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The Patient Room

A growing number of hospitals are being built with mostly single-bedded rooms instead of multi-bedded. But it is unclear to what extent decisions are based on scientific, evidence-based knowledge or political, economic, organisational or cultural requirements. The purpose of this article is to present an overview of the latest scientific knowledge about the pros and cons of single-bedded and multi-bedded wards in hospitals. The article will also focus on key areas where knowledge is lacking and where further research might be relevant.

The discussion about the pros and cons of single- or multi-bedded rooms is as old as the experience of building modern hospitals itself (Goldin and Thompson 1975). As early as 1788 the subject was discussed in Austria regarding two hospital buildings and the same reasoning was argued as that which may be construed from the latest research today. It can therefore be considered as a fundamental challenge in the design of hospital wards.

Research

Based on available findings of evidencebased knowledge we find that topics like privacy and patient dignity, patient satisfaction, communication, noise and sleep quality, light and air, treatment and care, hospital-acquired infections, patient safety, patient recovery rate and hospitalisation are most present in the ongoing discussion. On the other hand, compliance, rehabilitation and economic related topics appear to be less prevalent.

Focus on patient safety is an especially significant concern in US research but also something we in Scandinavia have directed our attention to. The article "Enestuer" from Journal of The Danish Medical Association identifies both the advantages and disadvantages or limitations in relation to patient safety and single-bedded rooms and also pointed out the general need for a broader perspective on research and more evidencebased knowledge in the field (Jensen 2009).

Single-Bedded Rooms:What do we Know?

The 2008 report "Future Patient Room" recommends single-bed rooms in all hospital wards because it ensures patient privacy, fresh air, rest and sleep. The architectural design of single-bedded rooms can better ensure the attenuation of noise from both technology and personnel. Thus, the quality of patients' sleep improves significantly, which is an extremely important but overlooked factor for recovery and length of stay (Andersen et al. 2008).

Single-bedded rooms seem to have a moderate effect on patient satisfaction with care as communication between patient and health professional is thought to be more comfortable and undisturbed. In addition, the single-bedded room allows the patient to maintain his or her dignity with personal care taking place without the other patients in the vicinity (van de Glinde et al. 2008).

Conflicting results were found in relation to risk of infection transmission. Some studies show that single-bedded rooms reduce the risk of hospital-acquired infections (HAI), while others conclude no significant differences between single- or multi-bedded rooms. For example, a study regarding the control of methicillin-resistant Staphylococcus aureus (MRSA) cannot conclude whether single-rooms or hand hygiene is the most important factor in the control of MRSA. Not surprisingly, other studies show that the use of detergents and alcohol dispensers reduce the risk of HAI. However, this depends on how they are placed - in and outside the patient room (Ulrich et al. 2004; 2008). There is still a lack of knowledge on the subject of how to reduce the risk of infection significantly. Researchers therefore call for further studies in this area (Cheng et al. 2010).

There is some evidence regarding the positive effect of daylight on the patients' healing process, depression risk, patient routine and the work environment. The same applies to the prospect of nature. Through its design the single-bedded room can offer daylight and views to nature as a real partner in treatment (Ulrich et al. 2004; 2008). But capital expenditure is higher and the occupancy rate could be increased. On the plus side, the single-bedded room can quickly be turned into an intensive care or isolation room. However, this requires flexible and well-trained health professionals, which has shown to be problematic in several studies (Ulrich et al. 2004).

The single-bedded room also provides space for patients' relatives, which to a certain degree allows their inclusion in the care or rehabilitation if appropriate and possible (Domanico et al. 2011). It is often concluded that overall there are many benefits to single-bedded rooms, but they are not without their disadvantages such as the patients' feelings of isolation and need for greater social contact, which may have a negative influence on the quality of care (Chaudhury et al. 2005).

Multi-Bedded Rooms:

What do we Know?

