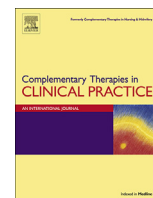




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# The therapeutic impacts of environmental design interventions on wellness in clinical settings: A narrative review



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## ARTICLE INFO

### Article history:

Received 26 May 2016

Accepted 24 June 2016

### Keywords:

Clinical settings

Design factors

Healing environment

Physical environment

Therapeutic sound

Wellness

## ABSTRACT

**Purpose:** The aim of this review is to document the role of physical environmental factors in clinical environments and their impact on patients and staff wellness with a particular focus on physical and mental healthcare.

**Methods:** Data sources comprised relevant English language articles and the results of literature search of ISI Web of Knowledge, PubMed, Scopus, ProQuest Central, MEDLINE, and Google.

**Results:** Incorporating physical environmental factors into hospital design can facilitate better user satisfaction, efficiency and organisational outcomes. Many of the design interventions convey positive distractions for patients and staff, in terms of views of pleasant outside vistas, soothing sound, artwork and music.

**Conclusions:** Well-designed physical settings play an important role in the healing process of patients in health care facilities. The challenge then is to fully understand that role in the ecological context of health care. Other contributors are possible and should be explored in further research.

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## 1. Introduction

The ideology behind healing is the psychological and spiritual concept of wellness. In recent decades, research on healthcare design and planning has highlighted substantial relationships between physical environmental factors and wellness [118]. The physical environment in which a patient receives care plays a significant role in their outcomes and should reduce pain, anxiety and stress for patients' comfort and safety [46,97].

Ulrich [170] advocated that healthcare physical and social environments promote wellness if they are designed to foster the reduction of environmental stressors such as the sense of control over physical-social surroundings, access to social support, connection to nature, and access to positive distractions. The healing environments approach in hospitals is, however, not a novel concept as such. Previously, there has been research interest in healing environments for promoting the patient's wellness and wellbeing [27], although it was mainly employing diverse methodologies such as holistic and spiritual [75]. However, in the 1970s, hospital designs began to transform when healthcare users started choosing hospitals based on aesthetic appeal, such as beautiful objects, artwork, sculptures, and fascinating colours. Consequently, the appearance of the hospital environment became a significant marketing strategy [2].

Similarly, earlier research has advocated that hospital design should do the sick patients no harm [122]. Research has linked poor design to psychological and physiological discomfort [175] but these negative effects can be tackled through good design [134,175]. Indeed, patients would recover more quickly from illnesses if they were cared for in an environment that had natural light, ventilation, cleanliness, and basic sanitation including reduced sound levels [122]. Similar research remarks that patients who viewed trees had shorter post-operative stays, took fewer pain relief drugs, and had a favourable response about their outcomes in medical notes when compared to those exposed to view a brick wall [2,169].

As such, hospital environments promote wellness if they are designed to foster social, psychological, physical, spiritual, and behavioural components of healthcare support and stimulate the body's innate capacity to heal itself [6]. Indeed, patients experience a positive satisfaction and better recovery in an environment that incorporates various aspects of the physical environmental factors, including art gallery, natural light, inciting natural elements, blended colours and decor, soothing music, pleasant sound and views, access to gardens and easy access to staff [61,141]. It is important to take into consideration these attributes and study their impact on patient and staff outcomes [43].

### 1.1. Understanding a therapeutic environment

Designers are faced with the increasing task of integrating cultural diversity, psychological and socio-spatial considerations by the application of Evidence-based design (EBD) in both the interior and exterior context of buildings. Evidence-based design strategies can improve stress-free environments in healthcare, by emphasizing strategic opportunities to influence the design of health care facilities. Evidence-based design (EBD) as a tool for healthcare planning is a method that began with the general purpose of providing evidence based medicine [76]. EBD has now become the theoretical concept of what are called healing environments. The healing environment in hospital settings begins with the healing presence of the healthcare providers. Healthcare providers create a healing environment by incorporating an atmosphere of safety, trust, and openness that allows for compassion, clarity, and truth. To achieve this, hospital providers must maintain a non-

judgmental relationship to invite those same qualities to flow from others. Donna [44] argued that therapeutic environments create a shared environment that strengthens the self-healing capacity of both patients and hospital providers. In other words, the healing environment should reflect the values, beliefs, and philosophies of the patients served.

There is a growing body of evidence on the positive impacts of the patient's physical environment (e.g. Refs. [6,7,42,45,82,112,116,144,158,174,179]) and this ideology was first initiated by Florence Nightingale [122]. There is good evidence, largely from existing studies, that specific design approaches in the hospital environment have the potential to reduce stress, pain, and anxiety. This includes good quality natural lighting, captivating healing colours, therapeutic sound (such as music, bird songs, water sounds etc.), privacy, and speech intelligibility. In addition, it has also been postulated that physical factors contributing to healing in the healthcare environment include a view of natural landscape, mitigating the degree of noise levels, interactive arts, good air quality, adequate signage, maintaining and effecting environmental changes to enhance patient safety that may heighten medical error and increase infection rates [43,169,196]. Similarly, Malkin [108] argued that the physical setting has the potential to be therapeutic if it achieves attributes set out in (Fig. 1). A healthy work environment that integrates physical environmental factors helps in the development of a healing environment that improves hospital staff efficiency and reduces the patient's hospital length of stay that promotes less stressful conditions [175].

## 2. Methods

This narrative review documents the role of physical environmental factors in clinical environments and its impacts on patients and staff wellness with a particular focus on physical and mental healthcare. In addition, this paper also elucidates the design trends towards the creation of a proper healing environment for hospital occupants.

A review of the literature was considered the appropriate method to answer the research question under investigation. Taking this approach, a review was undertaken between June 2015 and May 2016, which involved searching several electronic databases. Data sources comprised results of a literature search of Google, PubMed, Scopus, ProQuest Central, MEDLINE and Web of Knowledge using terms such as *therapeutic sound, noise, artwork, light, colour, healing environment, architecture, therapy, landscape, natural view, stress reduction, social support, positive distraction, access to nature, music, wellbeing, wellness, hospital, clinical settings, design factors, physical environment* and relevant additional terms derived from the papers retrieved. In addition, the references of retrieved articles were scanned for additional relevant material and earlier studies, significant in shaping the field under investigation. Priority was given to the reporting of empirical studies from peer-reviewed journals. There was no restriction to article publication dates. Article selection was generally founded on the title and the abstract. In case of uncertainty, the researchers read the entire text of an article. In addition, book reviews, non-empirical articles, news items, monographs, duplicates, encyclopaedia articles, non-English publication and editorials were in most cases excluded from the materials used in this narrative review. It was not possible to rely only on simple electronic searches of databases; therefore, the reference lists of relevant sources (e.g., books/book chapters and proceedings) were searched by hand to identify other studies of related interest.

The review grouped the literature and issues in the field into themes concerning the physical environment factors in healthcare settings; artwork and healing process; environmental light and

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