Birjand University of Medical Sciences

Journal of Surgery and Trauma

Original Article

Identifying environmental architecture components in treatment centers contributing to treatment with a stress reduction approach: a qualitative study

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Abstract

Introduction: It is well established that environmental architecture elements in treatment facilities have a major impact on reducing stress and enhancing health and recovery. The current study identifies environmental design elements that effectively promote treatment through stress reduction in the general surgical department.

Materials and Methods: A qualitative study was conducted using a conventional content analysis approach. The data were gathered via face-to-face, in-depth, semi-structured interviews (comprising 16 interviews). Participants were selected purposively from two general hospitals in Birjind city, one characterized by high architectural design levels and the other with a simple, conventional appearance. A conventional content analysis approach was adopted to analyze the data using MAXQDA software. The trustworthiness and robustness of the data were validated based on Guba and Lincoln's criteria.

Results: According to the study findings, environmental architectural factors in hospitals act like tranquilizers, improving patients' stress levels, mood, and emotions. These variables comprise (1). the physical elements of space (relatively stable), including sensory parameters, form, and space configuration, and the mental elements (less stable), which include the semantic and social parameters of space (2).

Conclusion: This study introduces a novel theoretical framework for therapeutic settings and outlines design strategies to improve environmental architecture in treatment facilities using an evidence-based design approach informed by the demands and preferences expressed by experts.

Keywords: Surgical Department, Therapeutic Settings, Environmental Architecture, Evidence-based Design, Stress Reduction

Citation: Torabi E, Mirzaei R, Heydari A, Jarrahi Feeriz J. Identifying environmental architecture components intreatment centers contributing to treatment with a stress reduction approach: a qualitative study.J Surg Trauma.2024;12(1):27-32.

Received: October 18, 2023 ***Revised: February 26, 2024*** ***Accepted: July 8, 2024***

[Downloaded from jsurgery.bums.ac.ir on 2026-10-31]

[DOI: 10.61186/jsurgtrauma.12.1.27]

Introduction

Health is not merely the absence of disease or weakness but an inclusive condition encompassing mental, physical, and social well-being (1). According to a 1989 statement by the World Health Organization, health and recovery necessitate a clean and harmonious environment that considers physical, psychological, social, and architectural factors (2).

The treatment environment is a setting that allows patients to experience a sense of physical, psychological, and social presence. The treatment setting supports patients' recovery, shortens hospital stays, reduces stress levels, and promotes health benefits (3).

Current literature on therapeutic environments indicates that the elements of environmental architecture play a significant role in establishing and promoting therapeutic settings. Nevertheless, this reality has been overlooked in numerous hospitals (4).

The importance of the architectural parameters of the therapeutic environment highlights the need to consider their impact on treatment and stress reduction for patients when designing treatment centers. Prior studies have primarily employed an atomistic approach to examining architectural factors, with findings highlighting stress reduction associated with certain architectural elements (5-7). Questionnaires and quantitative tools are insufficient for providing a comprehensive understanding of the elements of environmental architecture and their impact on patient treatment and stress reduction. A qualitative research method was adopted to gather comprehensive, in-depth data on the investigated phenomenon. The present study identifies the elements of environmental architecture that enhance treatment by reducing stress in the general surgery department. This study builds on previous research findings and expert suggestions to provide design solutions that improve architectural parameters by reducing stress in medical centers. The aim of this research is firstly to enhance the quality of treatment settings and facilitate patient recovery. Secondly, the study aims to apply environmental architecture principles to reduce environmental stress in design based on expert-preferred recommendations rather than solely focusing on functional efficiency. Thirdly, the study seeks to design solutions to enhance environmental architecture in hospital centers.

Materials and Methods

A qualitative study was conducted using a content analysis approach. The current research was conducted at the general surgery department of Imam Reza and Razi general hospitals in Birjand. A purposive sampling method was used with maximum variation (heterogeneity). The researcher aimed to choose interview participants with high levels of cooperation, extensive experience, ample information, and a willingness to take part in the study. A diverse pool of participants with varying characteristics, e.g., gender, tenure, and educational qualifications, were included to gather comprehensive data Table 1.

In this study, as in other qualitative studies, the number of participants was determined by data saturation. Interviews were conducted until no new data were available during the data analysis and coding process. The research tool comprised personal profile forms and the interview guide questions form. Semi-structured interviews started with a general question on the significance of environmental architectural parameters, followed by probing questions to gather more in-depth data. The research setting adhered to qualitative, naturalistic, and factual research methods, with all interviews taking place in a hospital setting in the general surgery department. Following the interviews, the researcher promptly began to create a written transcript of the interviews. The researcher transcribed the interviews verbatim into word processing software and then imported the file into the MAXQDA 10 software. The conventional content analysis method was adopted to elucidate the phenomenon under study. This method involves analyzing the data by extensively reading the interview text to fully understand and get a gist of the interview. The next step involved

