

The Role of Color Therapy towards psychological well-being in sustainable therapeutic environments

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Abstract

Color therapy is an alternative therapy that uses color and light to treat mental and physical health by balancing energy centers in the body, also known as chakras. Today, in the era of globalization, color therapy is one of the most popular alternative medicines used to influence human behavior and solve many psychological and physical problems. Research **problems** focus on understanding how color therapy can be effectively used to improve psychological wellbeing and integrate it into therapeutic environments. Although color therapy has shown its potential to influence psychological well-being and reduce stress, there are limited studies to establish clear guidelines for its application in interior design settings. Thus, individual differences in psychological responses to colors, cultural differences in color perception, and the interaction of colors with other design elements create challenges in generalizing the therapeutic use of colors, and here lies the **aim** of the research. This raises critical questions about how to systematically apply specific colors in interior environments to address various psychological issues while accommodating personal and cultural differences. The research follows the descriptive and inductive approach by gathering information to build the theoretical framework based on previous studies and analyzing them scientifically, and the analytical approach of different therapeutic environments to achieve the application of color studies. The researcher concludes that in order to improve psychological wellbeing and a better quality of life, color studies must be employed in designing interior environments due to their power to influence individuals and to avoid psychological harm and disorders.

Keywords: Color Therapy; Sustainable Therapeutic Environments; psychological well-being.

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Introduction:

The creation of color is vital in interior design because it affects many interiors regardless of whether they are residential interior administrative tourism or even therapeutic spaces (Enwin, A. et al 2023). Both color and human beings are closely correlated as color tends to have an effect on both the physiological and psychological states of humans, which is a critical aspect in interior design as well as in health care. Human beings perceive and react to colors in a manner that is distinctive from how they perceive and react to other objects in a space, so considering colors in the design as a treatment is important (Güneşet, E. et al 2020), therefore this research looks into color therapy which is a treatment based on the principle of electromagnetism – and in this case the spectrum visible to eyes – color, which is already thousands of years is used for the treatment of various symptoms, and now with the help of alternative medicine many different health and mental disorders can be treated, as one of the most common ways to influence human behavior color therapy. (Gupta, Rakesh. 2021). Being an alternative medicine form color therapy is being promoted for treating stress, depression, aggression, sleep disorder and panic attacks amongst various other psychological disorders (Toketemu Ohwovoriole, 2024). Schneider et al (2019) claim that color is a product of light that originates from the sun as electromagnetic energy of various wavelengths. A human being comprises of energy fields known as chakras that are located along the spine and help to control one's physical, emotional, as well as spiritual health. Essentially, energetical centers are responsible for energy circulation and equilibrium maintenance within one's body.

Research Issue

A significant research gap exists regarding the systematic application of color therapy in interior design, particularly concerning therapeutic environments for mental health. This study seeks to investigate the psychological and physiological impacts of diverse colors on anxiety and depression, assessing color therapy's efficacy and sustainability in enhancing patients' psychological quality of life, while accounting for individual and cultural disparities.

Research Aim

This research endeavors to harness the therapeutic potential of color therapy in promoting psychological and behavioral well-being. By integrating color therapy into sustainable interior design, this study aims

to explore its efficacy in facilitating recovery, mitigating stress, and enhancing overall mental health outcomes

Research Importance

The importance of this study lies in emphasizing the crucial role of color in interior design, considering its direct influence on human health and behavior. It contributes to advancing research and awareness regarding color therapy's potential to enhance psychological well-being within therapeutic environments.

Research Methodology

The research follows qualitative approach through descriptive and inductive methods by gathering information to build the theoretical framework based on the literature review for understanding color theory and the concept of color therapy and analyzing them scientifically, and the analytical approach of different therapeutic environments internationally and locally to reach how application of color affects psychological and physical health.

1. Theoretical Framework

1.1.Physical Properties of Colors

Ewin, et al, 2023, defines color as a perceptual phenomenon resulting from the difference in the light beam reflected or emitted from objects or sources. To see color, there must be light. When light shines on an object, some colors bounce off the object and others are absorbed by it. As a result, our eyes only see the colors reflected or bounced off it. (Fig.1). The first person to discover the relationship between color and light was the scientist Sir Isaac Newton in the seventeenth century (Ćurčić, et al, 2019). Color is described in terms of an individual's perception of the hue, brightness (Value), and saturation of objects and light sources. Color is a powerful tool used to enhance the visual appeal of interior design where interior designers need a deep understanding of colors, including their psychological effects and meanings in different contexts. Hence, designers can design certain mental states in users and create positive or negative effects on them by combining colors effectively. (Sadat B.N. 2011).



Fig.1. shows how eye sees color.

