Designing the healthcare workplace

Optimized workflow and processes in a healing environment

Dräger

Providing a good quality of care is the primary objective of any healthcare facility. Quality of care issues in hospitals have been linked to many different aspects of facility design: from poorly functioning ventilation systems, to crowded and noisy medication rooms, to flooring materials that contribute to falls, as well as nursing units whose distance from patient rooms contributes significantly to nurse fatigue. Hospitals also provide many opportunities for ergonomic stressors. Unlike working in a conventional office, where a poorly designed environment may provoke relatively minor health problems, in the hospital consequences of inappropriate design can be far more serious. (1) On the other hand, a well-designed healthcare workplace and environment can result in considerable improvements in the clinical outcomes, economic performance, productivity and patient as well as staff satisfaction.

Optimal healing environment

A healing environment is desirable for patients and for providers alike. One element is the physical space in which healing is practiced (2). An advanced workplace design in terms of healing environment offers for example hidden medical technology and a pleasant room design. Optimized environmental design includes characteristics or interventions like an effective ventilation system, a good acoustic environment, appropriate lighting, color concepts and an ergonomic design as well as well-planned floor layouts and work settings. All these modifications are associated with improved healthcare outcomes (3).

Creating a healing environment with evidence-based design can be considered as “smart investment” because it increases staff efficiency and promotes healing by making the stay for the patient less stressful, ultimately saving money for the hospital (4).

Evidence-based design of hospitals

In 2004 the authors of a comprehensive review regarding the design of healthcare environments and its effect on patients and staff found a correlation between physical environment and patients as well as staff outcomes in several areas: staff effectiveness, reduction of medical errors, increased staff satisfaction, improvement of patient (and staff) safety, stress reduction, improvement of outcomes and overall healthcare quality (5). Based on this article, a second review of more than one thousand studies looked at the relationship between the physical design of hospitals and key outcomes from two different perspectives: patient outcomes and staff outcomes. The authors showed a substantial connection between well designed physical settings and improved outcomes (3).

Patient outcomes include hospital-acquired infections

Each year a large number of patients die as a result of medical errors and hospital-acquired infections (6). Millions more suffer from non-lethal medical events, including errors in the amount and type of medication dispensed to patients (5,7). The design of the physical environment impacts nosocomial infection rates by affecting all three major transmission routes – air, contact, and water. Room ventilation, cleaning and decontamination therefore requires special consideration (8). Design strategies such as effective ventilation, better ergonomic design and improved work settings facilitate compliance with infection prevention standards and increase workplace safety (3).

Prevention of falls and medication errors

Patient falls in hospitals are common and may lead to negative outcomes such as injuries or prolonged hospitalization (9). Interventions should consider placement of doorways, handrails and securing carpeting as well as improving lightning. Falls may also be prevented with design features that consider the frailty of patients inside and outside their bathrooms. Once these basic features are corrected, patient falls can be decreased by up to 17.3 percent (4,5).

Environmental factors discussed in relation to medical errors include noise and light. Studies have shown that poor illumination may lead to errors in dispensing medication (10). Inappropriate organization of the medical supplies, lack of space and visibility contribute to medical errors as well (11). A standardization of patient rooms and equipment can decrease medical errors and clean and well organized workstations can to help reduce mistakes during device use.

Parameters to create supportive environments: Visual and acoustic comfort

The hospital stay is often a time of great stress for patients that can affect the treatment process. Studies demonstrated that specific design approaches in the hospital environment have the potential to reduce stress, pain and anxiety (12).

(Day)light is important for reducing patients' pain and depression and has a positive effect on length of stay (4). Different light settings and atmospheres therefore can accelerate the healing process. Revising the acoustic environment as well as optimizing day- and nighttime, light environments can improve sleep quality and duration. Hospital design that minimizes environmental stressors and fosters exposure to stress-reducing or restorative features should advance improved outcomes (13,14).

Staff Outcomes in terms of injuries, stress, work effectiveness and satisfaction

Staff safety

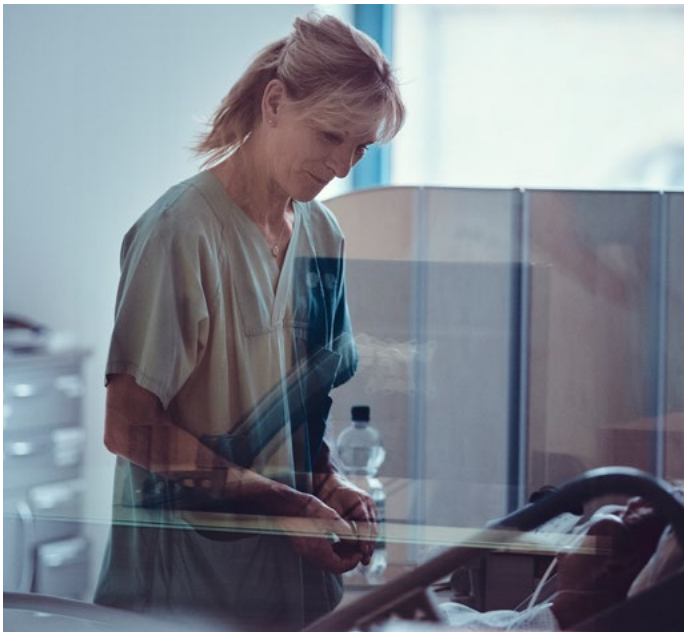
Nurses are frequently required to perform heavy manual lifting to move and reposition patients in their care. The musculoskeletal injuries and pain experienced by nurses have several negative implications. These include an impact on nurses' wellbeing, quality of life, and job satisfaction. Furthermore, high costs are generated from lost workdays. Several studies found that lifting interventions comprised of education, a lift team and mechanical lifting equipment can reduce staff injuries (15,16).

