

Recognition of Effective Components in the Architecture of Healing Environments for Reduction of Patient Stress in Specialized Heart Centers

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Abstract

The healthcare environments usually consider the health, functional, and physical communications in the existing spaces for healing and treatment of the people in the society, based on the intended specialty or in a general manner. Patients' sense of comfort has been neglected due to the economic costs and limited thinking of medical center employers. Physical factors can help create healing environments and reduce the patients' stress and mortality rate. The invariability of healing environments and their inconsistency with the healing components are distinct phenomena. However, the investigations have shown that these two interwoven categories have created broader aspects entitled 'the healing medical environments,' which effectively reduce stress. Therefore, in this study, we try to identify and explain the factors that reduce stress and increase life expectancy in patients by recognizing the physical components of the architecture of healing environments. The methodology is descriptive-analytical which reviews the theoretical frameworks of the healing environments. We would contemplate the effectiveness of such environments on the patients' stress from the viewpoint of different experts so that, in the meantime, we can obtain the physical components of the architecture of the healing environments that are effective in the reduction of the stress in cardiovascular patients. Finally, we would provide the theoretical framework in terms of these components.

Keywords: Healing environments, healing architecture components, patients' stress, specialized heart centers.

INTRODUCTION

The research indicates that the disturbed healing environments that lack natural elements can lead to aggression in the individual and, in the long run, lead to chronic diseases due to several reasons, such as stress reduction and reduction in attention and concentration (Sherman et al., 2013; Nachri, 2017). The medical environments can enjoy the features of healing environments and satisfy the patients, companions, and the medical staff. The healing environments approach is indicative of a belief that shows seeing the natural cover, water, and other natural elements can heal the patients. Today, the architecture of the medical centers is turning from pure functionalism to the creation of a healing environment. The healing environment

in the medical centers means creating a space that positively affects the treatment (Ghazali et al., 2012, Alrich et al., 2014; Shoviola, 2014). Stress is an inseparable part of human life, and its emergence in medical centers is an unavoidable complication for the patients that lead to a severely stressful situation. Since a part of the patients' and the medical staff's life is passed in the medical environments, and many of their social relations are established during the time they are in the hospital and the medical centers, addressing this subject is highly important (Moutabi, 2016, Folkman and Moskowitz, 2014). Paying attention to the conditions of the patient and evaluation of his/her needs regarding his/her higher vulnerability that a healthy person requires the architects to more scientifically and precisely

observe all architectural principles and components, as visual components such as the effective visual forms, lighting, color, etc. should be scientifically evaluated based on their use in different parts of the hospital. The selections must be based on scientific evidence and a thorough investigation of the effects on the patient's psychology and body and the performance of medical center staff (Khodadadeh & Tejareh, 2017, Saghaei et al., 2021).

The current study aimed to identify the components effective in the architecture of the healing medical environments and their effectiveness in patients' stress reduction in specialized heart centers. The hypotheses on which the current study is based are: First, the specialized heart centers, due to their nature, should be rich in terms of physical components of healing environments, and second, the stress reduction and increased life expectancy are among the functions of the effectiveness of healing environments.

In the current study, the necessity of addressing these issues has led to raising some questions such as: First, what architectural components of healing environments are effective on cardiovascular patients? And second, how do the physical components identified in these healing environments affect stress reduction in the patients?

Literature Review:

The medical environments are spaces that have gradually emerged from the past until now to continue life and protect human survival. They have always evolved throughout history and serve human beings and meet the needs of human societies in their present form. Naturally, the development of science and the medical sciences has been in line with the evolution and progress of treatment spaces. Throughout history, these two categories have never been separated from each other. The medical science and the subject of treatment are among the most ancient sciences of humans due to their relation and closeness to the human life and his need and tendency to survive, as the historical evidence shows that there have been three different schools for treatment of the patents, 9500 B.C. in the city of Atlantis (Malkin J, 1992).

In the early 20th century, physical fitness and taking care of the body and the psyche were among the main concerns of developed

societies. Since then, the hospitals have been drastically developed in terms of advanced equipment, specialties, and multi-functionalism. During the 1960s, and early 1970s, when science had dominated everything, the dominant approach was that the healthcare machine could do anything and the patients were just some objects. The logical outcome was the evident development of the buildings. In the late 80s, there was a huge shift in public perceptions of health. Again, the focus was put on the patient as the main pivot in designing the medical-healthcare spaces. The public dissatisfaction caused by the bitter experiences in the huge hospitals led to the request for spaces with higher human qualities. The medical buildings have increasingly grown and developed to meet different human needs. The rapid medicinal development and technologies in the healthcare sector, on the one hand, and the demographic changes, on the other hand, led to the replacement of large hospitals, which were the product of a purely technical approach to the subject of health, with the networks that covered all areas related to the health; small local institutions that are becoming more and more specialized. In line with the technological advancement in the 20th century and the medical and welfare aspects, issues such as stability, energy, site, landscape, nature, etc., grabbed more attention (Talebian, Atashi, Nabizadeh, 2013). Today, the medical space design depicts the healing environment as a complicated interactional system between several spaces that includes small-scale examination rooms to social scale and the space in which the healing environment is placed. The main idea here is that each need of the groups using these spaces helps with the healing of the patient and changes the environment into a healing environment (Salehnia et al., 2013).

The healing is a quality in which the psychological health is met and leads to stress reduction and improves recovery. Also, it is a term repeatedly used for landscapes that promote comfort and helps to maintain health and analyzes what affects the visitor. The World Health Organization also defines 'health' as an expression for physical, psychological, and social welfare and peace completely and consistently. However, it should be noted that healing is a broad term that does not merely relate to the patient's treatment but is referred to as the general process of healing that considers both the spirit and the body together.

The difference between treatment and healing, based on the definition of healing, is that the treatment puts the drug therapy of the patient in the first place. In contrast, healing is a multidimensional process in which mental and psychological factors are considered, related to mental, emotional, and social needs (Gavin & Landis, 1997).

Unlike treatment, healing is a mental and psychological concept. Most probably, there is a relationship between healing and manmade environments. Recently, the building and creation of a healing environment have been globally more focused since people's mental health highly affects the community's life and advancement. Therefore, investigation of the factors effective on people's mental health is a very important issue. One of these factors is the urban built environments in which people live. This built environment has direct and indirect effects on people's health (Abbas & Ghazali, 2008).

The approach of stress reduction in architecture emerged, indicating that hospital equipment, no matter how advanced and therapeutically meets the needs of all users, still, if designed without considering the mental needs of patients, may make many problems and obstacles for the patient and their recovery (McAndrew, 2008).

Stress is among the important psychological and mental health concepts known by people as a painful and unpleasant phenomenon. Psychologists depict stress with mental pressures and psychophysiological mechanisms and consider it the cause of changes in behavior and critical situations. The presence of stress in life is inevitable and necessary for mental growth. If it is within the individual's mental and physical tolerance threshold, it would be pleasant, useful, and constructive. But if it exceeds the body's capability and capacity, it would be harmful and unpleasant. The environmental variables are among the main factors effective on the stress. Factors such as the environment, thermal comfort, and physical and security factors effectively affect society's individuals' stress (Milanifar, 2009; Najafi, 2018).

Methodology:

The current study is conducted by the use of the descriptive-analytical method. A total of 26 scientific pieces of evidence were collected and investigated. All evidence was evaluated

considering the screening criteria such as best performance and evidence-based design method, non-overlapping content, new and up-to-date, and compliance with the purpose of the study, and a total of 16 articles were selected for content analysis. After analysis, interpretation, and generalization of the information in this evidence, the findings were organized and reported in 11 general categories. If all 11 categories obtained in the current study are comprehensively considered in designing the healing environments, the achievement of international standards in the medical centers would be realized.

Review of the Related Literature and its Findings:

The studies conducted about the components of medical environments and how they affect the stress reduction in the patients can be divided into several categories. This chapter provides an example to be elaborated on later in the second chapter.

