



KEY POINT SUMMARY

OBJECTIVES

This study aims to present an overall summary of the evidence in literature on healing environments, as related to PF outcomes and staff outcomes.

Healing environment: A review of the impact of physical environmental factors on users

Huisman, E. R. C. M., Morales, E., Van Hoof, J., & Kort, H. S. M. 2012 | *Building and Environment*. Volume 58, Pages 70-80

Key Concepts/Context

According to the authors, research that examines the physical environment and its impact on the healing and well-being of human beings has been growing in the last several years. There is increasing availability of literature on evidence-based design. For this study the authors reviewed literature to determine which of the studies have adequate evidence in terms of patient-family (PF) outcomes and staff outcomes. An intensive literature search and review revealed that most of the studies concerned PF outcomes and very few looked at staff outcomes.

Methods

A systematic literature review was conducted using different academic search engines on the Internet. After the screening process, a total of 65 articles were reviewed. These pertained to the influence of environmental factors on PF and staff outcomes.

Findings

Of the 65 articles reviewed, only 28 were found to have a high level of evidence (systematic reviews and randomized controlled trials). Of these, 86% pertained to PF outcomes while 14% pertained to staff outcomes.

Patient/ family outcomes:

- Reduction of errors:
 - Identical rooms: Standardization of patient rooms and equipment contribute to decreased errors.
 - Lighting: Hospital medication errors had a seasonal pattern in Alaska, with more errors happening in December than in



September. Electrical lighting higher illuminance was associated with fewer errors in medication dispensing.

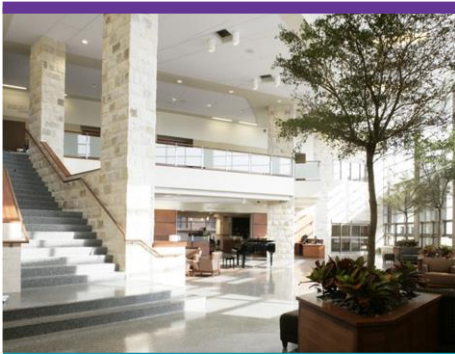
- Increasing safety and security:
 - Reduced falls: Patients diagnosed with a mental disorder had a higher chance of falls than those admitted with musculoskeletal, central nervous system or sense organ problems. Falls were associated with activities that require a patient to change his/ her posture; most falls take place in the patient room near the patient's bed, to and from or in the bathroom.
 - Reduced infection rate: Surfaces that get more frequently contaminated include overbed tables, privacy curtains, computer keyboards, infusion pump buttons, door handles, bedside rails, blood pressure cuffs, chairs, and countertops. Carpeted floors were more likely to harbor microorganisms than bare floors. Although bacteria could accumulate on both fabric-upholstered and vinyl-covered furniture, routine disinfection helped remove bacteria from vinyl surfaces, but not from fabric ones. Finally, single-bed rooms in burn units in combination with good air quality had a reduced rate of infection and mortality.
 - Indoor quality: The contents of indoor air contribute to the health and comfort of the patients, staff, and visitors in a healthcare facility.
- Enhancing control: Giving patients the ability to control their environment (room temperature, lights, sounds of TV, and daylight) alleviates feelings of stress and anxiety.
- Privacy:
 - Waiting rooms: Lack of privacy in the waiting area was a big concern.
 - Single-bed rooms: Occupants in multi-bed rooms expressed a strong need for privacy in the use of bathrooms and within the room/ward itself.
- Comfort
 - Materials: Some studies show carpets to be effective for safety, while others indicate the association between carpeted floors and certain bacteria.



- Art: Artwork featuring natural landscape, flowers, gardens, and figurative art led to reduced stress and improved outcomes, unlike abstract or ambiguous images.
- View: Patients with views of trees had fewer postoperative stays and took fewer pain medications, compared to patients whose windows faced a brick wall. Patients preferred views of plants, neighborhood, and people over those of buildings. Patients in an Intensive Therapy Unit (ITU) with windows retained long-term memories of their stay as compared to those who stayed in ITUs without windows. View does not always refer to the one from a window. Any view that offers visual stimulation and distracts the patient makes pain or a painful procedure more tolerable.
- Visual comfort: This refers to daylight factors, luminance, luminance intensity, and their impact on people. Daylight has a significant impact on patients and staff. Bright light therapy had antidepressant effects; morning light was more effective than evening light for the treatment of seasonal affective disorder; average length of stay for patients in sunnier rooms was less than for those staying in poorly lit rooms. Flooring materials with glare was problematic, especially for people with impaired vision.
- Acoustic comfort: The negative effects of sound and noise are related to the recovery of patients, stress levels, and the quantity and quality of sleep. Acoustic comfort related to sound levels varies with room type.
- Orientation: Seating patterns had an impact on social interactions – placing chairs in circles around a table encouraged interaction as opposed to chairs arranged linearly. Staff and patients both prefer to be in natural open settings. Views of gardens alleviate pain. Orientation is important to effective wayfinding, which can otherwise be stressful.
- Family support: The presence of family helped a patient's recovery, but it also posed a risk of infections. This review did not find a high level of evidence supporting design features for family.

Staff outcomes:

- Organization and functionality: Wayfinding was found to be a challenge in complex layouts typical of large hospitals, suggesting more directional signage at or before intersections.
- Technical support: Most of the evidence in this sub-topic related to ergonomic issues faced by the staff relating to bed heights and the impact



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of musculoskeletal issues on the work of nurses. Hospital beds with smaller wheels were easy to maneuver in small spaces, while those with large wheels were ergonomically comfortable for long distance transport.

- Comfort: Although high noise levels could hamper work, there were no studies with high level of evidence on this matter.

Limitations

The authors identify the use of specific keywords in their search criteria as a limitation of their review.

Design Implications

Some implications for design that could be inferred from this study include the following:

- Standardize the patient rooms.
- Employ lighting with higher illuminance in medication dispensing spaces.
- Use alternative materials that will not support the colonization of bacteria and other microorganisms for bedside railings, doorknobs, overbed tables, countertops, etc. For instance, vinyl-covered furniture is a viable alternative to fabric-upholstered furniture
- Explore alternatives to curtains to maintain privacy.
- In burn units, single patient rooms are more effective in reduced rates of infections
- Controls for room temperature, lights, fans and TVs may be provided near patient bed.

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