Visible light consists of 7 colors of the rainbow and can be divided into: Violet, Indigo, Blue, Green, Yellow, Orange, and Red (VIBGYOR). Red has the largest wavelength of 780 nanometers in this visible spectrum and violet has the smallest wavelength of 380 nanometers. The frequency of red is the lowest, but its tissue

penetration is better than the other colors in the rainbow (Sukhbir K. Shahid 2023), and according to (Haiying, et al 201, and Birren, F.2016) The color red has a stronger temperature or thermal energy than blue. It is claimed that light or a particular color is absorbed through the skin, the eyes, the water, food, breathing air, the lungs, and even the imagination or visualization something. There are many color therapy tools used for this purpose such as: nature, flowers, colorful foods, different colors of interiors of houses, offices or other healing environments, water with colored elixirs or dyes, colored essential oils and creams, different colored bath salts, colorful lighting, multi-colored candles, wall paintings, clothing of various colors, shoes of different colors, jewelry and accessories of diverse colors, colorful crystals and gems, different color makeups, hair colors, colorful wine glasses, colorful glassware, etc. The number of ways in which a human being can use color in his or her life is countless.

1.2.Biological Properties of Colors

Biological effects resulting from light have been found in both laboratory and biological studies where monochromatic light has shown fatal effects of bacteria and antibacterial reproductive stimulating bacteria in laboratory studies. These wavelengths remain particularly important because of their important role in reducing bacteria from injured wounds. Most of the live studies used direct radiation of monochromatic light as a basic therapeutic method. One of the most important factors is the penetration of light through dermal and epithelial tissue, the direct radiation is subject to optical window constraints. Whether colorful visible light can effectively reach the target cells with the same smoothness used in laboratory studies. However, the recent use of subcutaneous light probes and intravascular laser therapy may completely eliminate this anxiety. (Azeemi, et al 2019).

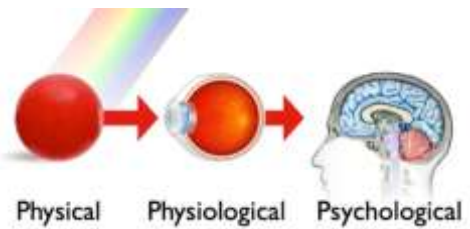


Fig.2. shows how color affect psychological aspect.

Different optical wave lengths affect the human body, playing a key role in maintaining the circadian clock, sleep patterns and daily life, and melatonin receptors which are found in brain cells that take information from the retina and pass it to the coniferous gland that leads to melatonin secretion. Serotonin production and secretion increase during the day while melatonin production increases at night. Many brain disorders such as depressive attacks, post-traumatic stress disorder and bipolar disorder are due to low levels of serotonin in the brain. On the other hand, high levels of serotonin lead to hallucinations. Maintaining the biological clock in humans is also due to the balance in the production of serotonin and melatonin in the body. Thus, many psychological disorders can be directly traced to the visual effects of visible wavelengths on the human body.

1.3.Color Therapy

Color therapy dates back to ancient civilizations in Egypt, India and China. This science has evolved throughout history with the efforts and theories of some scholars leading this science in this field, in Egyptian civilization (it is believed that the god Thoth discovered it) and the ancient Grecian, the ancients used colored minerals, stones, crystals, ointments and dyes as a remedy and built large halls with walls and roofs colored with nature's colors and windows with stained glass through which light would run out for treatment. (Tamam, D. et al. 2022), colors were incorporated into healing practices and architectural design in ancient Egyptian civilization, different colors were linked to certain gods and their corresponding forces. In India, Ayurveda, the traditional system of medicine, uses color therapy to balance the body's energies. Ancient Chinese medicine also recognizes the power of colors, integrating them into acupuncture, herbal remedies and many other forms of healing. (Mayer, et al, 2014). In the 10th century, Ibn Sina discussed the benefits of color therapy, its impact on the human body and mind, and the importance of color in diagnosing and treating diseases in his book "The Law of Medicine". Throughout history, color therapy has been used to treat a wide range of diseases from physical diseases to emotional imbalances. It has been used to relieve pain, reduce inflammation, improve sleep quality, promote relaxation, increase energy levels and improve mood. (infraredsauna.com). Colors are a form of electromagnetic energy, and each color has its own wavelength and frequency, so color therapy depends on the idea that these wavelengths can have a physiological and psychological effect on human health. Research

has shown that colors can affect feelings, emotions, psychological state and even physical health. (scholistico.com) Color therapy is a non-invasive and comprehensive treatment that brings balance and health to the mind and body. Tonal color vibrations improve mood and overall health. Colors consist of reflective lights that strike the retina with wavelengths that are interpreted in the recipient's mind and ultimately make their perception of color a physical and sensory experience. Color therapy is based on the idea that colors create an electric pulse in the human mind, which stimulates hormonal and biochemical processes in the human body and these processes either stimulate or calm down. (Gupta, R. 2012).