Effects of Colors in the Medical Environment on the Patients and Stress Reduction:

Sadeghi et al. (2014), in a study entitled 'the role of color in the hospitals in the acceleration of healing process, concluded that the colors affect the physical and mental diseases. Dargahi et al. (2013), in an article entitled 'a review of color therapy with emphasis on the hospitals' concluded that color therapy is related to different areas, among which the nature of different cultures, alleviation or reduction of physical and mental disorders, working environments and industrial psychology, creativity, and especially, the medical and hospital areas can be noted. Gorji Mehlabani et al. (2013), in a study, has addressed the effects of colors in designing inpatient departments in the hospitals and concluded that the correct use of colors in different sections of medical centers, such as the inpatient department, is among the very important factors for patients' healing process. The ancient Iranians used a type of color therapy based on light radiation.

Historical studies show that physicians used a red substance to treat some skin diseases in ancient China. Ancient Greeks used purple tape to cure the patients and have considered this color magical. However, the initiation of studies in this regard dates back to the mid-20th century. Goldstein (1949) has conducted some experiments about the effects of colors on the human body and published his observations. His experiments were conducted on patients with

Parkinson's, and the results showed that the red color intensifies the disease, while the green color has a healing function. In several precise experiments, Gerard (1957) concluded that red is a nerve stimulant and blue is the opposite.

On the other hand, Jacob and Hostimer (1974) indicated that red, yellow, green, and blue colors stimulate the nerves, respectively. In some experiments, Frank Gebert (1990) concluded that the red color is a stimulant while the green and blue are calming. In some experiments, Frieling (1990) concluded that the red color increases blood pressure and heart rate, while the green color creates a relative calmness. Frank Mank (1994) obtained similar results to those of Frieling.

In ancient India, the Ayurveda people believed that shining different colors on the body's energy center causes emotions or vitality. Color

Table 1: Properties, symbols, and effects of colors on the physical and mental diseases, source: Ethan, 1986; Loscher, 1994; Mo'udi, 2000; Ministry of Health, 2013; Mahmoudi & Shakibamanesh, 2005; Shamgholi & Yekta, 2012; Malkin, 2005, Malkin, 1999.

Color	Property	Symbol	Physical harm	Physical benefit	Mental harm	Mental benefit
Red	Increases blood pressure and heart rate, stimulant and energizing, appetizing	Confidence, life, warmth	High blood pressure, nervousness, high fever, obesity	Anemia and iron deficiency, colds, infections, infertility, bronchitis, rheumatism, constipation	the nervous system, Mental disorders	Fear, depression, boredom
Orange	Increases blood pressure and heart rate, antispasmodics, stimulant and energetic, appetizing	Energy, Liveliness, warmth	High blood pressure, imbalance, and inconsistency in the nervous system	Kidney and bile stones, cold, bronchitis, malignant glands, constipation, lung disease	the nervous system, Tension, stress, insomnia	Depression, Boredom, Isolation
Green	Lively, hopeful, calming, boosts tolerance, strengthens Feelings of	calmness and Hope Balance and	Low blood pressure, low heart rate,	Infection, insomnia, pain, Weakness in the body, heart problems, high blood pressure, strong repair of	Depression (if used for a long time and in long exposure)	Mental Stress and disorders

therapy is also still used in this region to solve physical and mental problems. In the late 17th century, the modern method of color used for therapy was known, which coincided with the decomposition by Isaac Newton. Finally, in 1878, Dr. Edwin D. Babbit found out that colors can heal wounds (Noorabadi, 2006).

The Egyptians were the first civilization to research color therapy. They built colorful corridors in their temples in Karnak and Thebes and discovered the effects of colors on healing the people. The color is the most ancient medicine in medical history, and it has been used to heal patients (Coceliu, 1999; Edge, 2003).

Regarding the review of the literature, the overall output of the articles reviewed is summarized in the following tables, which are presented as follows:

	friendship, hope, faith	harmony, cold	Malignant glands	muscle cells and bones		, fatigue, Low tolerance
Blue	Reduces nervous system activity, sedative, dilator, anesthetic	Calmness, the cold, Wideness	low blood pressure and heart rate, cold, Cold-tempered	Headache, asthma, jaundice, Chickenpox, rheumatism, burns, eczema and acne, Heart palpitations, pain, thyroid disease	extraordinary sleep disorders, Boredom, Depression, Fatigue	Stress, tension, obsession, Mental disorders, insomnia
Purple	Heart sedative and blood purifier, nostalgic and sad, Disposal of toxins	spirituality, dignity, Death	nervous system (If used for a long time and in long exposure)	Spleen and bladder diseases, Rickets, back pain, Sciatica, epilepsy, pneumonia, Weak immune system	Depression, nostalgia, emotional distress	Mental disorders such as schizophrenia and madness, hatred and anger, fear
Yellow	Creates a spirit of vitality, increases concentration, stimulates the nervous and muscular system, Seclusiveness	Light and Lighting, Wisdom, separation	Nervous temperament, Obesity, Hyperthyroidism, eye	Paralysis, rheumatism and arthritis, Laziness of the liver, pancreas, and Stomach, constipation	Psychopathy, attracted towards Isolationism and Seclusiveness	Depression, Boredom, lack of concentration
Gray and neutral colors	Eye and nerves relaxation, low visual stimulation, Boring	Calmness, Stillness, Boredom	nervous system) If used For a long time and	Mental tension, high blood pressure	Boredom, depression	Mental tensions and disorders, stress

			in long exposure(
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Table 2: Categorization of the patients with traits, needs, and dominant expectations, source: Sadeghi & Hosseini, 2015)

Patients categorization	Trait	Dominant expectations	Colors features	Suggestions
The elderly and the visually impaired	Long-term hospitalization, Visual impairment	High color contrast, interesting elements, attractive environment, relaxation, readability	High contrast, color with long wavelengths	Neutral colors with low contrast, color with short wavelength
Pregnant mothers	Anxious, apprehension	Calmness, beauty conveys a sense of health, a home-like environment	Bright and energizing, joyful, calm	Dark, increases heart rate and is stressful, very cold and sad and very hot
Children	Curious, intolerant, happy	Charm, readability, distraction, home-like environment, fitness, fun environment	A diverse combination of warm and cool colors. Cheerful and vibrant colors	Dark colors and neutral and very cold
Mentally ill	Severe and specific reaction to color, Distracted	Calmness, readability, charm, open and bright spaces, a home-like environment	light colors Neutral colors with So warm background	Dark, heart rate booster and Stressful, very cold and Sad and very hot
Other hospitalized patients	sudden emotional change, nostalgia, strangeness	Conveys a sense of health, entertainment, beauty, charming environment, secluded and quiet	Gentle, neutral with warm and happy background	Very cool and dark and brisk colors, blue for the heart section and orange for the skin section

This study indicates that in environments with undesirable colors, the stress rate and treatment duration are higher than in environments with desirable colors. Also, the colors suitable for the hospital design and have relaxing effects are blue, green, white, or a combination of them.

Generally, it can be said that regarding the effects of colors on stress reduction and treatment duration and better performance, the importance of paying attention to the effects of hospital design on building users is becoming increasingly clear.