Stress reduction

Contributing to employees' stress are poorly designed healthcare workplaces that are noisy, increase fatigue or hinder patient care activities (17). On the other hand, stress can be reduced by e.g. administration of bright light in staff work areas. This measure can also alleviate stress among night-shift nurses. Controlling noise can help to reduce stress and to create a quiet, healthy and comfortable environment for staff as well as patients and visitors.

Staff satisfaction and process efficiency

Healthcare worker job satisfaction is a very important parameter that influences productivity as well as quality of work (18). Job satisfaction of healthcare staff can be supported through optimal workplace infrastructure, including layout and organization of workstations. Workstation design should be adjustable and consider varying needs of staff. Ergonomic interventions are becoming even more important with regards to the ageing workforce. Improving the environment and the atmosphere in which nurses work may also attract new students to nursing.



Location of supplies is important for staff's walking and patient-care time. Workflow optimization with flexible and individual solutions for the workplace setup and customization can support process efficiency. Uninterrupted monitoring concepts for instance allow employees to spend more time with the patients; the monitoring stays unobtrusively in the background and quietly supports the work processes. And the clinic only needs training on one system for all employees, thus optimizes the processes on the patient and helps to save time and money.

Optimized workplace design adapted to different needs

Operating Room (OR) – The Operating Room is a key resource of all major hospitals. Redesigning the OR should consider optimized light solutions for surgical applications, usage of surfaces that can be easily decontaminated, pendants / ceiling supply units to have devices off the floor as well as smart cable management solutions.

Neonatal Care – Building a nurturing environment design is critical for the infants and their development as well as for the family and staff. Flexible workstation design and integrated solutions may enable nurses to spend more time with the infants. Less time is needed to walk about the unit during the work (14).

Intensive Care Unit (ICU) – A healing environment, meant to minimize the hospital stressors, makes the stay of critically ill patients less stressful and can promote faster healing. (4) Studies have shown that reducing noise levels and turning the lights down decrease patients' anxiety, which with other factors decreases the incidence of delirium (20).

Flexible and ergonomic workstation design enables rapid response to patient needs. On intensive beds, for example, all relevant monitors can be fitted in such a way that the treating physician can see them from both sides of the patient bed and they don't have to walk around the bed anymore.

Creating a healing environment by optimizing facility design can influence patient healing rates, decrease the length of hospital stays and impact patient satisfaction. Improving the work environment for healthcare staff may also improve the quality and safety of patient care.

Sources

1 Becker and Parsons, Hospital facilities and the role of evidence-based design. Journal of Facilities Management Vol. 5 No. 4, 2007, pp. 263-274.

2 Sakallaris et al., Optimal Healing Environments. Global Adv Health Med. 2015;4(3):40-45.

3 Ulrich et al., A review of the research literature on evidence-based healthcare design. HERD. 2008 Spring;1(3):61-125.

4 Huisman et al., Healing environment: A review of the impact of physical environmental factors on users. Building and Environment 58 (2012) 70-80.

5 Ulrich and Zimring, The Role of the Physical Environment in the Hospital of the 21st Century: A Once-in-a-Lifetime Opportunity Report to The Center for Health Design for the Designing the 21st Century Hospital Project.2004.

6 Kohn, T.L., Corrigan, M.J., Donaldson, S.M. (eds), Err Is Human. Building a Safer Health System. Washington: National Academy Press 2000.

7 Weingart SN, Wilson RM, Gibberd RW, Harrison B. Epidemiology of medical error. BMJ : British Medical Journal. 2000;320(7237):774-777.

8 Mehta Y, Gupta A, Todi S, et al. Guidelines for prevention of hospital acquired infections. Indian Journal of Critical Care Medicine: Peer-reviewed, Official Publication of Indian Society of Critical Care Medicine. 2014;18(3):149-163. doi:10.4103/0972-5229.128705.

9 Schwendimann et al., Falls and consequent injuries in hospitalized patients: effects of an interdisciplinary falls prevention program. BMC Health Services Research 2006, 6:69.

10 Buchanan et al., Illumination and errors in dispensing. Am J Hosp Pharm. 1991 Oct;48(10):2137-45.

11 Mahmood A, Chaudhury H, Valente M, Appl Nurs Res. Nurses‘ perceptions of how physical environment t affects medication errors in acute care settings. 2011 Nov;24(4):229-37.

12 Iyendo et al., The therapeutic impacts of environmental design interventions on wellness in clinical settings: A narrative review Complementary Therapies in Clinical Practice 24 (2016) 174-188.

13 Ulrich et al., Effects of interior design on wellness: theory and recent scientific research. J Health Care Inter Des. 1991;3:97-109.

14 Ulrich et al., Essay Evidence-based health-care architecture. Lancet 2006; 368: S38–S39.

15 Guthrie et al., A patient lifting intervention for preventing the work-related injuries of nurses. Work 22, 2004, 79–88.

16 Richardson et al., Interventions to prevent and reduce the impact of musculoskeletal injuries among nurses: A systematic review. Int J Nurs Stud. 2018 Jun;82:58-67.

17 Ulrich et al., The Environment’s Impact on Stress. Chapter 3 in Marberry S.S. Improving Healthcare with better builing design. Chicago: ACHE Management Series/Health administration Press, 2006, pp. 37-61.

18 Nikic et al., Job satisfaction in healthcare workers. Acta Medica Medianae 2008; 47(4):9-12.

19 Reiling et al., Patient Safety and Quality: An Evidence-Based Handbook for Nurses. 2008, Chapter 28 The Impact of Facility Design on Patient Safety.

20 R Rubert, Creating a Healing Environment in the ICU - Semantic Scholar.

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