1.4.How color therapy works

According to *HealthyPlace.com*, a website specialized in mental health, color therapy based on the premise that different colors provoke different responses in people. Some colors are stimulating, while others may be soothing, hence, colors may affect the energy level, mood, appetite, emotions and even decision-making. Accordingly this means that color and light can be used as a therapeutic tools and be useful in combating a range of diseases, where color therapy has been proposed (Although not proven) to positively affect academic performance, aggressive/hostile behavior, asthma, attention deficit disorder, hyperactivity, hypertension, bronchitis, dyslexia, learning difficulties, improved athletic performance, epilepsy, insomnia, lung cancer, migraines, muscle relaxation, prisoners' repair, stress, uterine fibroids and vision disorders. Colors may also have harmful effects as *Epilepsy Foundation* reports indicate that about 3% of people with epilepsy suffer from light-sensitive epilepsy, where exposure to flashing lights with a certain intensity or visual patterns leads to seizures. A study at Goldsmith University in London found that some colors were more likely to cause these epileptic seizures. For example, glistening stimulation in red and blue triggers greater crustacean than stimulation in red, green or blue and green. (*epilepsy.com*).

According to (Gupta, R. 2021) each color is associated with one of the seven chakras in the body which can be used to treat imbalances or disorders associated with that area of the body. Research has begun to demonstrate the importance of color in treating diseases, for example, looking at blue light has been shown to lower blood pressure by calming the involuntary nervous system, in contrary red light causes its increase. Color therapy assumes that diseases are only an imbalance in the body's different energy forces, which include color, sound, heat, movement, touch

and pressure. When colors in the body decrease or increase for various reasons, diseases are produced. This color imbalance affects a person psychologically and physically, and results in various symptoms. Therefore, in order to rid the person of this disease, the appropriate color that the body lacks will be needed. Providing a person with this incomplete color would restore the person's normal condition and eliminate the pathological condition. Studies have also shown that plants grow and produce better with color therapy. (Sukhbir K. Shahid, 2023).

Principles of Color Therapy leverages sunlight-derived colors to balance bodily energy, restoring equilibrium among the five elemental constituents (earth, fire, water, air, and aether) and their corresponding chakras. This holistic approach addresses elemental imbalances, attributed to disease, by harnessing color properties and characteristics aligned with each element. The key considerations for effective color therapy to address physiological and emotional disparities are energy Balance to restore body's energy centers equilibrium (chakras), Chakra connection is to associate colors with specific chakras, emotions, and physical function, lastly light and frequency by utilizing precise wavelengths and frequencies to impact body and mind.

Color Therapy uses two techniques that can be performed either through sight (by looking at a particular color to provoke the desired response in your body), or by directly reflecting certain colors on parts of the body. These two types are Direct Color Therapy, and Indirect color therapy. Color therapists believe that color can enter our bodies either through our eyes or skin. Each color we can see has a unique wavelength and frequency, each unique frequency has a different effect on people and is used for different purposes. Warm colors are usually used for stimulating effects, while cold colors are used for soothing effects. The direct color therapy is done by exposing parts of the patient's skin or whole body to colorful light radiation, where the skin absorbs the energy emitted by light and stimulates the oxidation process and photosynthesis. This treatment can be complementary along with a chemotherapy or basic treatment protocol using doses with an approved treatment plan at a certain amount of energy and for a specified period of time. There are several studies that



Fig.3. shows direct color therapy instrument.

have examined the results of direct color therapy research experiments, such as the studies of "Avci et al, 2013" on the effects of red and infrared light lamps on the temperature of tissues in the body to relieve pain and lower jaw movement in patients with temporomandibular joint disorders (Panhoca et al., 2015), and the study (2019 Martignago et al) evaluating the skin response to red and infrared light wavelengths for skin grafting after cosmetic surgery and investigating the effect of orange light on burn scars in children.

Second, indirect color therapy depends on the effects of colors and their energy on the psychological and physical state of patients, where color therapy is a complementary stimulant to the self-healing process - a psychological effect that leads to an organic effect - in addition to following the drug treatment plan. Through previous studies, indirect color therapy methods can be divided into; Color meditation where color energy is transmitted by the light-receiving cells in the eye, which convert it into

nerve signals that travel through the nervous system to the endocrine glands and affected organs. Absorbing color energy by bathing in sunlight filtered by colored panels or water irradiated with colored light, wearing colored clothes, using liquids colored with pigments or liquids treated with light filtered by colored glass such as water and therapeutic materials such as creams and ointments. **Dual color**

meditation and absorption of colorful energy, this occurs when humans are surrounded by colorful interior elements - walls, floors or ceilings - allowing the body to benefit from chromatic energy transmitted through the eyes

to the nervous system and then to the infected organ, and the electromagnetic energy generated by the wavelength of the reflected colored light from the surrounding internal surfaces. (Kondratova, 2013, Bankenahally,) 2016.