Patients	Color						
	Red	Yellow	Blue	Green	Orange	Purple	Gray and neutral colors
The elderly and the visually impaired	●	□	○	□	●	□	□
Pregnant mothers	○	○	●	□	●	□	○
Children	●	●	□	□	●	●	
Mentally ill	○	□	□	□		□	○
Other patients	□	□	□	●	□	□	●
<p>● The use of this color in space is recommended. □ The use of this color in space is unrestricted. ○ The use of this color in space is not recommended.</p> <p>General color recommendations:</p> <ul style="list-style-type: none"> - Humans generally feel warm when seeing red and orange colors and cold when seeing green and blue colors, which leads to the emergence of the words warm and cold colors- Warm colors increase blood pressure and increase heart rate, creating movement and excitement. Cold colors reduce the activity of the nervous system, calm and peace.- In mental discomfort, warm colors create excitement, and cold colors cause peace of mind and comfort. - The predominant color of the sections should be selected from light colors that inspire peace, and dark colors should be avoided inside the sections. - White is a hygienic and clinical color (Kolivand and Kazemi, 2012, 37). Therefore, in hospital settings, white and light colors are more popular among patients- - Cold colors such as beige, gray, and cream can be very efficient and useful colors for interiors- These colors are mildly warm and also relatively attractive- - Blue, green and yellow colors should dominate hospital spaces- Blue and green as calming colors along with yellow can cause brightness and optimism. - Colors that designers usually do not recommend in large quantities: dark blue, which can be a very cold color; Dark green because of the effect it has on hatred and disgust; Purple, which mainly induces superstition and prejudice; and red. 							
Wall	Common colors used for walls vary between light and white. Choosing such colors is that it is possible to make the most of the light, but if light can enter the room, dark colors can be used.						
Ceiling	It is better to use lighter colors for ceilings than wall and floor colors- This helps maintain light, especially at night and in the absence of a natural light source. Suggested colors for						

	the ceiling are white, grayish-white, or yellow. If the ceiling needs to look shorter than it is, you can use a darker color than the rest of the room.
Floor	The floor color of rooms is usually dark, - But in healing spaces, light colors should be chosen to show the stains. Green is suitable for use on the floor of the rooms because it shows body fluids and thus, prevents accidents on slippery floors.

Effects of Quality of Healing Environments on the Patients and Stress Reduction:

Since the mid-70s, the researchers have discussed the healing buildings, especially terms of children's medical buildings. They admitted that windowless corridors, roundabout corridors, and sterilized indoor areas with an unpleasant odor create a feeling of discomfort in the space and, as a result, increase the psychological pressure and stress in patients. In this regard, Dr. Roger Ulrich, a researcher who has academically investigated the effects of indoor design on individuals' health since 1980, especially expressed this issue in several studies about the patients and the healing environments. Coleman, in 1987, discussed the importance of the type and scale of furniture in the hospitalization space and light suitable for sick children. Also, some researchers have addressed the effects of nature in the healing environments on sick children.

In this regard, in 2001, by using semi-structured interviews, the researchers concluded that the natural elements positively affect sick children in a hospital in the United States. Hatton also, in 2005, conducted qualitative research on seven sick teenagers and asked them to draw their desirable room so that he could explore their needs. Also, Jun Thai, in a study entitled 'playing at the hospital: the role of playing at the hospital and its effects on children's stress reduction, investigated the role of playing in the healing of sick children and designing environments for playing in the hospital and its effect on reducing child stress. In this study, two groups were investigated: The group in the hospital and the group that was not. The most frequent point the children noted in their stories was the feeling of loneliness and fear during the hospitalization.

Rolin also, in another study, investigated the effects of the design of two hospitals and their dominant policies on the social interactions and deprivations for children suffering from cancer. In this study, observation, interviews, and children's photography and painting were used

to obtain the features of both hospitals and their effects on the children. In addition, some other Canadian researchers, in a qualitative and by the use of interviews, observations, and photography techniques, investigated the role of the atrium in the design of the hospital and the creation of a more favorable environment for children and pointed out the positive effects of this space inside the hospital. Today, the medical centers' architecture is turning from pure functionalism to the creation of a healing environment. The healing environment in the medical centers means creating a space that has a positive effect on the treatment of the illness. Based on the existing evidence, the changes in medical centers' design in a way that a more comfortable, beautiful, and eloquent environment is created can reduce the tensions in the patients and increase their satisfaction with the quality of treatment in the medical centers. For example, the reconstruction of a waiting room in a psychiatric clinic with small changes in the overall layout of the hall, color scheme, furniture, floor covering, curtains, and how to present information on the screen leads to an increase in patients' positive assessment of the environment, improving mood and the physiological states and ultimately, the patients' satisfaction in the waiting area.

Regarding the literature reviewed, the overall output of the information extracted from the investigated articles is summarized as follows:

Among the important features of healing, spaces are generally known by the natural elements. These live and organic elements are constantly growing and changing and give the man a sense of security, hope, and life. Another feature of such spaces is their enclosure. It induces a sense of security and being away from the crowds, stress, and negative energies around and offers a different experience of space. Among the other features are stimulation of the five senses in a positive way, e.g., the man can touch the ground beneath his feet, see the trees blossoming and enjoy it, smell the pleasant scent of the flowers, hear the breeze passing through the plants, feel the breeze on his skin and hair, and ... An environment that does not inspire the message of

life, the cycle of nature, a sense of calm, security and beauty to the audience and positively stimulate the human senses, is not a healing environment.

Therefore, it can be said that a healing environment:

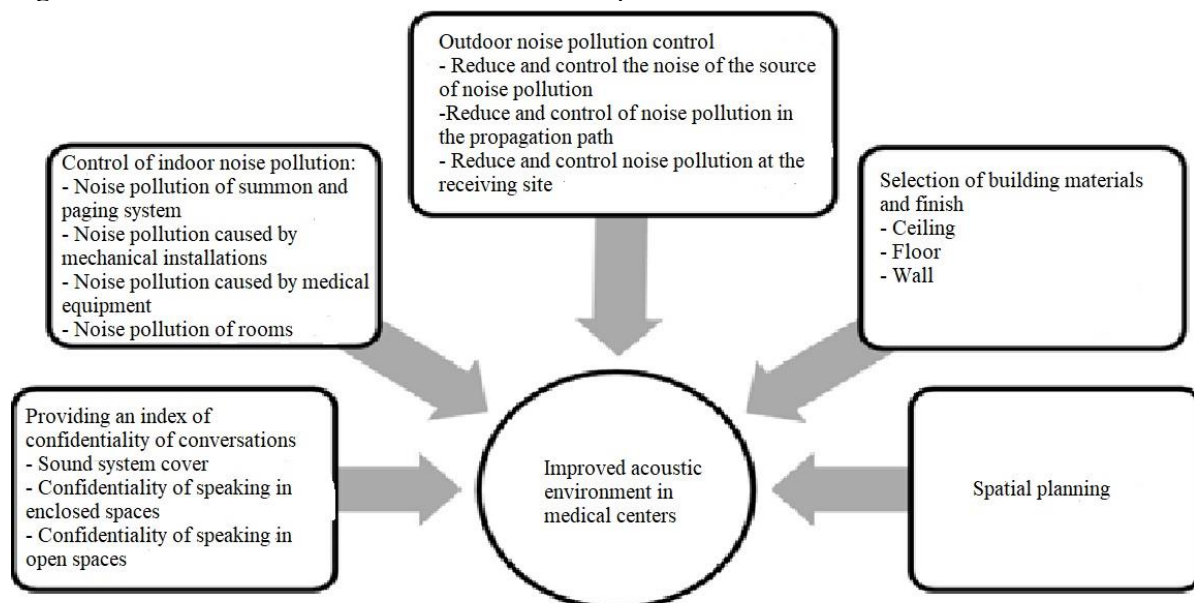
1. Reduces the stress and balances the body.
2. Helps patients accept their illness by being present in the treatment environment and hopeful for the treatment.
3. Prepares an environment in which the staff can perform physical therapy, exercise, etc., as a treatment for patients.
4. Prepares a calm environment against the stressful environment inside the hospital.

We introduce two approaches as the healing approaches in the medical centers based on what was mentioned above. They are:

1. It should reduce stress, anxiety, and depression in the patients.
2. It increases the patient's pleasure in the treatment space where he has to spend some time.

Effects of Noise Pollution in Healing Environments on the Patients and Emergence of Stress:

Figure 1: factors effective in the formation of an improved noise environment in the medical centers



Noise pollution means a level of noise in the environment that is unpleasant to the inhabitants. And its negative effects on humans have been known for more than 2,500 years. The Greeks banned metalworking, including hammering, inside the city and settlements in 600 BC. However, today, noise pollution is making problems for the large cities as a side product of advanced technologies. And one of the critical places in this regard is the medical centers and hospitals (Rabeian & Gharib, 2003). The issue of noise pollution in hospitals has been extensively addressed in scientific research and the press (GGHC, 2007).