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[DOI: 10.61186/jsurgtrauma.12.1.27]

a thorough examination of the interview text line by line to identify the codes. The statements were read first, and then the segments that contained meaning were identified. The researcher compared their initial perception and analysis notes in these segments, and codes were extracted at this stage. The codes were directly derived from the interview text to establish the initial code structure. The primary codes combined with each other by identifying similarities and differences, resulting in core codes. Core codes were used to establish subcategories according to their similarities and differences. Subcategories, in turn, shaped categories according to their relationship to each other. Definitions were subsequently given for every category and subcategory. The research rigor and trustworthiness were assessed using Guba and Lincoln's criteria. In order to enhance the dependability of the research outcomes, the research assistant reviewed the data collection and analysis procedures, in addition to the researcher's prolonged immersion with the data. In order to ensure trustworthiness, the codes and concepts were validated by experts and research colleagues. Additionally, multiple colleagues coded sections of the interview text, and the coders' agreement was assessed. The ethical considerations in this research included securing written informed consent from the participants and highlighting the confidentiality of the information and participants' characteristics. The researcher guaranteed the participants that their involvement in the study was voluntary and that they could choose to stop cooperating at any time. The participants were briefed on the interview recording process and the utilization of their statements. Furthermore, they were assured that if they did not wish to have their voice recorded, the recording would be paused, and their statements would be only noted down. If the audio recording was interrupted for an extended period, causing a disturbance in the interview process, the participant was excluded from the analysis.

Results

The participants of this study comprised 16 experts from the field of general surgery at two teaching hospitals in Birjand, namely Imam Reza and Razi. Table 1 presents the demographic characteristics of the participants involved in this study.

Table 1. Demographic characteristics of the interviewees (n = 16)

Variables		Number of People	Percent
Gender	Female	7	43.75
	Male	9	56.25
Work Experience (year)	5-10	4	25.00
	10-20	9	56.25
	20-30	3	18.75
Educational Certificate	PhD	11	68.75
	Master's	5	31.25

An investigation into the perceived impacts of architectural components in healthcare spaces with the interviewees revealed a significant influence of environmental architecture on treatment enhancement and patient stress reduction. Notably, participants from Razi Hospital, which boasts a more aesthetically pleasing and sophisticated design compared to Imam Reza Hospital, expressed greater satisfaction across various mental, physical, and social aspects.

They reported reduced stress, pain alleviation, positive distractions, tranquility, and perceived family support in their recovery, all of which they attributed to the hospital's environment.

The analysis and coding of interviews yielded the identification of key environmental architectural components that contributed to these positive impacts Table 2.

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[DOI: 10.61186/jsurgtrauma.12.1.27]

Table 2. Architectural factors contributing to reduced patient stress

Main Category	Category	Subcategory	Code
Architectural elements effective in reducing patient stress	Physical components of space	Sensory components	Light, sound, temperature, humidity, aroma, smell, and color
		Shape components	Materials, space shape, size, and scale
		Space configuration components	Appropriate division of space, definition of entrance and exit spaces, height and depth of space, determining axis and centers of concentration, creating balance between open and closed spaces, use of interior decoration details, distribution and precise arrangement of furniture, composition, and order of space components
	Mental components of space	Semantic components	A sense of security, nature, and memorability
		Social components of space	Social space, private space, social activities, social interactions, and beliefs

The findings indicate that the architectural components of healthcare environments can be broadly categorized into physical space components (relatively static) and mental space components. Architectural variables that directly influence patient stress reduction were also extracted during the interview analysis.

From the participants' point of view, Imam Reza Hospital has a simple and traditional hospital appearance. The criteria applied in selecting Emma Reza Hospital include compliance with standards, the absence of environmental threats and the interior not being worn out, so that the environment does not have a negative effect, but is simply normal and lacks architectural design creativity to promote environmental architecture. On the other hand, Razi Hospital has a more beautiful and elegant appearance than Imam Reza Hospital, where it has been tried to turn the sterile and cold atmosphere of the hospital into a warmer and more beautiful environment. Significantly, from the participants' point of view, Razi hospital, which has a more beautiful and elegant appearance than Imam Reza hospital, they felt more satisfaction from different mental, physical and social aspects and feelings such as stress reduction, pain relief, and distraction. They have reported positive, calmness, family help in recovery, etc. under the influence of the hospital environment. For example, one of the participants said, "The presence of rooms with high ceilings and cheerful coloring conveys a good feeling to patients." Another participant stated that "planting trees and flowers in the hospital grounds, proper ventilation, access to toilets and drinking water, charging points for mobile phones, rooms suitable for prayer, soft colors such as blue, green and silver for the rooms and The different spaces of the hospital, the use of comfortable and appropriate chairs, providing suitable spaces for resting with the patient, the use of relaxing signs and images can create a good image of the hospital for the patient and his family and help the patient recover. In this regard, another participant stated, "The space and architecture of the hospital are very important. If the room that is allocated for the patient does not provide privacy, it is not suitable in terms of cooling and heating systems. If there are many patients in the room, the noise is high. If the ventilation is not suitable, the room is boring or the staff's attitude is not suitable. It makes the patient's soul-sick as well."