1.5.The effect of color therapy on human psychology

Colors have different psychological qualities. Warm colors, such as red, orange, and yellow, are energizing colors, while cold colors, such as blue, indigo, and violet, are soothing colors. Color therapy has also been widely used in modern psychotherapy and is based on the fact that different



Fig.4. shows Madlove mental clinic, UK uses indirect color therapy.

wavelengths in the visual area affect the neurohormonal pathways, specifically the serotonin and melatonin pathways. And in the treatment of post-traumatic stress disorder, phobias, and panic disorder. (Azeemi, et al, 2019). The basis for the use of color therapy in psychotherapy is the effect of colors on the human psyche and physiology in several ways, including behavior, mood attention, alertness, and daily rhythms. The effects of these color wavelengths are primarily due to the visual effects of light falling on the retina, passing through the visual pathway, and reaching the suprachiasmatic nucleus located in the anterior hypothalamus.

The seven chakras were thought to be valuable only for spiritual evolution. However, recent scientific studies have proved the opposite, revealing that many organizational chakras in the human body are closely associated with human psychology. (Schneider, Adalbert & Cooper, N.J, 2019), the original meaning of the word "chakra" is "wheel" where it refers to the wheels of the ruler's carriage, called "chakravartin." The term is defined as a disc or rotary wheel; Chakra in the human body is a rotating disk or energy wheel that extends along the spine. Chakras' health is directly related to a person's physical, mental and emotional health (Fig.5).

There are seven main chakras located along the spine, each associated with specific physical, psychological and spiritual qualities:

- Muladhara (Root Chakra) - Located at the base of the spine, it is associated with survival and our connection to the earth, survival instincts, endurance and passion. The colour "red" may stimulate circulation.
- Svadhisthana (Sacral Chakra) - Located below the navel in the pelvis, the "optimism" chakra is associated with pleasure, creativity and sexuality. "Orange" may be antibacterial and ease digestion
- Manipura (Solar Plexus Chakra) - Located in the upper abdomen (navel), governs personal power and confidence "willpower" happiness, "yellow" may help the lymphatic system and/or the neuromuscular system.
- Anahata (Heart Chakra) - Located in the center of the chest in the heart, associated with love and compassion "acceptance" "green" may combat depression.
- Vishuddha (Throat Chakra) – The "expression" chakra focuses on communication and knowledge. Blue may calm breathing and/or heart rate and detoxify.
- Ajna (Third Eye Chakra) – Located between the eyebrows, this chakra is associated with intuition and insight. The "intuition" chakra is associated with clairvoyance and indigo helps with headaches.

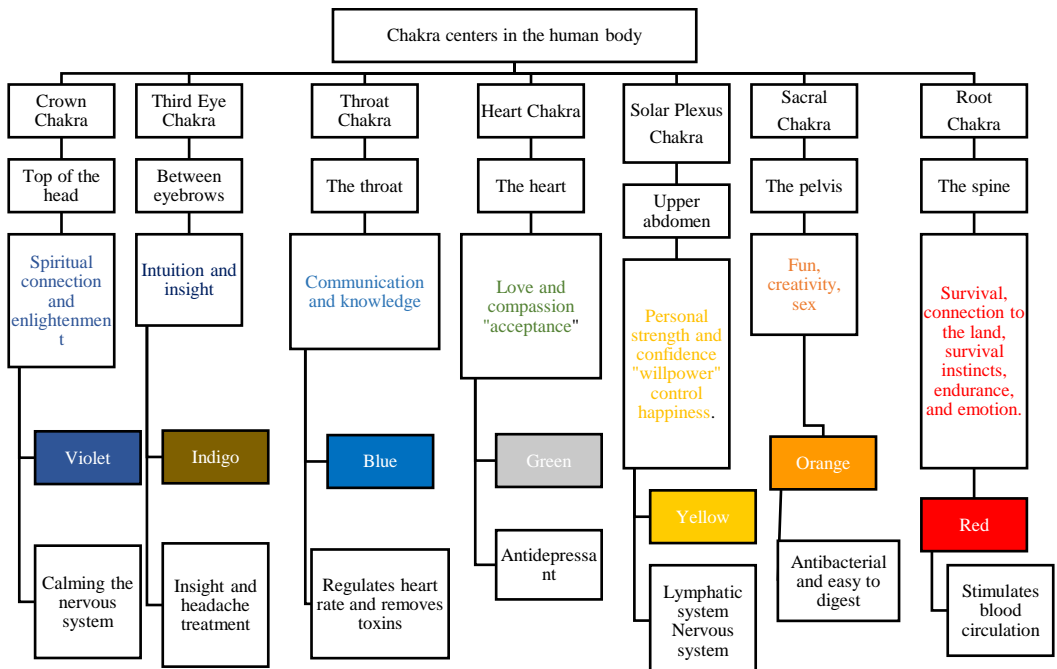
-Sahasrara (Crown Chakra) – Located at the top of the head, this represents spiritual connection and enlightenment. This “knowledge” chakra is associated with imagination and spiritual awakening. Violet may calm the nervous system. (Healthline.com).



Fig.5 shows the seven chakras in the human body.

<https://www.healthline.com/health/fitness-exercise/7-chakras>

Table1, shows the seven chakras in the human body and their specific physical, psychological and spiritual qualities.