Ulrich et al. in 2004, investigating 130 scientific articles about noise pollution in the hospitals, have reported that this pollution is considered a huge stressful factor for the patient and the staff. This study showed that in the medical centers, with the decrease in noise pollution, the patients' satisfaction with the services and their sleeping quality increased while their blood pressure decreased. Also, the staff showed a higher functional efficacy. Regarding the literature reviewed, the overall output of the articles investigated is summarized as follows:

1- Planning and designing the spaces: Numerous factors affect the planning of the spaces in a medical building. Now, if the acoustic comfort of

the users is considered as a factor, probably, there would be some changes in the planning and design: Lack of vertical and horizontal proximity of incompatible acoustic spaces-failure in replacement of spaces sensitive to noise pollution in places exposed to noise outside the building - the proximity of similar spaces in terms of acoustic requirements to save money and interventions- apply design solutions such as single-bedded rooms and ...

2- Selection of materials: If the materials and implementation details are considered to reduce noise pollution from the beginning of the design and construction process, the secondary interventions and the costs will be reduced.

3- Designing the outer layer of the building with consideration for their effects on inner spaces' acoustic quality.

4- Designing the yard to improve the inner spaces' acoustic quality.

5- Improvement of compatibility of acoustical engineering in each space of the building.

When functional requirements make the proximity of two spaces unavoidable with negative effects on the acoustic environment, when noise pollution is unavoidable due to space performance, or in case of acoustic problems after building, the strategies in the current study can be used to improve the acoustic environment and increase the confidentiality of conversations.

Effects of Environmental Factors on the Patients and Stress Reduction:

Space design based on an environmental approach emerged in the early 1960s. In the late

18th century, Florence Nightingale was also among the first to investigate the environmental elements effective in accelerating healing and reducing the mental pressure of patients in hospitals. In this regard, he suggested higher rooms, bigger windows, and suitable conditioning and natural lighting. After him, in the mid-1790s, the researchers discussed and investigated the healing buildings. With the Attention Restoration Theory (ART), inspired by the healing environments, Kaplan investigated the effects of green space and varied landscapes on man. According to Wilson, the author of the book 'Biophilia,' humans possess an innate tendency to seek connections with nature and other forms of life. He believes that humans are instinctively attracted to the green color of the plants and the blue color of water instead of the gray color of concrete and cement and other unnatural materials. Also, other scholars such as Frumkin and Ulrich have confirmed the findings by Wilson. The experience has proved that if individuals, especially the patients, spend three to five minutes in nature, this interaction would significantly decrease their stress and play an important role in reducing their anger and fear. Ulrich is among the most important researchers to consider the effects of landscape on health. Verderber, in 1983, suggested the role of the window and outside view in the mental and cognitive development of the environment, which is also effective in the treatment process. In the area of behavioral sciences, John Lang is a prominent figure.

Regarding the literature reviewed, the overall output of the articles investigated is summarized as follows:

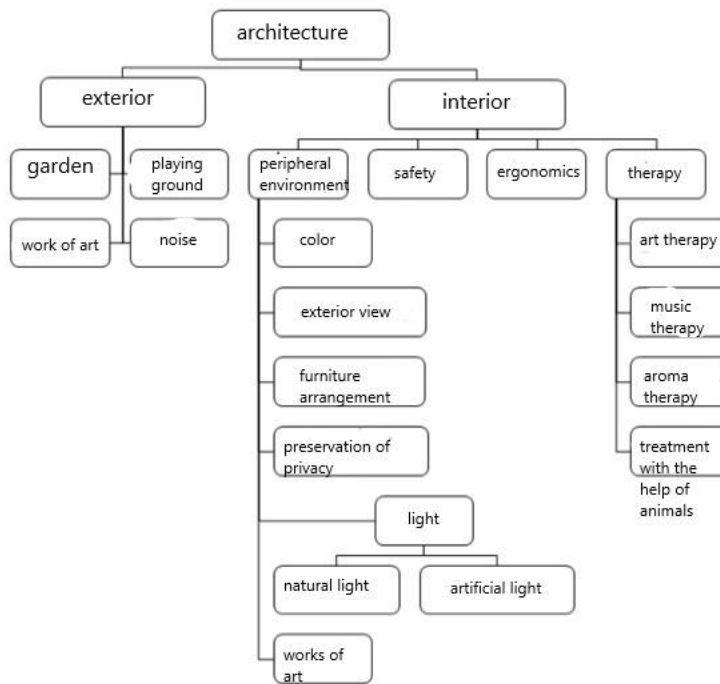


Figure 2: Architecture of healing space (Source: Ghazali and Abbas, 2010)

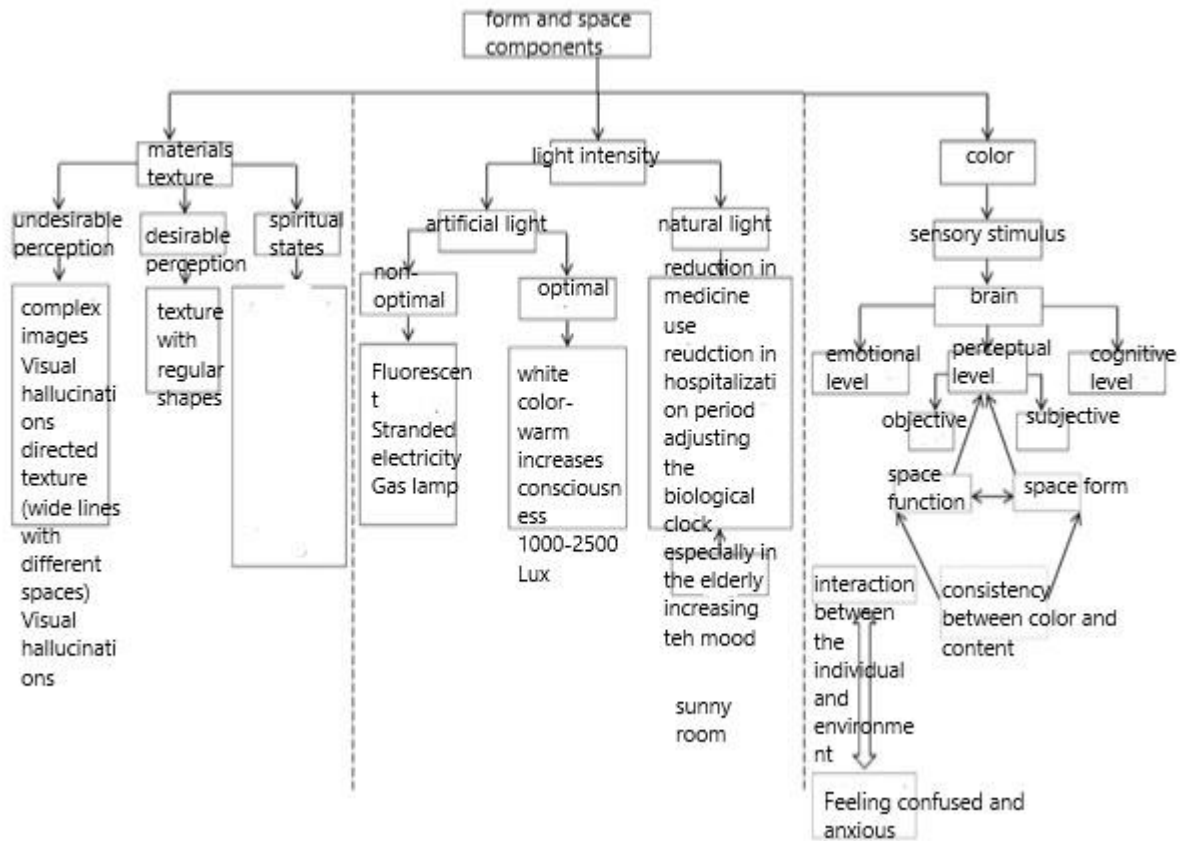


Figure 3: The effects of neuropsychological components of form and space on dementia patients

Table 4: Results of Integrated Analysis of Triple Content Analysis of Form and Space Components on Excellent Mind Functions in Dementia and Alzheimer's Patients

finding that has no application in practice and real circumstances.

