared and single bedrooms contribute to privacy and satisfaction with the layout. The number of respondents for single rooms was relatively low, compared to the respondents for shared rooms. Future research with equal numbers of participants for both rooms may identify differences, which can be tested on statistical significance.

Although previous validated questionnaires formed the basis for the questionnaire designed, this study comprised additionally new questions, specific for patients, visitors and staff. Because the questionnaire reflects on the integral perception of the bedroom and the intention to limit the time needed for completing the questionnaire, the question about hand hygiene was limited to only one question, as well as the question about differences between single and shared bedrooms. The importance to see the patient at the entrance of the bedroom would have been relevant to ask visitors as well.

The importance for staff to have the bedroom door open towards the corridor may be explained by the findings of Maben et al. (2015) [15]. In that study staff stated that the limited vision on patients was a disadvantage of single rooms, compared to bay wards. The findings on privacy of patients in single rooms are consistent with that study as well. The importance for patients to have a view on staff, while they are cleaning their hands, is consistent with the improved satisfaction of patients with rooms facing staff, compared to rooms facing the back of staff or staff cleaning their hands in the toilets (Mac Allister et al., 2018) [16]. The low satisfaction of staff with the ability to keep the conversation with patients private while providing care, may be explained by the large number of shared rooms in the hospital building, compared to single rooms. Van de Glind et al. (2008) suggested that verbal and nonverbal communication of physicians with patients improved in single rooms compared to four bed rooms [17].

4.2 Applicability

The differences between patients, visitors and staff in satisfaction and importance with layout related aspects contribute to a better understanding of the needs during the programming and design process of hospitals. Organizational measures as well as layout related measures may contribute to the patients' privacy. The results of this study indicate that it is important to locate the sink and alcohol dispenser parallel to the patient beds, in order to provide a view on the hand hygiene performance. Doors with free wheel closers may support satisfaction of staff, due to their perceived importance on the ability to have the doors open. With regards to "control one's space and territory" detailed study on the following aspects may contribute to improved privacy in future design projects:

- Appropriate dimensions of the cupboards in combination with organizational measures on patient information of items needed during an inpatient stay.
- Schedules for visiting hours in shared patient rooms.

As staff was less satisfied with the ability to provide visual privacy during care than patients were with their privacy while receiving care, it is relevant to provide insight in the difference in perception of staff and patients within hospital organization and education. This insight may contribute to patient and work satisfaction, with regards to ‘the right to expect treatment with dignity during intimate care.’

4.3 Research and education

Within the hospital organization, the study improved collaboration between the science and nursing education department. The connection with the local nursing school improved as well, as their students were involved in the questionnaire design and distribution of the questionnaires on paper (for patients and visitors) at the wards.

5 Conclusion

Layout related aspects as well as organizational aspects contribute to privacy and interaction for patients in single and shared bedrooms. Staff was less satisfied with privacy in single and shared rooms than patients and visitors. Detailed study on organizational as well as spatial aspects may improve privacy in single and shared bedrooms in future. As staff was less satisfied than patients and visitors, involvement of nurses in future design processes may contribute to improved satisfaction.

References

- [1] Ulrich RS, Zimring C, Zhu X, DuBose J, Seo H, Choi Y, et al. (2008) A review of the research literature on evidence based healthcare design, *Health Environments & Research Design Journal* 61-125
- [2] Dijkstra K, Pieterse M, Pruyn A. (2006) Physical environmental stimuli that turn healthcare facilities into healing environments through psychologically mediated effects: systematic review, *Journal of advanced nursing*, 166-81
- [3] Salonen H, Lahtinen M, Lappalainen S, Nevala N, Knibbs LD, Marowska L, et al. (2013) Physical characteristics of the indoor environment that affect health and wellbeing in healthcare facilities: a review, *Intelligent buildings international*, 3-25
- [4] Huisman ER, Morale E, Van Hoof J, Kort HSM. (2012) Healing environment: A review of the impact of physical environmental factors on users. *Building and Environment*, 70-80
- [5] Hamilton DK. (2009) Every facility project and every building is a research opportunity, *Health Environments & Research Design Journal*, 112-5.
- [6] Woogara J. (2001) Human rights and patients' privacy in UK hospitals. *Nurs Ethics* 234/46.
- [7] Severt D., T. Aiello, S. Elswick, C. Cyr (2008) Hospitality in hospitals? *International Journal of Contemporary Hospitality Management* 667-678
- [8] Altman, I (1975). The environment and social behavior. Monterey, CA: Brooks/Cole
- [9] Alalouch C, Aspinall P & Smith H (2009) On locational preferences for privacy in hospital wards. *Facilities* Vol. 27 No. 3/4, 2009 pp. 88-106
- [10] Alalouch, G. (2011) Hospital Ward Architecture. A Mixed Methods Approach for Spatial Design and Privacy. Lap Lambert Academic Publishing. [8] Fornara F, Bonaiuto M, Bonnes M. (2006) Perceived hospital environment quality indicators: A study of orthopaedic units, *Journal of Environmental Psychology*, 321-34.
- [11] Eijkelenboom A, Bluyssen PM. (2019) Comfort and health of patients and staff, related to the physical environment of different departments in hospitals: a literature review, *Intelligent Buildings International*.
- [12] Penfold C, Maben J. (2011) Impact of hospital ward design on staff and patient experiences, staff survey MAU, Southampton: National Institute for Health and Research
- [13] Bluyssen P. M., Roda C, Mandin C, Fossati S, Carrer P, deKluizenaar Y, et al. (2016) Self-reported health and comfort in 'modern' office buildings: first results from the European OFFICAIR study, *Indoor Air*, 298-317
- [14] Eijkelenboom A, Blok GA, Bluyssen PM. (2019) Comfort and satisfaction of patients, visitors and staff with patient rooms at inpatient wards, a pilot study. Accepted full paper to CLIMA 2019.
- [15] Maben J, Griffiths P, Penfold C, Simon M, Anderson JE, Robert G, et al. One size fits all? (2015) Mixed methods evaluation of the impact of 100% single-room accommodation on staff and patients experience, safety and costs, *BMJ Quality & Safety*, 1-16
- [16] MacAllister L., Zimring C., Ryherd E. (2018) Exploring the relationships between patient room layout and patient satisfaction, *Health Environments & Research Design Journal*, 1-17
- [17] van de Glind I, van Dulmen S, Goossensen A. (2008) Physician-patient communication in single-bedded versus four-bedded hospital rooms, *Patient Education and Counseling*, 215-9