The colors used in color therapy session vary depending on the type of illness being treated. For instance, blue or purple lights have calming and anti-inflammatory effects. Green color helps purify and alleviate depression. while white and yellow light stimulates the lymphatic system. Red light is energizing but can cause emotion if you are already nervous. According to Indian philosophy, chakras are the centers of power and spiritual energy within our bodies (Gupta, R. 2012).

It treats the physical symptoms of illness as well as the non-physical ones, balances the chakras in the body has a positive effect not only on the physical levels but also on the mental, spiritual and psychological levels. It aids in meditation and relaxation and can enlighten and transform an individual and remove emotional blockages before they manifest as mental or physical illnesses. Apart from these benefits, color therapy can improve awareness and help individuals understand the need to include certain colors in their daily lives. It can also aid in natural healing in the body, allowing for overall well-being. Colors profoundly affect the human mind, body and soul, they make mental, emotional, chemical, physiological and physical changes in a person, but the effect is more on the psyche, which is partly or entirely responsible for many of the body's diseases. Physical psychiatric disorder occurs due to mental problems, and emotional interference is an inevitable part of almost all physical illnesses. Colors help correct these emotional and mental problems, so their adverse effects on the body are reduced. (Sukhbir K. Shahid, 2023).

Many researchers have studied the impact of each color on an individual's mental state and in general", it was noted that red enhances physical energy, stamina, stability and vitality, Orange color improves creativity, optimism, emotional expression, enthusiasm, yellow color increases intelligence, personal strength, joy and lightness, Green balances, harmonizes and helps communicate, blue and indigo colors can calm down, give inner peace and increase emotional depth and love, Nile and violet colors can enhance imagination, global flow and artistic skills. Some observers attributed the increase in street crime to sodium yellow streetlamps. Blue streetlamps installed in Japan and Scotland are said to lower crime rates in these places. (Ikemoto Y, et al 2023), another study found that pink paint on prison walls can reduce aggression among prison populations.

Color therapy is a type of alternative medicine and is claimed to help treat a variety of psychological conditions such as: stress, depression, aggression, high blood pressure, sleep disorders, anxiety, certain types of cancer, and skin infections. (Ohwovoriole, 2023), it is important to note that there is no significant evidence that color therapy is effective for any medical condition. According to the American Cancer Association, available scientific evidence does not support any claims that the use of light or color therapy is effective in the treatment of cancer or any other diseases. But over the decades color therapy has provided many benefits ranging from physical to mental, including Stress relief where some colors such as blue and green are thought to have soothing effects to promote relaxation and relieve feelings on people with stress or anxiety. Seasonal emotional disorders, people suffer mainly from seasonal emotional disorder during cold weather due to lack of sunlight. Some types of bright light therapy have been shown to be useful for this emotional disorder. Improved sleep quality, blue light can help regulate melatonin production, a hormone that regulates sleep cycles, improving sleep quality. Increased energy levels, red and orange color are often used to stimulate energy production and combat fatigue. Mood improvement, yellow and orange are thought to have mood-boosting effects, enhancing feelings of happiness and optimism. Pain management, red and blue light have been shown to reduce pain and inflammation. Improve focus and attention, yellow and green color are often used to enhance cognitive function and encourage focus. And Spiritual growth and consciousness, indigo and violet color are associated with spiritual consciousness, intuition and meditation.

1.6.Color Therapy previous studies

The researcher (Kutchma, 2003) presented a study on the effect of red versus green room colors on the feeling of stress. The practical experiments were conducted on 15 male and 15 female university students, where they are subjected for five minutes in a room with walls colored once in red, once in green, and once in white, and then the degrees of depression, anxiety, and stress were measured. The results showed that according to the stress classification that people who were placed in the red room had higher degrees of stress and tension classification compared to people in the green or white room. The study concluded that the walls color of space has a strong effect on the psychology of space users.

Two separate studies have been conducted to explore how teens and interior designers can design bedrooms to create perfect workspaces and a refuge for tired teens. Previous research on the psychological impact of light and color has been limited, and there is a lack of research on how these elements affect adolescents. The first study asked participants what feelings each room made them feel, and when participants were asked what feelings, they felt in cold-colored rooms (blue, purple and green), the selected feelings were as follows: relaxation and happiness respectively, as adult participants were found to prefer cold colors over warm colors in residential environments. For rooms with warm colors, red, orange, pink and yellow, the word chosen for most rooms was discomfort, happiness or happiness and activity respectively. The red room was the only room that received the highest number of negative emotions. Finally, for neutral colors (grey and brown), both rooms got the most responses as comfortable. Overall, the color chosen by most participants for each room was positive except for the red room. In this section, participants showed no clear preference among the nine colors. However, they showed dislike of the red room. (Shorewala, et al, 2021).

In another study conducted by "Elliot, et al, 2007" to study the relationship between color and psychological performance, specifically the color red and its performance ability, the results of many experiments showed that caution must be taken when using the color red as a stimulus to increase task performance.