The color and the light have found validity and reliability in healing the patients, generally as a set of signs that play a part of the environmental meaning in designing the healing and caring spaces. Color has been identified as the most important component in creating the characteristics of a suitable atmosphere (thoughtful, calm or activating, environmental quality) and cognitive effects on the mind, visual perception and improving daily functions, improving the physiological function of the body and behavioral disorders. Color stimulates a sense of spaciousness or limitation of space.

The color, the light, the type, and texture of the internal materials in the space, although forming the constituents of the space, are known in the literature related to the neurological environment as the sensory stimuli of the environment. Answering the research questions and analyzing the contents of the studies on the

Table 5: Strategic theoretical approaches to the relationship between the patient and the medical staff and their evaluation

Row	Components studied	Legitimacy	Participation	Recognition of patient's values/patient satisfaction	Role of physician	Type of relationship	Autonomy of patient	Most distinguished strong points	Most distinguished weak points
1	The dominant spatial-temporal strategy of physicians and medical staff	The individual power of physicians, The official science of the medical	N/A	Not known. Lack of relationship with the patient's values, beliefs, and emotions	Full guardian of the patient in medical affairs	Physician-oriented	The patient has no power over medical decisions	Ensuring that patient receives the best possible intervention	No priority of the patient's rights or demands in case of conflict with the

components of form and space (light, color, type, and texture of the materials), it is revealed that the type and temperature of the color can be most effective on the mental cognition (selective attention and adjustment of stimulation level). Light (natural and artificial) affects mental cognition by increasing consciousness. The effects of the relationship between the type and texture of the materials on the mental cognitive and the relationship between the type of materials and visual perception, daily functions, and psychology of the patients require further investigations. The natural light and type of color have healing effects on the behavioral disorders, especially in increasing mood and reducing dizziness and restlessness. Materials with regular, directed, complex, intersecting textures and shapes lead to visual hallucinations and behavioral disorders.

Summary and Conclusion:

The strategies that can be used in terms of the investigations administered are as follows:

		system, dominant values of the medical community							defined norm
2	Pluralism spatial-temporal strategy	Interaction between the patient and physician with an emphasis on the dominant values in the medical community	Available	Not known	Consultant	Patient-oriented in line with physician supervision	It is strong. Ultimately, the patient perceives and selects the final path	Consideration for values effective on patient's health, recognizing the physician	Patient's mistake in decision-making
3	Sectional spatial-temporal strategy	Lack of attention to the medical values	Participation in business, not the treatment	Known or gradually becoming known	Partial, discontinued, sectional	Product-oriented	It is good but practically inappropriate	Parties to the contract benefit if there is control and supervision. Prices are proportionate to the quality	The relationship is not humanistic. The physician-patient relationship is passive.
4	The dominant spatial-temporal strategy of	The individual power of the	N/A	Is known	Provides specialized	Patient-oriented	Is strong. The patient dominates the	Consideration for values of others (the	Patient's mistake in decision-making,

	the patient on the physician and medical staff	patient based on specialized information from the medical system			information		medical decisions	patient), failure in recognizing the physician	the physician is passive, excessive attention to the patient's autonomy
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The architectural components which can be identified in the healing environments are expressed as follows:

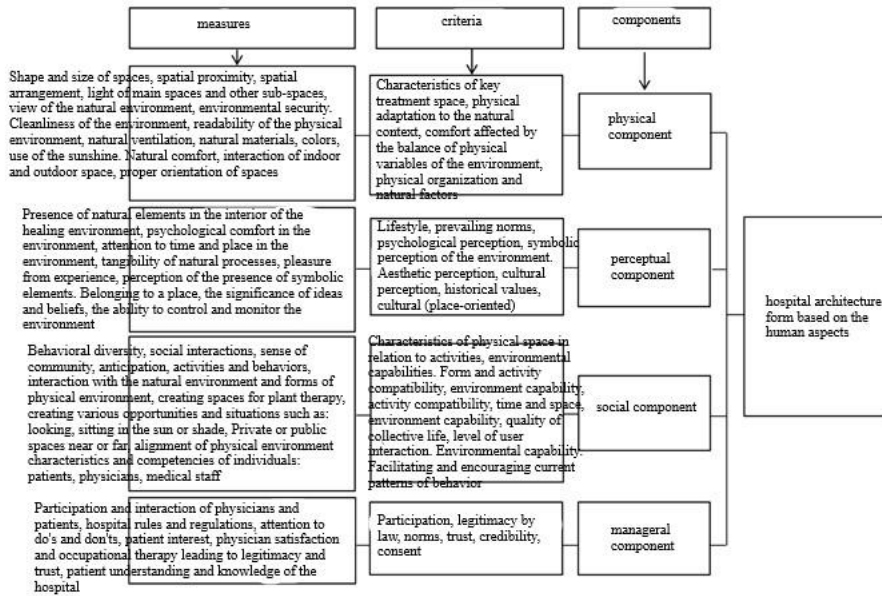


Figure 4: Practical principles used in the design of treatment spaces (effective components in the design of the healing environment)

Regarding the investigated cases, it can be concluded that:

- Today, due to the functional design of the hospitals, usually, in public health facilities, which are in the majority due to public access and affordability, the specialized points of healing environments are less observed, but in private medical environments, most of these points can be traced and examined.
- In the components studied for the healing environments, most of the physical components and perceptual components can be designed more than before by professional designers.
- The use of naturalism and Iranian architecture patterns which can be more seen in the Iranian gardens can be used in healing environments. Following components can be noted: Shape and size of spaces - Spatial proximity - Spatial arrangement - Light of main spaces and other sub-spaces - View of the natural environment - Environmental security - Environmental cleanliness - Readability of the physical environment - Natural ventilation - Natural materials - Color - Sunshine utilization- Natural comfort - Interaction of indoor and outdoor space - Proper orientation of spaces.
- The perceptual component which is more used in healing environments through the science of psychology is as follows: Presence of natural elements in the interior space of the treatment environment - Mental comfort in the environment, attention to the time-place in the environment - Tangibility of natural processes - Pleasure due to experience - Perception of the presence of symbolic elements - Belonging to the place - Indication of beliefs- Ability to control and monitoring the environment.
- The social components are among the components dependent on the character of the users of the healing environment and can have healing

aspects based on the personal thoughts of the patient.

- Managerial components are also manifested based on the ability of the employer in economic and managerial aspects and are more dependent on the staff and physicians' activities.

It should be noted that in terms of the specialized heart centers, the use of physical components that stimulate the patient due to the type of disease should be avoided. The efficacy of the physical and perceptual components that can be investigated in the specialized heart centers by the architectural designers is a challenge that requires further specialized studies. Achieving a suitable model for heart patients needs to prepare a specialized questionnaire in the field under study and answering it by specialists, experts, and psychologists that can be a way to select specific components.

REFERENCE

- Asemani, Omid. (2012) A look at physician-patient communication models and related challenges. *Iranian Journal of Medical Ethics and History*, 1-109-36-50, 5(4).
- Aghamalai, Timur, Zare, Shahram, Podat, Abbas, & Kobriai. (2007) Perceptions and expectations of primary health care recipients about the quality of services in Bandar Abbas health centers. *Hormozgan Medical Journal*, .11-3-173-179.
- Altman, Irwin. (2013). *Environment and social behavior: privacy, personal space, territory, and crowds*, translated by Ali Namazian, Shahid Beheshti University, Tehran.
- Ebrahimi, Ameneh; (2013), Analysis of the role of interior architecture in medical spaces with the approach of healing architecture, the third national conference on interior architecture and decoration, Isfahan, Institute of Higher Education for Scholars.
- Ebrahimi, Mehdi. (2009) Space and social theory. *Iranian Journal of Sociology*, 1-168.
- Ethan, Johannes (1986) *Book of Color*, translated by Dr. Mohammad Hossein Halimi, Ministry of Culture and Islamic Guidance, Tehran.
- Bayangani, Rahim. (2016), The effect of implementing the ideal discharge model on the level of anxiety in patients with myocardial infarction. *Journal of Urmia School of Nursing and Midwifery*, Volume 14, Number 9.

