

Artículo de investigación

Study the mental effect of color in the interior architecture of the hospital spaces and effect on the patient tranquility

Estudio del efecto mental del color en la arquitectura interior de los espacios del hospital y el efecto en la tranquilidad del paciente

Estudar o efeito mental da cor na arquitetura interior dos espaços hospitalares e afetar a tranquilidade do paciente

Recibido: 20 de abril de 2018. Aceptado: 10 de mayo de 2018

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Abstract

Interior architecture plays a major role in the building environment quality. Setting quality and space partitioning, color and material of the surface coverage, lighting, furniture, and etc. are the factors affecting the beauty of the interior spaces. Effect of environment psychology such as color and light on the human senses and its feedback in the environment influences the environment quality. Colors around us, not only possess the ability to transfer the message and emotion, but also possess the energy therapy property. Color psychology means the effect of environment on the mind and mental states of people through the stunning available in the environment. This fact is of great importance in the therapeutic Spaces because a patient that goes to the hospital, is in the unfavorable conditions and therefore it should be tried to reduce the patient anxiety and increase the hope of life and restore the patient's tranquility. Thus, people strictly need the variety of color and form and combined artworks in the around environment. Generally, using the diverse colors and suitable lighting eliminates the uniformity in the environment and impatience in the patients and avoids weakening of the senses and the nervous system. Therefore, by knowing the topic of environment psychology and use the color and light in the therapeutic space and by the descriptive method, in this study we try to investigate the effect of colors on the different diseases and classify them quantitatively in order to create a sense of relaxation and more satisfaction in patients. Recent studies have

Resumen

La arquitectura interior juega un papel importante en la calidad del entorno de la construcción. Establecer la calidad y el espacio de particionamiento, el color y el material de la cobertura de la superficie, la iluminación, los muebles, etc. son los factores que afectan la belleza de los espacios interiores. El efecto de la psicología ambiental, como el color y la luz en los sentidos humanos y su retroalimentación en el ambiente, influye en la calidad del ambiente. Los colores que nos rodean no solo poseen la capacidad de transferir el mensaje y la emoción, sino que también poseen la propiedad de terapia energética. La psicología del color significa el efecto del medio ambiente en la mente y los estados mentales de las personas a través del aturdimiento disponible en el entorno. Este hecho es de gran importancia en los Espacios terapéuticos porque un paciente que acude al hospital, se encuentra en las condiciones desfavorables y por lo tanto se debe tratar de reducir la ansiedad del paciente e incrementar la esperanza de vida y restablecer la tranquilidad del paciente. Por lo tanto, las personas necesitan estrictamente la variedad de colores y formas y obras de arte combinadas en el entorno circundante. En general, el uso de colores diversos y una iluminación adecuada elimina la uniformidad en el entorno y la impaciencia en los pacientes y evita el debilitamiento de los sentidos y el sistema nervioso. Por lo tanto, al conocer el tema de la psicología ambiental y utilizar el color y la luz en el espacio terapéutico y el método descriptivo, en este estudio tratamos de

reported that accurate use of the special colors can create useful effect in the mind balance and health, physical and mental relaxation, and in result rapid restore of health in the recovery time.

Keywords: relaxation, hospital space, interior architecture, environmental psychology

investigar el efecto de los colores sobre las diferentes enfermedades y clasificarlos cuantitativamente para crear un sentido de relajación y más satisfacción en los pacientes. Estudios recientes han informado que el uso preciso de los colores especiales puede crear un efecto útil en el equilibrio mental y la salud, la relajación física y mental y, en consecuencia, la restauración rápida de la salud en el tiempo de recuperación.

Palabras claves: relajación, espacio hospitalario, arquitectura de interiores, psicología ambiental.