Jacobs (1972) examined the psychological effects of the four primary colors on heart rate and respiration rate. Twenty-four people were exposed to the four primary colors: red, yellow, green and blue. The results showed significant color effects when measuring heart rate, with red being the most exciting, followed by green, yellow and blue. Changes in the respiration rate were also observed. The study concluded that the four primary colors have psychological effects that lead to organic changes in the human body. A study by Takahashi et. Al (2018) investigated the impact of colors on emotions. Seven basic emotional words and corresponding facial expressions to these words were used to study how colors evoke emotions. The results showed an association between color and emotion in the cases of anger, joy, surprise, sadness, and neutrality. It was also found that

positive emotions tend to be associated with brighter, more saturated colors, while negative emotions are associated with less bright colors.

A study by Lishchuk, I., (2019) explores the psychological effects of color in healthcare facilities on patients and professionals. It identifies several colors that can significantly affect mood, emotional conditions and recovery processes. Blue and blue green are recommended for patients' rooms, while red can stimulate circulation but slow recovery. Yellow and orange are suitable for children's places, reducing stress and anxiety. Brown conveys sophistication and comfort, while green is associated with balance and harmony. Purple is associated with calming the nervous system and helping with head and sinus congestion. Pink is recognized as a therapeutic color. Research recommends designing healthcare facilities based on color psychology, using soothing colors, avoiding bright colors in adult areas, and incorporating vibrant colors in children's areas. More research is needed to better understand color psychology and develop guidelines for using colors in healthcare environments.

2. Analytical Study

2.1.Mindful TMS Neurocore Clinic

TAG X Studio- Year 2024, located in New Delhi, India, the interior design of the psychiatric clinic adopts a simple approach, using a palette of neutral colors enhanced with light touches of bright colors. The space is carefully arranged with an open and comfortable layout, with playful elements that contribute to a relaxing atmosphere.



Fig.6 shows colour design in the clinic entrance.

It aims to create a calm, coherent and attractive environment, which is essential for patients dealing with the sensitive nature of mental health. By promoting a friendly and healing space, the clinic ensures that individuals feel comfortable and calm, encourages them to freely discuss their concerns and achieve a sense of comfort and openness during their visits.

Fig.7 shows the design concept adopts simplicity, ensuring that every space - from the reception area to counseling rooms and doctors' offices - reflects an open, broad and light atmosphere.

<https://thearchitectsdiary.com/the-interior-design-of-this-psychological-clinic-creates-an-environment-of-comfort-tag-x-eclectic/>



Fig.8 shows the interior design of this psychiatric clinic creates an environment of comfort, openness and confidence.



This approach not only enhances aesthetic appeal, but also contributes to a quiet and welcoming psychiatric experience for both customers and staff. The use of natural light is maximized by large windows and strategically placed mirrors, helping to enhance a sense of openness, and carefully selected artworks and decorative elements have been selected to offer delicate color touches, such as a piece of abstract art in soothing blue and green or a vase containing one vibrant flower.

The furniture is simple and elegant, with comfortable chairs and a cozy sofa that invites customers to sit comfortably. Natural materials, such as wooden touches or woven rugs, add a touch of warmth to the minimalist interior design.



Fig.9 shows the colour design in the consulting rooms provides private sanctuaries where clients feel safe and supported. A simple design featuring soft, neutral colors creates a sense of calm and serenity in each space.

Large windows or low-light fixtures flood each room with soft natural light, maintaining an airy feel throughout the space. The inclusion of subtle colors and cozy touches, such as a soft blanket or a small, framed print on the wall, add a gentle vibrancy that contributes to the room's relaxing atmosphere. The design uses simple props, focusing on creating a calming environment that emphasizes the therapeutic process. The doctors' rooms are designed to provide a professional and attractive atmosphere. The simple approach ensures that the space remains

clutter-free, with clean and practical furniture that supports efficiency and comfort. Light colored walls and simple and modern furniture contribute to the feeling of ventilation in the room. At the same time, natural light is maximized by strategically placed windows or skylights. For a welcoming touch, light color touches are added through decorative touch. A colorful office lamp or piece of art is enhanced by soothing colors of the place's beauty. The overall design emphasizes the balance between professionalism and warmth. Thus, it ensures that the Chamber feels comfortable and contributes to fruitful consultations. The use of simple props, such as one stylish plant or a carefully selected piece of decor, also enhances the quiet and orderly room ambience.

2.2. Pi Psychiatry & Psychology Clinic

Architect Boro Simbelt – 2023, Pi Psychiatry & Psychology Clinic is located on Baghdad Street, the most important commercial and residential hub of the Anatolian side of Istanbul, Turkey, in an office complex adjacent to the main street. Although the location is lively and commercial, Boro's idea was to create a calm space for patients, implementing the idea of imperfection using a natural palette of muted colors and soothing finishes.

There is a separate reception and waiting room welcoming patients, with folding doors to allow for a private room. For adult consultation, a group therapy space is designed to have a comfortable seating area and active listening points for the therapist.