- Bakhtiari Manesh, Elham. (2016). Strengthening balanced sensory perception in the workshop on understanding and expressing the environment. *Seffeh*, 26 (73), 21-38.
- Dadashi, Mojgan, Andarz Habibi, Roya, Habibi Moghadam, Atieh, ... & Mojgan. (2011). Satisfaction of clients in private clinics with compliance with the Charter of Patients' Rights. *Iranian Journal of Ethics and Medical History*, 3-61-6.
- Demister, Weber (2008), *Ergonomics for Beginners*, translated by Ali Pourghasemi, third edition, Central Publishing, Tehran.
- Rabeian, M., Gharib (2003) Noise pollution in operating rooms and intensive care units. *Medicine and Cultivation*, No. 51, pp. 50-57.
- Rahimi Mehr, Vahideh; Motadayen, Heshmatullah; Mehrabani, Mehrzad; (2017). Creating healing spaces in hospitals with a view to the teachings of traditional Iranian medicine, *Journal of Traditional Medicine of Islam and Iran*, 4, pp. 451-462.
- Rezaei, Sahar; Hosseini, Seyed Behshid; (2016), Study of effective factors in the interior design of cancer treatment centers with a healing environment design approach, 2nd International Conference on Architecture, Civil Engineering and Urban Planning at the beginning of the third millennium, Tehran, Anabafat Consortium of Alborz Architecture and Urban Planning Association Paydar - Salvi Nasr Cultural and Artistic Institute.
- Zenozi, F, Ranjbarian, F., Afjeji, S. (2006) Investigation of Noise Pollution in the NICU of Mofid Children's Hospital in 2005, *Journal of Medical Sciences of Azad University*, Year 16, Issue 16, 1-129.
- Sarmad, Zohreh; Bazargan, Abbas and Hejazi, Elaheh (1998) *Research Methods in Behavioral Sciences*, Agah Publications, Tehran.
- Seyed Sadr, Seyed Abolghasem (2005) *Architecture, Color and Man*, Asaar Andisheh, Tehran.
- Shamgholi, Gholamreza, and Yekita, Hamed (2012) Basic concepts in hospital architecture design, Soroush Danesh, Tehran.
- Shahcheraghi, Azadeh, Alireza Bandarabad, (2017), *Enclosed in Environment: Application of Environmental Psychology in Architecture and Urban Planning*, Tehran University Jahad Daneshgahi Publications.
- Sharqi, Ali; Matouf, Sharif and Asadi, Saeedeh. (2017) Analysis of the role of risk perception on environmental behavior during an earthquake in Ganjali Khan complex and Kerman bazaar. *Iranian Islamic City Studies*, 7 (28), 77-85.
- Shipley, M. (2002). Analysis of staff behavior in the neonatal intensive care unit. *Child Health Care*, 31 (3), 233-239.
- Saleh Nia, Monireh et al. (2013) "The effect of the physical environment of the treatment environment on its mental image: customers' perspectives." *Hakim*, 15.
- Alal-Hesabi, Mehran; Charbgu, Nasibeh; And Rezazadeh, Raziah. (2017) Presenting a conceptual model of the meaning of place and its continuity indicators (interpretive phenomenological analysis of individuals' lived experiences.) *Journal of Bagh-e Nazar*, 20, (52) 50513. .2.
- Kamyab, Zahra, Mirzaei, Mohsen, Dabiran, Soheila. (2016), The pattern of age changes of the first acute myocardial infarction in Rafsanjan during the years 2003 to 2012: Has age decreased ?, *Journal of Rafsanjan University of Medical Sciences*, Volume 15, Number 11.
- Kolivand, Pirhossein and Kazemi, Hadi (2012) *Lighting and color in hospital design*, Mirmah, Tehran.
- Golparvar Fard, Nazanin, (2017), *Man - Nature - Architecture*, p. 333.
- Talebian, Nima, Atashi, Mehdi, Nabizadeh, Sima, (2013), *Hospital Architectural Performances*, Book 4, Tehran, Kasra Library Publishing, Second Edition.
- Losher, Max (1994) *Psychology of colors: Get to know your character better by experimenting with color selection*, translated by Vida Abizadeh, Dorsa, Tehran.
- Litkoohi, Sanaz, (2008), *Principles of designing a children's hospital based on users' opinions*, Tehran Science and Technology.
- Malkin, Jane (2005) *Planning of medical spaces, comprehensive design guide*, translated by Saeed Pirozian, Iran Housing Company, Tehran.
- Mahmoudi, Kourosh and Shakibamanesh, Amir (2005) *Principles and bases of chromatography in architecture and urban planning*, Tahan and Helleh, Tehran.
- Mardomi, Karim; Hashemnejad, Hashem; Hassanpour, Kasra and Bagheri, Maliheh (2013) *Evidence-Based Design for Medical Centers*, Asr Kankash, Tehran.
- Mossadeghrad, Alimohammad (2004) *Textbook of Hospital Organization and Specialized Management*, Dibakaran Cultural and Artistic Institute, Tehran, Tehran.
- Motalebi, Qasim; Vejdanzadeh, Ladan. (2015). The effect of physical environment of treatment spaces on reducing patients' stress. A case study of a dental office, *Journal of Fine Arts - Architecture and Urban Planning*, Volume 20, Number 2, pp. 35-46.

- Montazer al-Hojjah Mohammad Reza; Ekhlesi, Ahmad; (2018). Evaluation of effective factors on the level of effectiveness and patients' satisfaction with treatment spaces: A case study of Yazd hospitals, *Hospital Quarterly*, 2 (65), pp. 81-96.
- Mutabi, Fereshteh. (2016). *Stress Management Skills*, Danjeh Publishing, Tehran.
- Moaoudi, Mohammad Amin (2000) *The use of color in ergonomics*, Hesse Bartar, Tehran.
- Mikaeli, Alireza, Sahraei Nejad, Nasim. (2009). *Calm Village: Coding and Design*. *Environmental Science and Technology*. Volume 11, Number 4.
- Nazer Ilkhani, Roya and Omid Rahaei, (2015), *The study of the effect of color in children's treatment spaces from the perspective of environmental psychology*, *International Conference on Human, Architecture, Civil Engineering and City*, Tabriz, Center for Strategic Studies.
- Nayebe, Fereshteh. *The effect of indoor lighting on quality of life*. *Tandis*. April 15th, (2009). No. 148.
- nayebe, Fereshteh et al. (2008). *The Effect of Light on Quality of Life and Human Ethical Behavior*, *Ethical Journal in Science and Technology*, No. 314, Second Year.
- Nisar Nubari, Mahsa. (2015). *Design of a psychotherapy center with the approach of healing environments*, Master Thesis, Tabriz University of Islamic Arts.
- Nili, Rana; Sultanzadeh, Hussein (2012). *How to reflect the characteristic landscapes in the landscape pattern of the Persian garden*, *Bagh Quarterly: Nazar*.
- Varney et al. (2014). "Assessment of Built Environment in a Primary Pediatric Treatment Environment: Development of a Child Health Care Complex and Staff Satisfaction for Child Health Care Centers", pp. 10-20.
- Ministry of Health, Treatment and Medical Education, Deputy of Management and Resources Development, Office of Physical Resources Management and executor of Development Plans (2013), *Safe Hospital Planning and Design Standard, General Hospital Standards and Requirements*, Volume 10, Pendar Nik, Tehran.
- Vejdan Zadeh, Ladan; Matlabi, Qasim; (2016), *Recognizing the factors affecting the creation of healing environments*. *Seffeh Magazine*, Volume 26, Number 72.
- Abbas, M.Y. and R. Ghazali, 2010. *Healing environment of pediatric wards*. *Procedia-Social and Behavioral Sciences*, 5: p. 948-957.
- Abdullahzade MM. *Natures Architecture, explaining an approach about the ratio of human and artificial environment based on quadruples*. *Scientific Journal of Iranian Architecture Studies*. 2015; number 8: 137-156. [in Persian].
- Abdullahzade MM. *Natures Architecture, explaining an approach about the ratio of human and artificial environment based on quadruples*. *Scientific Journal of Iranian Architecture Studies*. 2015; number 8: 137-156. [in Persian].
- Adams, Annmarie & Theodore, David & Goldenberg Ellie & McLaren, Coralee & McKeever, Patricia, 2010, *Kids In The Atrium: Comparing Architectural Intentions And Children's Experiences In A Pediatric Hospital Lobby*, *Journal of Social Science & Medicine*, 70, 658-667.
- Adveri, et, al. (2013). *Design details for health: making the most of design's healing potential (Vol. 9)*. John Wiley & Sons.
- Adveri, et, al. (2013). *Design details for health: making the most of design's healing potential (Vol. 9)*. John Wiley & Sons.
- Akinluyi, Muyiwa L. Joseph A. Fadamiro, Hezekiah A. Ayoola, Morakinyo J. Alade. 2021. *Efficacy of Architectural Space Design for Healing and Humanization in Lagos University Teaching Hospital, Nigeria*. *International Journal of Architecture and Urban Development* Vol. 11
- Aujoulat, Isabelle & Simonelli, Fabrizio & Deccache Alain (2006), *Health Promotion Needs of Children and Adolescents In hospitals, a Review*, *Patient Education and Counseling Journal*, 1, 61, 23-32.
- ANSI S12 WG44, and the joint subcommittee on speech privacy & healthcare acoustics (The Acoustical Working Group) .2010, January. *Sound and vibration design guidelines for health care facilities*. 2nd Public draft .Available from: <http://www.speechprivacy.org> . Date access: 18/12/2010
- Armstrong Ceiling Systems .2003. *Rx for healthcare speech privacy: A balanced acoustical design*. Available from: <http://www.armstrong.com/common/c2002/content/files/7728.pdf> . Date access: 21/12/2010
- ASHRAE HVAC .2003. (American Society of Heating, Refrigerating and Air Conditioning Engineers) *Design Manual for Hospitals and Clinics*.
- Bailey, E. , S., Timmons .2005. *Noise levels in PICU: An evaluative study*. *Paediatric Nursing* 17(10): 22-26.
- Almusaed, A. (2011). *Biophilic and Bioclimatic Architecture: Analytical Therapy for the Next Generation of Passive Sustainable*