Resumo

A arquitetura de interiores desempenha um papel importante na qualidade do ambiente de construção. Estabeleça a qualidade e o espaço de partição, a cor e o material da cobertura da superfície, a iluminação, o mobiliário, etc. são os fatores que afetam a beleza dos espaços interiores. O efeito da psicologia ambiental, como cor e luz nos sentidos humanos e seu feedback no ambiente, influencia a qualidade do ambiente. As cores que nos cercam não só têm a capacidade de transferir a mensagem e a emoção, mas também possuem a propriedade da terapia energética. A psicologia da cor significa o efeito do ambiente na mente e nos estados mentais das pessoas através do deslumbramento disponível no ambiente. Esse fato é de grande importância nos Espaços Terapêuticos, pois um paciente que chega ao hospital, está em condições desfavoráveis e, portanto, deve tentar diminuir a ansiedade do paciente e aumentar a expectativa de vida e restaurar a tranquilidade do paciente. Portanto, as pessoas precisam estritamente da variedade de cores e formas e obras de arte combinadas no ambiente circundante. Em geral, o uso de diversas cores e iluminação adequada elimina a uniformidade do ambiente e a impaciência nos pacientes e previne o enfraquecimento dos sentidos e do sistema nervoso. Portanto, conhecer o tema da psicologia ambiental e cor uso e luz no espaço terapêutico e o método descritivo, neste estudo nós investigamos o efeito de cores em diferentes doenças e classificar quantitativamente para criar uma sensação de relaxamento e mais satisfação nos pacientes. Estudos recentes relatam que o uso preciso de cores especiais pode criar um efeito útil no equilíbrio mental e na saúde, relaxamento físico e mental e, conseqüentemente, a rápida restauração da saúde no tempo de recuperação.

Palavras-chave: relaxamento, espaço hospitalar, arquitetura de interiores, psicologia ambiental

Introduction

In the new millennium, some ideas have been spread in which the interior design and exterior view give patients the feeling of security and control. Research show that people need to control the physical environment and the feeling control is one of the most important factors affecting the health and stress level. Also, people who don't control their environment, often suffer from the different diverse of tension (Dilani, 2006). On the other hand, hospital, which is the place of pain, treatment, birth, and death of the human, is attended in terms of architecture because man survives illness and gets his healthy or dies (Sedighe, 1982). The unknown environment of hospital causes the stress and discomfort in the patient and is

considered as one of the factors reinforcing the stress. When the patient is younger or more elder, this fact is more important. Moreover, considering the environmental barriers and even parameters that improve the efficiency and increase the environmental charm, makes a more efficient foundation in these environments (Ebno Shahidi, 2012). Some researcher believe that the color is a visual characteristic and the form element finds meaning through color and also gives a sense of scale (Pati, 2012). Use the color is different in the various environment. in the use of color, it is necessary to pay attention to the psychological characteristics of people (Mahmoudi, 2009). Effect of the light and color on the patients can be explored in the environment

psychology. With regard to the importance of using the light and color in the hospitals, the environment psychology is necessary in designing the hospital spaces.

Now, with regard to the mentioned issues, a question is presented: what is the role of the color and environment psychology on the design of the therapeutic spaces and how can color be used to create the relaxation and facilitate the treatment process in the hospital space design? To answer these questions, in this paper, the environment psychology will be studied and the available theories and effect of color and light psychology in the therapeutic environment will be investigated.

Methodology

In order to investigate the effect of the color on the interior spaces of the hospital, in the present study, we use a analytic- descriptive method. First, the references are recognized and then the information are collected and organized and finally the information are interpreted.

In this section, the available information are analyzed and the information about environment psychology, color and its role in the design of the hospital interior spaces are studied. Based on the findings, a required viewpoint will be presented. The goal of this section is to collect the knowledge in order to test the presented hypotheses. In the next step, the findings will be analyzed. The data collection method is through library. With regard to the collected data, the recognition and analysis of these patterns will be performed manually.

Environment psychology

-Environment definition. On the one hand, environment is a space surrounding the human and other creatures and on the other hand, is a limited and sensible space for human. Thus, the intended environment is different for the different persons. The environments consists of material (quantitative and physical) and mental (qualitative and non- physical components and

elements that appear in the form of natural element , human made, natural conditions, and etc. (Taghvaie, 2010). the key of any environment definition is the “ surrounding” characteristic of the environment. This feature causes some conceptual and cognitive term problems in understanding the meanings which is given when using the term "environment" (Porteous. 1977). The literature distinguish between the different terms of physical environment, social environment, psychology environment, and behavioral environment. The main point of this classification and similar classifications is to distinguish between real and objective world around the human and the Phenomenological world that affects the behavioral patterns or mental reaction of the people, consciously and unconsciously (Lang, 2004).