The multi-bedded room may counter the risk of patients experiencing loneliness, isolation and fear of being overlooked. Furthermore, patients with the same types of illnesses and symptoms may benefit from each other. By using each other as benchmarks patients have the opportunity to assess their own disease situation and learn from others' illness experiences (Gubrium et al. 2003). This is a significant requirement in the

treatment and rehabilitation phase that can be extremely difficult to meet for caregivers.

The primary function of multi-bedded rooms is to give staff the possibility of a quick overview of a group of patients. In addition, multi-bedded wards shorten distances within the department and thus increase efficiency of staff. Problems with lack of space and thereby storage opportunities in multi- bedded room are, however, a challenge, which may reduce the benefits from the shorter distances. Capital expenditure is lower for multi-bedded rooms because there are fewer engineering heavy walls, which in turn can increase flexibility in construction (Phiri 2003).

Multi-bedded rooms reduce patients' access to privacy, fresh air and quietness significantly and the availability of daylight and views of nature from the bed is only reserved for patients at the window. These factors are said to have an impact on patient length of stay (Ulrich, 2004; 2008; Frandsen 2009).

Economics

The relationship between capital expenditure on the one hand and effective utilisation of human resources in operations on the other hand should in itself be an argument for more research. In the shadow of the current trend of predominantly private rooms we could be building hospitals that we cannot afford to operate. The implications here are both associated with the social and health economy because money spent on health and hospitals may prove to be used less efficiently - both for the individual patient and also society. A future scenario could be that patients in single-bedded rooms will be exposed to video and telemedical monitoring and experience many fast visits by staff and indoor walls designed with windows. This may lead to an evil boomerang of good intentions to return with bad consequences. The initial single-bedded room argument about privacy, time and undisturbed dialogue with healthcare professionals seems contradicted by the constraints of reality.

Recommendations

The pros and cons of single and multi-bedded rooms are inconclusive but more in favour of the single-bedded room. Our recommendation is that patient wards should be primarily set up with single-bedded rooms but also provide patient rooms with several beds so that the ward can meet the desire or need of patients who ask for or need more social contact and knowledge sharing with fellow patients. Regarding multi-bedded rooms, the recommendation is of patient rooms with three beds (Andersen et al. 2008). It is also recommended that efforts are made to design flexible multibed rooms, where privacy and tranquility can actually be offered while social interaction among patients is also supported.

Need for Further Research

The data included in this review article indicates that there seems to be a clear link between single-bedded wards and medical outcomes but the actual relationships between variables are not yet clear enough. It is not clear whether single- bedded wards and this "one-size-fitsall" approach to hospital design is suitable for all patient groups. The overall generalisations about types of patient rooms and outcomes are problematic because there are multifactorial conditions. There is therefore a need for a much larger number of research projects and testing of different concepts which includes the significance of the individual patient and diagnostic groups' needs and preferences for the design of wards in relation to safety, recovery and rehabilitation. This research must also be designed to place the patient room in a broader, multidiciplinary context regarding capital expenditure and occupancy, staff-turnover and other relevant measures.
Research is also lacking on the complex subject of the effect on recovery rate and patient safety in the use of single-bedded rooms. In addition, the research designs of the few studies carried through are considered poor (van de Glinde et al. 2007).This is also pointed out in the two reviews (Ulrich et al. 2004; Ulrich et al. 2008), which highlight the need for more studies of patient safety and HAIs associated with private rooms and recovery rates.

There is a lack of research on patient room layout in relation to the rehabilitation of individual patient groups, but this is becoming more and more sought after as we start to design the hospital around the needs of the patient. It leads us to leave the overall architectural layout until fundamental and significant concerns of patients and economic factors are profoundly explored and crucial decisions are made.

Future research should build on existing knowledge of patient rooms and develop a common conceptual framework that ensures the best possible evidence. This will serve as a basis for evidence-based decision making in designing the hospital business model and building.

Figure 1. A multi-bedded room

Figure 2. The single-bedded room with space for relatives

Figure 3. A multi-bedded room. Only one bed benefits from the natural light

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