A wooden corner was formed to play for the adjacent children's treatment room, adapting vibrant colors and abstract images of decorative elements.



Fig.10 shows the Interior design elements and colour design in Pi Psychiatry & Psychology clinic. <https://archello.com/project/pi-psychiatrty-psychology-clinic>

With the addition of two other joint consultation rooms, the clinic provides a quiet environment of calm nature and technical details.

2.3.Serenity Psychology Center

Serenity Clinic is located in Maadi - West Sarayat in 2012. The design relied on natural lighting from the large longitudinal windows in the waiting area. It is noted that there was no recourse to an interior designer, but rather the opinions and preferences of the founders were relied

upon in terms of choosing only neutral beige furniture in the reception, with the addition of a light blue or orange seat in the examination rooms. A blue sofa was added in one of the examination rooms. The design relied on the use of natural materials such as wood in the tables and kilim in the colored carpets to enhance sustainability and return to nature, which the design was based on. Although this clinic provides color therapy sessions for patients, it is noted that there was no recourse to a specialist to design the clinic, while the space provides some positive elements such as natural light and neutral colors. Many aspects can be improved to make it more suitable for a therapeutic environment, such as: excessive openness and lack of privacy. While the room benefits from spaciousness, absolute openness may not be ideal for a psychological clinic. Large windows, despite their beauty, can compromise privacy - an important aspect in any therapeutic environment, which may hinder comfort and weakness. The arrival of natural light for the room, although useful, can become harsh without proper window processors, leading to glare or discomfort. Frosted glass, transparent curtains, or blinds were preferred to balance light control and privacy, lack of personalization and warmth make the space feels cold



Fig.11 shows the Interior design elements and colour design in Serenity psychology center. By the author

and somewhat impersonal due to its simple design, while simplicity is appreciated, psychology clinics require spaces that exude warmth and comfort to help patients feel comfortable, a lack of artwork, personal touches, or softer design elements makes the room feel generic and unwelcoming, it was better to offer precise artworks and soft fabrics (such as coverings or pillows) and pale green, blue or pastel decor to create a more humane and comfortable environment, but only add color in one seat in the examination rooms was sufficient.

The marble floors in the reception area can create echoes and would have been better if the examination rooms were made of wood. The current furniture arrangement, although aesthetically balanced, does not promote an ideal therapeutic environment as the chairs are placed too far apart, which can seem too formal and a way of individual therapy. There is no variety in seating options for different patient preferences. Although one plant is visible, the space does not include enough natural elements to promote well-being. The presence of plants has been shown to reduce stress, promote a sense of calm, and improve the overall emotional and physical experience of space. Current ceiling lighting fixtures look exaggerated and formalized for a psychiatric clinic and contradict simple aesthetics and may seem inappropriate in a therapeutic environment.

2.4.Nine Psychology Clinic

Nine Psychology Center is located in the famous Maadi commercial street "Street 9". The clinic has a classic character, and the interior decorations were carefully and tastefully designed by its founder in 2017 to provide a warm and comfortable atmosphere.



Fig.12 shows the Interior design elements and colour design in Nine psychology center. By the author

The warmth of the clinic is noted by the prevailing use of wood throughout the building. The researcher sees that the design is calm and simple, and

the use of natural wood and clean white colors creates a calm and uncluttered atmosphere, which is well in line with the soothing needs of the treatment environment. Soft diffused lighting adds to the calm atmosphere. An attempt to integrate nature as green plants add a touch of nature, reducing stress and promoting relaxation.

Symmetrical shelves and a clean layout provide structure and order, which helps patients feel settled and secure. The room feels calm and neutral with soft, indirect lighting. The use of symmetrical wall lights and a well-organized photo gallery creates structure and focus, which can help patients feel settled. A dark green sofa may look very elegant and calming to use, whereas a red sofa dominates the room and may evoke intensity or discomfort in some patients, as red is associated with strong emotions. Soft, light-colored upholstery may be more appropriate for a calm, therapeutic space. A black-framed exhibition wall can be visually disturbing. One piece of quiet artwork or images of nature may seem quieter. Wooden flooring works well, adding a rug with enhanced comfort. Classic interiors, though elegant and timeless, may be ineffective in a psychiatric clinic because they may look formal rather than warm and attractive, flooding customers with bold colors, patterns or ornate details and plenty of wood use, lacking the convenience and inclusiveness needed for therapeutic settings.

For a psychiatric clinic the design should focus on creating a neutral, calm and comfortable environment with smooth and natural colors, comfortable and modern furniture, simple decoration with elements inspired by nature or soothing. This approach helps patients feel emotionally safe, supported and able to focus on their recovery journey.

3. Findings:

3.1 The researcher found out the importance of using color in the interior design for therapeutic environments in specific proportions and degrees to support and improve mental health, such as the associated spaces with soothing colors (like blue and green) with a significant decrease in tension indicators, improved concentration and cognitive performance using soft grey and pastel green especially in therapeutic rooms designed for consultation and mindfulness practices, the soft yellow and beige shades provoked positive emotional responses, enhancing optimism and emotional warmth among patients.