Based on the Craik theory , environment psychology is to study the human behavior so that relates to the daily life in the physical environment (Craik, 1970). Craik (Cited in Porteous, 1977) applies this distinction and uses in the different words. He introduced three distinguished components : phenomenon, personal, and conceptual environment (figure 1).

Sunflod (cited in Porteous, 1977) defines the environment as a “hierarchy” where the person is considered as a center and surrounded by behavioral environment, perceptual environment, practical environment and geographic environment (figure 2). The geographical environment attributes whole outside world to the individual. A part of geographical environment is the practical environment that includes those parts affect the person regardless of his awareness. The practical environment comprises perceptual environment that includes those practical environment where the person is fully aware of it. The reason of this is to present the past emotion or experience. The center of this hierarchy is the behavioral environment that is a part of the conceptual environment and includes the person’s reaction to the environment.

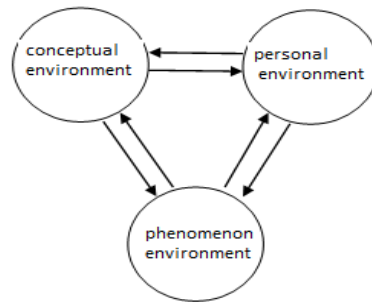


Figure 1- Environmental internal relation from the Craik viewpoint. Ref: Porteous 1977

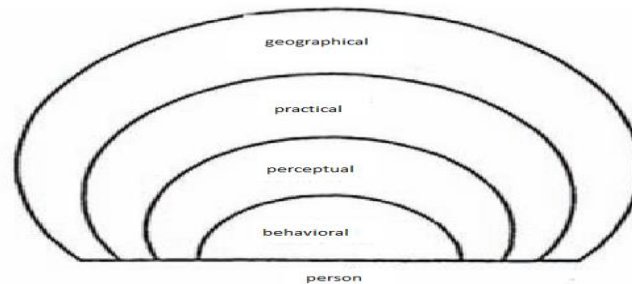


Figure 2- environment hierarchy from the Sunfeld viewpoint. Ref: Porteous 1977

-Reasons of the environment importance. What is important for the psychologists is the interaction between environment and inheritance. The complexity of this interaction and effect on the different personality trait has been researched yet. The concept of space and the space imagination as a system of locations is a required condition to find a place of existential reliance (Nurberg, Scholtzer, 2009)

-Environment types.

Physical environment : the geographical places (non- social and non- cultural aspects)

Psychological environment: includes the people mental images

Social environment: includes the institutions consisting of individuals and groups

Behavioral environment: a set of factors to which the human reacts

-Environment nature. Environment can be defined as anything is around us, natural or handmade and artificial. However , our definition of environment depends on our view and use of the environment. Socialists define environments as social organizations and process. Architects define environments as buildings and outdoor spaces. Environment can be classified through different methods and on terms of different issues. One of these classifications is John Lang classification. He divides environments into sub-classification of physical , social, psychological, and behavioral environment. Physical environment includes the geographical environment and social environment comprising

the people and groups. Psychological environment includes people mental images. Behavioral environment includes a set of factors to which a person reacts (Lang, 2009, 87). The around space is the most basic definition of the environment. Therefore, any definition, description and clarification of the environment performance and nature should be related to a thing around us. What architectures create is a potential environment for the human behavior and use.

-Psychological definition of the environment. The start of this major was between 1961-1966 that the first architecture- psychology conferences in American. Of course, some believe that the environment psychology is as old as psychology. Gifford, Egon Brunswick, and then Kurt Lewin are known as the founders of this major. In 1943, Brunswick used the environment psychology for the first time . In the German references Melbach (1902) , is known as the first psychology founder. Some topics of this research field are personal space, Privacy, territory, and crowd. Generally, we can say that this major is a sub-set of the behavioral sciences and is a intra- major research that has a close relation to the architecture, landscape architecture, and urban design. environment psychology as a branch of the psychology , studies the human behavior in relation to his habitation and the architects have had a significant contribution to present and develop it (Nateghian, 2014).