- Architecture. London, England: Springer Verlag.
- Ardalan, N., Bakhtiari, L. 2012. Sense of Unit, Nader, translated by Vandad Jalili, Elme memar royal publication.
- Beiner, R., Arendt, H., Cavell, S., Larmore, C., O'Neill, O., Kateb, G., University, P., Dostal, R.J., Wellmer, A., Benhabib, S., Young, I., Bilsky, L.Y., & Villa, D.)2001(. Judgment, Imagination, and Politics: Themes from Kant and Arendt. Rowman & Littlefield Publishers.
- Berglund, B., P., Hassmen .1996. Sources and effects of low-frequency noise, Journal of the Acoustical Society of America. 99(5), 2985-3002.
- Blomkvist, V., et al .2005. Acoustics and psychosocial environment in intensive coronary care. Occupational and Environmental Medicine 62(3): Article 1e.
- Buelow, M .2001. Noise level measurements in four Phoenix emergency departments. Journal of Emergency Nursing 27(1): 23-27.
- Busch-Vishniac, I., et al .2005. Noise levels in Johns Hopkins Hospital. Journal of the Acoustical Society of America 118(6): 3629-3645.
- Bourdieu, P., & Wacquant, L.)1999(. On the Cunning of Imperialist Reason. Theory, Culture & Society, 16)1(41-58.
- Castells, M.)1999(. Grassrooting the Space of Flows. Urban Geography, 20)4(, 294-302.
- Chryssikou, E.)2019(. Psychiatric Institutions and the Physical Environment: Combining Medical Architecture Methodologies and Architectural Morphology to Increase Our Understanding. Journal of Healthcare Engineering, 1-16.
- Dalke, Hilary et al.)2004(. Lighting and color for hospital design, A report on an NHS Estates Funded Research Project, London South Bank University, London.
- Devlin, A. S., & Arneill, A. B. (2003). Health care environments and patient outcomes: A review of the literature. Environment and behavior, 35(5), 665-496
- Dilani, Alen, (2000), Psychosocially Supportive Design Scandinavian Healthcare Desig /Mediapublishing/Papers.aspx
- Del Nord, Romano (2006), Environmental Stress Prevention in Children's Hospital Design, Motta Architettura Srl, Milan.
- Davenny, B. 2007. Acoustic environment technical brief: Green guide for health care™ environment quality credit 9, Green Guide for Health Care™ . Available from: <http://www.gghc.org> . Date access: 13/02/2011
- Debbie ,Stoewen, D. L. Brinks , (2017). Dimensions of wellness: Change your habits, change your life. The Canadian Veterinary Journal, 58(8), 861.
- Eisen, S. L. (2007). The healing effects of art in pediatric healthcare: Art preferences of healthy children and hospitalized children (Doctoral dissertation, Texas A&M University).
- Foucault, M.)1980(. The History of Sexuality: Interview. Oxford Literary Review, 4)2(, 3-14.
- Foucault, M.)2012(. The Birth of the Clinic. Routledge.
- Foucault, M.)2007(. The Language of Space. Space, Knowledge and Power: Foucault and Geography, In Space, Knowledge and Power)153-167(. Routledge.
- Giedion, S. (1971). Space, Time, Architecture. (M. Mazini, Trans.). Tehran: Scientific and Cultural Publishing Company.
- Gilliett, M.)2010(. Applied Interior Designing Guidance, translated by Ermia Zorriasatein, Alireza Sahragard, Pashuten publication.
- Graham, H., & Oakley, A)1981(. Competing Ideologies of Reproduction: Medical and Maternal Perspectives on Pregnancy.
- Habermas, J.)1984(. Habermas: Questions and Counterquestions. Praxis International, 4)3(, 229-249.
- Harvey, A.C.)1990(. Forecasting, Structural Time Series Models and the Kalman Filter.
- Harvey, D.)2003(. The Right to the City. International Journal of Urban and Regional Research, 27)4(, 939-941.
- Harvey, D.)2012(. The Right to the City. In The Urban Sociology Reader)443-446(. Routledge.
- Harvey, D. (2016). The Ways of the World. Profile Books.
- Hawking, S.W.)1988(. Wormholes in Spacetime. Physical Review D, 37)4(, 904.
- Hosking, Sarah & Haggard, Liz)1999(. Healing the hospital environment: design, management and maintenance of healthcare premises, E & Fn spon, London & New York.
- Hutton, Alison, (2005), Consumer, Perspectives in Ado lescent Ward Design, Issues in Clinical Nursing, 14,534- 537. Institute for Health Metrics and Evaluation (IHME). Available: <https://vizhub.healthdata.org/gbd-compare/>. Accessed: 3 March 2018.
- Jalal Mahmood , fouad and Yosif Tayib, Abdullah. 2019. Healing environment correlated with patients' psychological comfort: Post-occupancy evaluation of general hospitals First Published November 18, 2019