- 3.2 The study concluded that color therapy, when applied carefully in sustainable therapeutic environments, has a profound impact on mental health, where cold and earthy colors promote calm and recovery, warm colors promote comfort and positivity, and neutral colors provide balance and mental clarity. Combining these colors with sustainable nature-inspired design elements amplifies the overall therapeutic benefits, emphasizing the importance of color selection in creating spaces that support emotional healing and well-being, and red can be used with caution to stimulate circulation.
- 3.3 To promote sustainability in therapeutic environments, natural and ground colors must be integrated (such as green, brown and yellow) which increases the sense of connection to nature, promotes the feelings of Earth connection and general well-being and makes spaces look more welcoming, regaining of power and less clinical, compared to environments dominated by stark white or dark shades, supports long-term emotional comfort, especially when combined with Biophilic Design elements such as plants, natural materials and natural light.

4. Recommendations

- 4.1 It is recommended that designers, therapists and therapeutic environments work collaboratively to implement thoughtful color choices tailored to patients' needs while enhancing environmental responsibility by integrating the principles of color therapy alongside sustainable design and biophilic, therapeutic environments can be transformed into spaces that feed emotional well-being, reduce stress and promote psychological healing.
- 4.2 Conduct further research on color psychology and explore the long-term effects of color therapy on diverse populations, including individuals with specific psychological conditions (such as anxiety, depression, and post-traumatic stress disorder), and investigate the role of cultural and regional influences on color perception to improve recommendations for global therapeutic practices.
- 4.3 Study the interaction between color, texture and light to better understand their combined effects on mental health.
- 4.4 Promote awareness of the benefits of color therapy and the importance of using color with caution and care and educate mental health professionals, designers and facility managers about the psychological effects of color therapy and its role in sustainable design. by developing training programmers or workshops to encourage

evidence-based application of color therapy in therapeutic environments.

- 4.5 Develop guidelines for designing spaces in therapeutic environments using intentional colors based on their function. In consultation rooms, use soft blues, greens or greys for calm and focus. In waiting areas, use warm neutral colors such as beige and pale yellow to reduce anxiety and create a welcoming atmosphere. In group therapy rooms, use balanced combinations of warm and cool colors to promote comfort and focus. In meditation/relaxation areas, prioritize earthy colors inspired by nature such as green, soft brown or pastel shades for a grounding effect.

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دور العلاج بالألوان من أجل تحسين الصحة النفسية في البيئات العلاجية المستدامة

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المستخلص

العلاج بالألوان (Color therapy (or chromotherapy) هو علاج بديل حيث يستخدم اللون والضوء لعلاج الصحة النفسية والجسدية من خلال موازنة مراكز الطاقة في الجسم والمعروفة أيضًا باسم الشاكرات (chakras)، اليوم في عصر العولمة يعتبر العلاج بالألوان هو أحد أكثر الأدوية البديلة شيوعًا المستخدمة للتأثير على سلوك الإنسان ولحل العديد من المشاكل النفسية والجسدية.

تركز مشكلة البحث على فهم كيفية الاستفادة من العلاج بالألوان بشكل فعال لتحسين الصحة النفسية ودمجها العملي في البيئات العلاجية المستدامة، حيث أظهر العلاج بالألوان إمكاناته في التأثير على الرفاهية النفسية وتقليل التوتر، إلا أن هناك دراسات محدودة لوضع إرشادات واضحة لتطبيقه في إعدادات التصميم الداخلي. وبالتالي إن الاختلافات الفردية في الاستجابات النفسية للألوان، والاختلافات الثقافية في إدراك الألوان، وتفاعل الألوان مع عناصر التصميم الأخرى (مثل الإضاءة وتخطيط الفراغ) تخلق تحديات في تعميم الاستخدام العلاجي للألوان وهنا يكمن هدف البحث. وهذا يثير أسئلة حاسمة حول كيفية تطبيق ألوان معينة بشكل منهجي في البيئات الداخلية لمعالجة قضايا الصحة النفسية المختلفة مع استيعاب الاختلافات الشخصية والثقافية.

يتبع البحث المنهج الوصفي والاستقرائي عن طريق جمع المعلومات لبناء الإطار النظري القائم على الدراسات السابقة وتحليلها تحليل علمي، والمنهج التحليلي لبيئات علاجية مختلفة لتحقيق تطبيق الدراسات اللونية، وتستنتج الباحثة أنه من أجل تحسين الصحة النفسية

وجودة حياة أفضل يجب توظيف الدراسات اللونية في تصميم البيئات الداخلية لما له من قوة في التأثير على الأفراد ولتفادي الأضرار والاضطرابات النفسية.

الكلمات المفتاحية: العلاج بالألوان؛ بيئات علاجية مستدامة؛ الصحة النفسية.