“ environment psychology “ can be defined as the psychology of “ human” and his “ environment”.

Hitherto, various definition of this major have been presented by researchers(Canter and Craik, 1981). it can be said that the environment psychology studies the common relationship between the physical environment and human behavior and experience (Holahan, 1982) .

-Environment perception (study the relation between human and environment and process of perception of the natural and artificial environment). Perception is a part of life process by which each of us imagines a world from a certain theoretical point of view. Relation between the human and surrounding environment and quality of his perception of the environment is a function of his multiple senses set. Human senses are rarely used separated from each other because they are often linked together and this fact is very important to understand a complete image of the surrounding environment. However, the effect of sight in the perception and reaction to beauty is more important than other senses (Bell, 2003, 59). In the other word, the perception of who can use all senses, is visual, in the first step. But , there are some situations where hearing, smelling, and touching is more important than sight sense. The light energy is used in the sight sense. Shape, tissue, color, light concentration, and movement and also spatial aspects such as distance and depth are recognized by the sight sense. In addition to depict the around environment, sight sense is used as a major way of thinking . In fact, use the "mind eye" is sued to picture the creative ideas (same, 2010).

-Environment and effect on the human. Human is an adaptable creature, but his perception about environment is influenced by things to which he has a close relation (Lang, 2009).

an effect of environment on the human is shaped due to quality of the human perception about his surroundings. Environment perception is based on the human knowledge and information about shapes, spaces, performance, and apparent and inner meaning. The first result is the contact between human and environment. This perception causes human creates a relation to the environment by different senses such as sense of identity, happiness, sadness, proud, humility, preference, self- alienation, and many psychic relation. All of these feelings is the result of a relation that produces the human principles and cultural values or values hidden or latent in the environment (Taghi Zade, 2002).

Color

-Color definition. The most accurate definition of the color is that a visual reflection that creates by passing or diffusion or reflection of the color combination by things. The color concept definition is also based on the color contrast between two surfaces. Color is a part of sight perception so that one can distinguish a stain from adjacent spots without regarding its structure through eye (without movement) (Akhsheik , 2011,6)

Tonality : different degrees of the light and darkness of a color called tone. The meaning of the totality is the general effect of the color in an art work. The goal of tone is the color variations that obtained from a warm or cool color dominated in an artwork. The dominated totality is the most color that observed in a painting board. (Ghaderi, 2007, 112). Color value: is the transparency and brilliance of a color. For example, a different between dark red and light red is called value. In the other word, the color purity degree is known as a relation between the most complete saturation limit of a color and the amount of gray mixed with color (Ghaderi, 2007,112).

-Color classification and study the features and physical and mental effect. Color influences either human body and mind. After understanding the features and perceptions of the colors, understanding their psychological effect will be easier. Surprisingly, direct and indirectly, color influences on our body through different ways. sight sense , which is a factor for understanding and receiving colors, totally includes 80% of all human perception and acts through light and dark contrast. Warm and cool colors include a wide set of colors that each one has special features and influences the environment, differently (ministry of Health and treatment, 2013).

Generally, colors divided into three categories:

Neutral colors: colors those are not in the color spectrum and obtained through combining of other colors. They can have the positive or negative effect. Black, white, gray, brown, and beige are the neutral colors.

Warm colors: these colors nervous system stimulant and exacerbates feelings. These colors are clearly visible and attract attention. Red , orange, yellow, green, and purple are the warm colors.

Cool colors: these colors are relaxing colors. Their harmony is more in the different environment. They are not more visible. Blue, indigo color, green are the cool colors.

In the following table, the general features of the warm and cool colors are presented.

Cool color	Blue, green, green- blue, purple
Features	Relaxing, low visual stimulation, reducing the stress, rapid time passing under the cool color, things seem lighter, room seems larger Places where monotone, repetitious, and hard works
Usage	All spaces that need relaxation and focus Intensive Care Unit- hospital section, emergency room, surgery room Green : official rooms (increase the readability)
Caution	Probability of being bored of environment where these colors are overcome.