Discussion

Recent studies in the field of healing environments acknowledge the significance and value of further research on this subject. This study adopts a

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[DOI: 10.61186/jsurgtrauma.12.1.27]

comprehensive and holistic approach to examine the architectural elements of the environment and their impact on stress reduction. In this context, it can be argued that inconsistencies among the various architectural components of the environment can hinder the healing processn and patient well-being and increase stress levels. Conversely, harmony between these components, as emphasized by experts in the interviews, holds paramount importance. Indeed, environmental architecture emerges from the synchronization of these dimensions rather than the mere presence of one or two components. Disruptions in any of these architectural dimensions cannot be neutralized by the effects of the others. The findings of this study reveal that the architectural elements of healthcare environments encompass two primary components: physical spatial elements and mental spatial elements. Each of these components exerts distinct influences on stress reduction among patients. This study extracted and presented design components for enhancing the therapeutic effect of the hospital environment with a focus on stress reduction. This was achieved based on the needs and preferences expressed by experts in the interviews and a review of relevant literature. Physical spatial elements comprise sensory components (light, sound, temperature and humidity, fragrance, smell, and color), shape components (materials, spatial form, size, and scale), and spatial configuration components (appropriate space allocation, definition of entry and exit spaces, space height and depth, determination of axis and focal points, a balance between open and closed spaces, use of interior decoration details, precise distribution and arrangement of furniture, composition, and order of spatial elements).

Mental spatial elements include semantic components (sense of security, nature, and memorability) and social spatial components (social space, private space, social activities, social interactions, and beliefs). A study on sick children demonstrated that the aesthetic quality of architecture can improve the patient's mood, vitality, self-esteem, and self-awareness. The contemporary architectural landscape of healthcare facilities is undergoing a paradigm shift, transitioning from mere functionality to the creation of therapeutic environments. A healing environment within healthcare settings entails fostering an ambiance that positively impacts patient treatment outcomes (8). Hospitals play a pivotal role in alleviating patients' physical discomfort and fostering a sense of tranquility for their loved ones. This objective can only be achieved when the aesthetics, décor, and color schemes employed in hospitals can positively influence patients' emotions and well-being. Drawing upon Islamic color therapy principles, it is believed that colors can be used to treat various ailments. Interior designers, too, incorporate vibrant hues in the interior and exterior design of hospitals and other medical settings to create more inviting and calming spaces for patients undergoing treatment (8).

Based on prior research, the key elements in designing therapeutic spaces include: establishing a seamless integration between indoor and outdoor spaces; fostering interaction between patients and landscape design elements; enabling the reduction of noise pollution within the space; creating aesthetically pleasing or green vistas; ensuring quality in the interior ambiance of the spaces; fostering a sense of belonging to the space; understanding the space through attention to patient needs; providing areas for interaction among patients; enabling the possibility of altering furniture and layout; enabling the regulation of temperature and humidity conditions within the space; ensuring the appropriateness of spatial dimensions; and employing designs and colors that resonate with patients' emotional states. Moreover, the presence of adequate and controllable lighting can mitigate patient anxiety and stress, promote tranquility, enhance environmental behaviors, reduce the duration of hospitalization, elevate the pain tolerance threshold, increase patient satisfaction with the space, and facilitate a connection with the environment (9, 10).An optimal supportive care environment accelerates patients' recovery and treatment. In other words, an optimal supportive care environment, aided by positive distractions, may facilitate stress management, patient relaxation, and acceptance of the treatment process (11). It should be noted that the current

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research was conducted using a qualitative method. Qualitative data cannot be widely generalized.

Conclusion

As regards environmental aesthetics and patient health, hospital physical spaces can provide appropriate views on how to improve patient healing, which is also the subject and purpose of this study. The impact of environmental aesthetics on the healing process is significant. Environmental aesthetics primarily pertains to the psychological dimension and can be employed in creating treatment centers, which are psychologically oriented settings. This approach has significant qualitative and quantitative impacts on the duration of patients' recovery. These features can convert the experience of being hospitalized in the stagnant and anxiety-inducing environment of the hospital into a more enjoyable one, thereby creating a positive and spiritually enriching atmosphere within hospitals.

Acknowledgments

This article is derived from the first author's doctoral dissertation, titled "Presentation of a Conceptual Model for the Physical Elements of Therapeutic Spaces with a View to Reducing Patient Stress (A Case Study of Birjand Hospitals)." The study's code of ethics is IR.BUMS.REC.1401.081. We express our gratitude to all the individuals who contributed to this study.

Funding

None.

Conflict of Interest

The authors declare that they have no conflict of interest.

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