- Research Article
<https://doi.org/10.1177/1420326X19888005>
- Jun Tai, Norma, (2008), Play in Hospital, *Journal of Paediatrics and Child Health*, 5, 18, 233-237
 - Karimi, V. 1998 . The Art of Color Therapy of Form and Space and the Effect on Environmental Graphic on Children Hospitals 2 .
 - Karimi, V. 2008. The Art of Color Therapy of Form and Space and the Effect on Environmental Graphic on Children Hospitals 1, Rah pooyeh publication, second edition, No. 1, winter.
 - Kellman, Neil (1987), Considering Children's Special Needs in the Layout and Scale of Pediatrics Hospitals, In *Children's Environments Quarterly*, 4, 3, 3-6.
 - Lawson, B. (2002). Healing architecture. *The Architectural Review*, 211(1261), 72
 - Lefebvre, H.)1991(. *The Production of Space*)142(. Blackwell:Oxford.
 - Lennard, S.H.C., & Lennard, H.L.)1984(. *Public Life in Urban Places: Social and Architectural Characteristics Conducive to Public Life in European Cities*. Gondolier Press/Imcl Council.
 - Massey, D.)2005(. *For Space*. Sage.- Malkin, Jain)1992(*Hospital Interior Architecture: Creating Healing Environments for Special Patient Population*, Van Nostrand Reinhold, Michigan.
 - Malkin, Jain)2002(*Medical and Dental Space Planning: A Comprehensive Guide to Design, Equipment, and Procedure*, John Wiley and Sons Inc., New York.
 - Mursafavi, Hesham (2006), *Design for Effective and Affective Medical Environments*, PhD Thesis, University Duisburg –Essen.
 - Mileski, Krapt, 2017 (UMD) University of Maryland's Your Guide to Living Well. Available from: <https://umwellness.wordpress.com/8dimensions-of-wellness/> Last accessed June 27, 2017.
 - Motalebi, Gh. & VojdanZadeh, L. The effect of the physical environment of the therapeutic spaces on reducing the stress of patients; Case study of dentistry. *Honarhaye Ziba* , 2014; 20(2): 35-46.
 - NACHRI (2017), Evidence for Innovation , National Association of Children's Hospitals and Related Institutions (NACHRI) Issue <http://www.healthcaredesignmagazine.com>, Date: Online, Posted On: 7/8/2008.
 - NACHRI (2017), Evidence for Innovation , National Association of Children's Hospitals and Related Institutions (NACHRI) Issue <http://www.healthcaredesignmagazine.com>, Date: Online, Posted On: 7/8/2008
 - Naderi, J. & Raman, B. (2013). Capturing impressions of pedestrian landscapes used for healing purposes with decision tree learning]. *Journal of Landscape and Urban Planning*, (73): 155-166
 - Nadja Kabisch, The health benefits of nature-based solutions to urbanization challenges for children and the elderly, volume 159, November 2017, pages 362-373.
 - Nikookar.(2015). Healthy campus by open space design: Approaches and guidelines. *Frontiers of Architectural Research*, 3(4), 452-467.
 - Nikookar.(2015). Healthy campus by open space design: Approaches and guidelines. *Frontiers of Architectural Research*, 3(4), 452-467.
 - OnosahwoIyendo. T, Chukwuemeke Uwajeh. P & StephenIkenna. E, 2016, The therapeutic impacts of environmental design interventions on wellness in clinical settings: A narrative review, *Complementary Therapies in Clinical Practice*, Volume 24, August 2016, Pages 174-188.
 - OnosahwoIyendo. T, Chukwuemeke Uwajeh. P & StephenIkenna. E, 2016, The therapeutic impacts of environmental design interventions on wellness in clinical settings: A narrative review, *Complementary Therapies in Clinical Practice*, Volume 24, August 2016, Pages 174-188.
 - Rollins, Judy Ann (2010), The Influence of Two Hospitals' Designs And Policies on Social Interaction And Privacy As Coping Factors For Children With Cancer And
 - Say Jer, O. and Ibrahim, F. ,2014, "Enhancement of Space Environment Via Healing Garden," *American Transactions on Engineering & Applied Sciences*, pp. 281-298
 - Seamon, D., & Gill, H.K.)2016(. *Qualitative Approaches to Environment-behavior Research. Research Methods for Environmental Psychology*, 5.
 - Sherman, S. A., Varni, J. W., Ulrich, R. S., & Malcarne, V. L. (2013). Post-occupancy evaluation of healing gardens in a pediatric cancer center. *Landscape and Urban Planning*, 73(2-3), 167-183.
 - Sherman, S. A; Varni, J. W; Ulrich, R. S; Malcarne, V. L(2005), Post-occupancy evaluation of healing gardens in a pediatric cancer center, *Landscape and Urban Planning*. 73(2-3), pp 167-183.
 - Simonsen , Thorben P. and Duff Cameron . First published: 28 October 2019. <https://doi.org/10.1111/1467-9566.13011>
 - Siuyu.Lau . (2014). Prevention is better than cure: the new ESC Guidelines.

- Standards of Self Care Guidelines, Green Cross Academy of Traumatology. Available from http://home.cogeco.ca/~cmc/Standards_of_Self_Care.pdf Last accessed June 27, 2017.
- Sue P. H; Heidi. D-H; Meriwether, Marian P.; Adams, Swann Arp, 2017, Healing by Creating: Patient Evaluations of Art-Making Program, *Journal of Creative Behavior*, v51 n1 p35-44 Mar 2017.
- SULIS (2015). Healing Gardens. Sustainable Urban Landscape Informa Series,))2,10.12
- T. McAndrew, Francis, 2008, *Environmental Psychology*, Translated by Gholamreza Mahmoudi, Zarbaf-e Asl Publishing, Tehran
- Thomas, Frederix, Lena 2017. Therapeutic landscapes in hospital design: a qualitative assessment by staff and service users of the design of a new hospital inpatient unit.
- Ulrich, Roger & Zimring, Craig(2004), *The Role of The Physical Environment In The Hospital of The 21 St Century A Once In A Lifetime Opportunity*, Report to the Center for Health Design for the Designing The 21st Century Hospital Project.
- Ulrich, Roger (2000), *Effects of Healthcare Environmental Design on Medical Outcomes* Ulrich, Roger & F Simons, Robert & D Losito, Barbara Michael (1991) *Stress Recovery During Exposure To Natural And Urban Environments*, *Journal Of & Fiorito, Evelyn & Miles, Mark & Zelson, Environmental Psychology*, 11, 201-230.
- Ulrich, R.S., et al .2008. A review of the research literature on evidence-based healthcare design. Georgia Institute of Technology. Available from http://www.healthdesign.org/hcleader/HCLeader_5_LitReviewWP.pdf . Date access: 13/02/2011
- United States Gypsum Company (USG) .2006. *Acoustical assemblies: Making sound choices*. Brochure SA-200. Chicago
- USG & Lencore Acoustics Corp .2004. *Achieving HIPAA oral privacy compliance: USG and Lencore Acoustics helping you meet healthcare privacy requirements*. Chicago, USG Interiors, Inc. Available from: http://www.lencore.com/files/_usg_lencore_hipaa.pdf . Date access: 13/02/2011
- Waropay, V. M. , H.S., Roller .1986. Design aid for office acoustics: How to determine composite sound isolation ratings for offices by combining performance of walls, ceilings, and floors. USG Form Function 4
- Van den Berg, A. et al. (2014). Green space as a buffer between stressful life events and health. *Journal of Social Science & Medicine*, 70(12): 1203-1210.
- Velarde, M. D., Fry, G., & Tveit, M. (2007), Kabisch, (2017). Health effects of viewing landscapes—Landscape types in environmental psychology. *Urban Forestry & Urban Greening*, 6(4), 199-212.
- Vygotsky, L.S.)1978(*Mind and Society: The Development of Higher Mental Processes*, Cambridge, MA: Harvard University Press.
- Weston, W.W.)1995(*Overview of the Patient-centered Clinical Method. Patient-centered Medicine: Transforming the Clinical Method*, 21-30.
- Whitehouse, Sandra & W.Varni, James & Seid, Michael Cooper Marcus, Clare & Jane Ensberg, Mary & Jacobs Jenifer & S Mehlenbeck, Robyn (2001), *Evaluating a Children's Hospital Garden Environment: Utilization and Consumer Satisfaction*, *Journal of Environmental Psychology*, 21, 301-314.
- Wilson, Margaret & Megal, Mary & Enebach, Laura Carlson, Kimberly (2010), *The Voices of Children: Stories about Hospitalization*, *Journal of Pediatric Health Care*, 2, 24, 95-101.
- , 9-14.,
- White, AR, Mitchel, A. (1996). "Familiazation with complementary medicine: of doctors. *Complement Therapy for Nursing & Midwifery* 2000;6:41-7 report of a new course for primary care physicians". and *and Complementary Medicine*, 2: 307-14 *Journal of Alternative*
- World Health Organization (WHO) .1999. *Guidelines for Community Noise*. Available from www.who.int . Date access: 11/04/2011
- Zollman, C, Vickers, A. (1999). "Users and practitioners of complementary medicine", *British Medical Journal*, 319: 836-83