Table 1- study the cool color (ref: ministry of health and treatment, V. 10, 2013)

Warm colors	Colors of Red, yellow, purple spectrum
Features	High visual stimulation, time passes slowly under the cool color, things seem heavier and larger Are used for motility and excitement in the environment
Usage	Are used to create happiness and joy in environment that possesses the depression, boredom and stillness. Probability of excessive mobility, mental disorders, visual disturbance, distress in the environment that where these colors are overcome.
Caution	Use the warm color is forbidden in the following places: intensive care unit, heart section, emergency section, official rooms, children section

Table 2- study the warm color (ref: ministray of health and treatment, V. 10, 2013)

-Study the colors based on their psychological features. In the following table, some features of the important colors more known in the color spectrum and used in the therapeutic environments, are studied (ref: ministry of health and treatment, V. 10, 2013). Color psychology means influencing the environment in the mind and mental states of the people through painting in the space. This is important in the therapeutic environments. Color affects the mind and mental states through the stimulating impact on the sensory receptors and processing these stimulations in the brain. Use the various colors and suitable lighting removes the monotony and boredom in the environment and avoids weakening of the senses and the nervous system. Those who have to stay in places such as elderly nursing home and hospital, strongly need the variety of color and form and observing the artworks that integrated in the environment internal design because regarding these facts reinforces the nervous system of these people and increases the mental activity (ministry of health and treatment, 2013,274).

-Effect of color on the human perception about the environment. Colors can create stress or relaxation in the space through their warmth and coolness. Effect of colors on our spirit forms an important part of our relation to the environment. Generally, there is a sensitive relation between the mental tendencies and colors. One of the simplest ways to restore the relaxation is to use the urban harmonic colors (Bahadori, 2013, 10). In the figure 1, the factors affecting the color perception of human are presented.

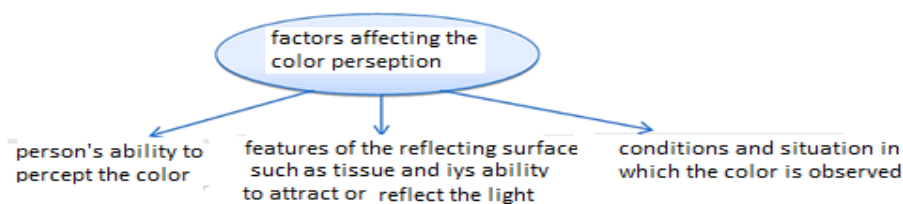


Figure 1- factor affecting the color perception.

-Color in architecture. Architects and interior designers study the form, space, light, and tissue in designing the building. But, color is one of details that designers pay less attention to. To make the effects of the color clear from the beginning, it should be selected as a constituting component from the beginning (Yousefi, 2014, 5).

The most successful color design in the interior space should be appropriate with the design goal. The appropriateness and effectiveness of the color in the design process is presented in the following figure.

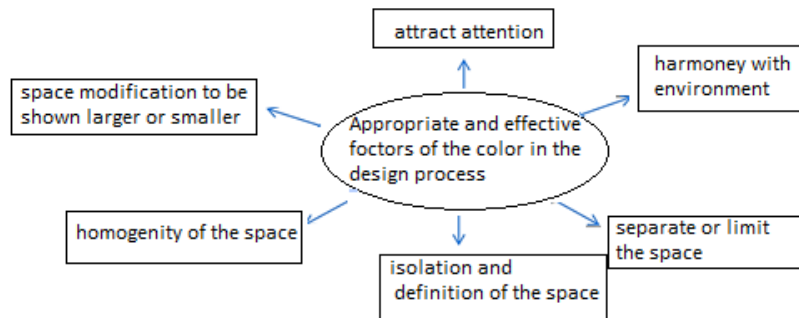


Figure 2- Appropriateness and effectiveness of the color in the design process (ref: Yousefi, 2014)

-Color adjustment in the architecture design. The main point is that the color effect is determined by considering the relative position to the other colors. A color is always observed in contrast with the around colors. However, the coloring value and extend is also one of the effective factor in this topic. Therefore, substituting the colors and their contrast to each other is important in the visual composition. The balance in the environment coloring is the most important goal in the space color composition. The colored surface acts as a axial factor in any space (Seyed Sadr, 1955,68).

Another way to obtain the suitable structure and system in coloring is to create the light and dark colors or warm and cool colors in the suitable surfaces. For example, the warm colors are stimulant and make things seem larger and convex. Cool colors make objects seem smaller and further.

Effect of the colors in the interior spaces

Colors are presented in two main streams in the environment:

Main covers of spaces including walls, floors, and doors

Decoration items including curtains, furniture, and carpet

Effect of color on the measurement	Blue and green objects seem larger than yellow and red objects
Effect of color on the distance	Blue and green surfaces seem further, but yellow and red surfaces seem closer
Effect of color on the flexibility	Colors with short wavelength (purple, blue, and green) make an object seem smoothly. Colors with long wavelength (yellow, red) create a sense of smoothness and flexibility.
Effect of color on the temperature	Red and yellow are the warm colors and green and blue are the cool colors.
Effect of color on the hardness	Red, yellow, and white are the hard colors. Blue, green, and black are the soft colors
Effect of color on the weight	Objects with bright color seem lighter

Table 3- different effects of the colors on the decoration items (ref: Ostovar, 2011, 27)

-Use of color in the interior environment of the therapeutic spaces. Color can be used as a practical and effective tool in designing the therapeutic spaces. A tool that has not been considered in this area because of deciding the non-expert (Abkar and Zamani, 2013). Color application in any time and place is very important. All of us comment about colors used in the buildings or interior decoration in the daily life. But, we should pay attention to that where and how use the colors. The interior designers get a lot of money to design the interior spaces, which often are pleasant and don't make an especial physiology problems (Nejatian and Esmail Zade, 2013)

-Color routing effects. Other use of colors in the therapeutic environments is to use as a strong tool to conduct and help people in order to find their rout inside and outside of the building. Readability is one of the necessary components in the therapeutic environment design. Routing in the hospital environment is a main problem for the clients to the hospital because of the multiplicity therapeutic sections and sub-sections. Because of the lack of mental stability due to stresses available in the environment, the focus and remembering the routs is not simply. Therefore , use the various colors, shapes, and pictures can be effective to remember the routs.

Today , use the help elements is highly regarded as a principle in designing the public and special therapeutic buildings because of the people mental desirability and acceptance. By defining the color codes in the hospital environment, the different therapeutic buildings, sections, and access paths can be separated and therefore the unnecessary traffic that wastes the time, physical energy, and mental balance of the people, is avoided (Nasouri, 2013).

Light

-Light and patient treatment. Light is an effective factor in the hospital from the visual, mental, and biological aspects. The visual effect of the sunlight on the surface, shape, and space of the room can be predicted and controlled by change the size, location, and direction of windows and ceiling windows available in the limited space. The size of a wall widow or ceiling window , matters, wall or ceiling structure, need to create private space , air conditioner, desirable degree of limitation, and effect of pop ups on the exterior view play a role in determining the light exposure level of a room.

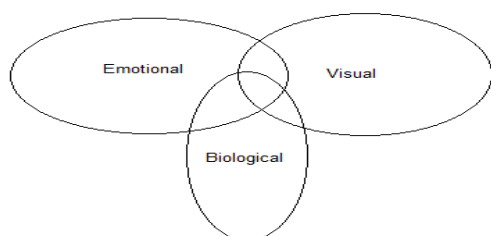


Figure 3- effect of space light exposure on the patient (ref: Nasouri, 2013)

By entering into space through the window in the ceiling, sunlight energy strikes the surfaces available in the room and refreshes the color of

surfaces and reveals their combination. Also , by creating the shadow and light patterns , sunlight revives the room space and separates the figures, the strength and diffusion of the sunlight in the room can reveal or hide the room shape. Color and brightness of the sunlight creates a cheery space in the room and dispersion of sunlight causes a dark and unhappy environment is created in the room. (Nasouri, 2013).

-Advantages of light exposure in the hospital. Increasing the natural day light helps the required artificial light in the building and decreases the light cost and saves the energy. Also , depending to the region weather , this can help the room temperature control. These advantages is accompanied with other advantages such as creating a healer therapeutic environment and a welcoming space for patients and staff in the hospital (Heerwagen, 2007, 33).



Figure 4- light exposure of a hospital room. Patient children's home in the central Seattle

Hospital room that uses the sunlight for the lighting hourly, reduces the stress and blood pressure and makes a better patient recovery after surgery and reduction the need to sedative medicine and hospitalization time period (Brown, 2005,1). Since using the day light reduces the electric light , then 87% of light energy can be saved (Nattali, 2008, 22). Day light is effective in the work cycle of the hospital's staff and improvement the nurses' matching with night shifts. The presence of the window and access to day light in the work place increases the satisfaction with the work environment. The morale of the staff is inconceivable in the recovery of the patient. Sunlight influences the human visual works, controlling the circadian rhythm of body , power of perception , and critical chemical reaction of body and in result influences the human health (Anjali, 2006,1). Based on the obtained results, it can be said that use the natural light in the different seasons is

desirable in the therapeutic centers. In addition to the energy efficiency, the primary effect of the sunlight is to reinforce the circadian rhythm of body that is proved that has a significant effect on the patient's recovery.

-Relationship between color, material, and light. If we consider several artificial and natural light sources, effect of one each on a fixed color in an environment is different and it can change the color of the environment. Light is the most important visual elements by which the artists achieve the widest sense of emotional expression in their works. Colors causes the eye error and change of the dimensions and volume of the architecture spaces . use the color can show the architecture building taller , shorter, wider, and higher. Generally, one can say that color and light is the old patterns that possess a public hidden concept. Being aware of physical, mental, and perceptual effects of the variant color spectrum is the most important instrument in the architecture design. Even before the building edge recognition, shiny colors influence the mind. Different color surfaces determine the borders. Observer judges the tissue, material, and spatial quality and the activity in terms of the observed color and compares with his mental pattern. Because of belonging to a natural element, each of colors is mentioned in an old-pattern form. By reviving a collective memory in the mind of audience, colors stimulate the visual perception about the object (Eftekhari Zade, 2013).

Conclusion

With regard to the study performed about the color and its effect on the environment, we can conclude that there is a continuous relation between environment color and our feeling and impression. With regard to their features , colors can be used in the different sections of the hospital. Generally, the color cannot be considered as a neutral factor of an environment, but the color is a complex concept that is affected by some conditions such as lighting, personal tendency, and perception of the color matching. As much as the concept of a color is important, the colored object is also important.

As observed above, we should consider that the perceptual effects of color influence the functionality of its environment users.

Based on the performed study , the findings and achievements of using the color and color psychology in the therapeutic environments and a design related to this space are:

Increase the sense of security for all people in the therapeutic environments

Increase the efficiency in the therapeutic environments to reduce the mental stress of the environment

Introduce a sense of belonging to the therapeutic environments and in result reduction the anxiety and stress

Increase the self- confidence of the young people in the therapeutic environments

Increase the spatial quality and healing dimension of the environment

Reduction the time period of treatment due to increase the quality of space

Creativity in the space design because of the need of dynamics and variety in the therapeutic environments

Energy saving due to the harmony between light (artificial or natural) and the color effect in the therapeutic environment design

Create the attractive environments and visual stimulation in the patients to improve the disease conditions

Ease in spatial separation for the visitors and novice people

Use the color as a guiding toward the desired sections

Use the color and light in order to alarm in the spaces where the probability of occurrence of an incident is for non-experts

Therefore, with regard to the special conditions of the different sections in the hospital, the different color can be used. in the figure 3, the effect of the main colors and some popular secondary colors are presented. Also, after studying the mental effect of the colors, the suitable recognition of the color to use in the appropriate hospital's section is studied. In the table 3, these effects are explained.

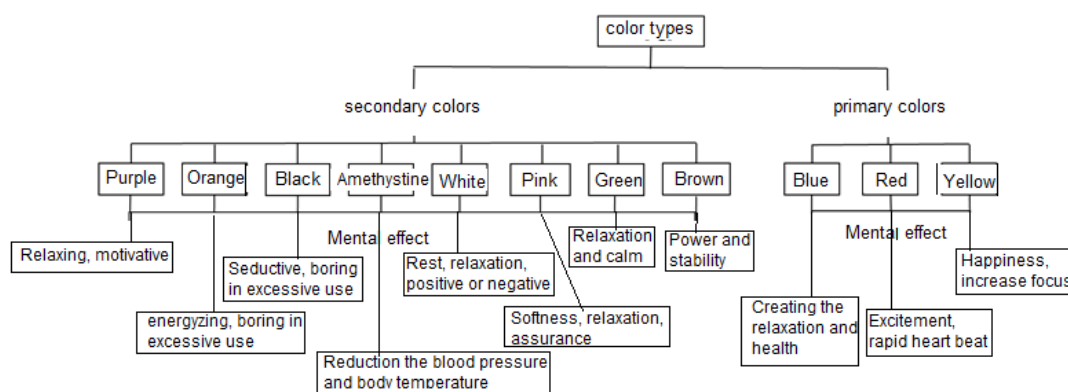


Figure 3- mental effects of the colors (ref: author)

Color	Effectiveness	Use in hospital	Prohibition of use
Yellow	Anti- depression Improve the low blood pressure due to the anemia Create happiness and focus Appetizer Treatment for weakness and stomach , intestine, and digestive disease Clear the skin	Nursing station, secretary, elderly people section, depressed patient section, section of Diseases of the intestine and stomach, Orthopedics and Physiotherapy section (low usage)	Maternity ward Neonatal ward Mental disease ward Children ward (overuse of this color causes the visual chaos, eye fatigue, or reduction the sight power)
	Increase the blood pressure and heart beat Increase the body temperature Appetizer Motivating and exciting	Rheumatism disease section Pulmonary disease Section Digestive disease section	Mental disease ward Heart disease ward Intensive Care Unit Surgery section (due to introduce the blood and injury feeling, it is not suggested in hospital)
	Having the lowest chaos among the colors Relaxing Reducing the blood pressure and body temperature Strongly disinfectants	Emergency section, surgery section, ICU and C. C. U section, women section, Pulmonary Diseases section, section of the mental patients (environments that need the relaxation, focus, and stress reduction)	In the Diagnostic section of the heart, the cool colors (because it decreases the blood pressure) and warm colors (because it increases the blood pressure) should not be used widely since It makes difficult to diagnose accurately.

Table 4- color usage in the different sections of the hospital in terms of their mental effect (ref: author)

Color	Effectiveness	Use in hospital	Prohibition of use
Green	Reducing the stress Reducing the fatigue Relaxing	This color is a common color in the hospital that can be used in the public section, emergency section, surgery room, hospital rooms, women section, CCU section, ICU section to reduce the high blood pressure and places need the sound reduction A green floor covering makes the Spots of body secretions are observed clearly. This is effective in a better cleaning and control of infection	This color has not be used in the treatment of cancer or endocrine diseases because the green color increases the rate of growth and develop the tubers and cancerous tumors
White	relaxing	Because being neutral, this color should be used appropriately. This color is the best color of the clothes for doctors and nurses. It also is suitable for drugstore, Sterile	Witnesses show that a complete white environment may reduces the visual stimulation and causes the depression and anxiety in the

		section, Laundry room, radiology section, and all sections	patients that stay there for a long time.
Neutral color	Relaxing Removing the anxiety	Suitable for the interior spaces (beige, gray, and cream)	Overuse of the gray colors in the hospital causes the low visual stimulation and makes the environment become boring. This increases the depression
Orange	Stimulate the nervous system Increase the appetite Energizing Increase the blood circulation and body temperature	Section of nursing, sentry, reception, restaurant , physiotherapy section, work therapy, and dining room In the mental patient section that causes the depression treatment Elimination of the diseases of the spleen, pancreatic gland, stomach, intestines and kidneys	Use the orange color and other warm colors is not appropriate in spaces that need the focus and relaxation, such as official section and etc. .

Table 5- color usage in the different sections of the hospital in terms of their mental effect (ref: author)

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