



**COLOR PREFERENCES OF CHILDREN IN A WAITING ROOM OF A
HOSPITAL**



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COLOR PREFERENCES OF CHILDREN IN A WAITING ROOM OF A
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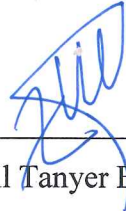
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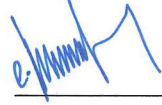
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ABSTRACT

COLOR PREFERENCES OF CHILDREN IN A WAITING ROOM OF A HOSPITAL

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The aim of this study is to understand the children's color preferences in a waiting room of a hospital and to investigate the effect of gender and culture differences on color preferences in the waiting room. The sample group consists of Turkish and Libyan children between the ages 6-17. A questionnaire was administered to the children in order to understand their color preferences and color preferences in the waiting room of the hospital. An original photograph of the waiting room with three different colored alternatives were shown to the children, and the children were asked to indicate their feelings and the most preferred waiting room according to color. The results indicated that the most preferred waiting room for the Libyan children was the green waiting room while the most preferred waiting room for the Turkish children was the white waiting room. The results of this study can be useful for interior architects, designers and hospital owners who give importance to children color preferences in the waiting rooms to reduce stress and anxiety of the children in a hospital.

Keywords: Children, Color Preference, Culture, Gender, Hospital waiting room

ÖZ

HASTANE BEKLEME ODASINDA ÇOCUKLARIN RENK TERCİHLERİ

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Bu çalışmanın amacı bir hastanenin bekleme odasında çocukların renk tercihlerini anlamak ve cinsiyet ve kültür farklılıklarının renk tercihler üzerinde bir etkisini olup olmadığını araştırmaktır. Örneklem grubu 6-17 arasındaki Türk ve Libyalı çocuklarından oluşmaktadır. Çocukların renk tercihlerini ve hastanenin bekleme odasındaki renk tercihlerini anlamak için, çocuklara bir anket uygulanmıştır. Bekleme odasının orijinal fotoğrafı üç farklı renk alternatifi ile çocuklara gösterilmiştir ve çocuklardan duygularını ve renge göre en çok tercih edilen bekleme odasını göstermeleri istenmiştir. Araştırmada elde edilen sonuçlar, Libyalı çocuklar tarafından en çok tercih edilen bekleme odası renginin yeşil olduğunu ve Türk çocukları içinse en çok tercih edilen bekleme odasının beyaz bekleme odası olduğunu göstermiştir. Bu çalışmanın sonuçlarının çocukların hastanelere karşı olan stresli ve kaygılı durumlarını azaltmak için bekleme odalarında çocukların renk tercihleri üzerine önem veren hastane sahipleri, iç mimarlar, tasarımcılar açısından önemli olduğu düşünülmektedir.

Anahtar kelimeler: Çocuklar, Renk tercihi, Kültür, Cinsiyet, Hastane bekleme odası

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1. INTRODUCTION

Color represents the moral and intangible value that affects everything that exists around us and it is a significant part of our daily lives. Elements of color are used in architecture in order to highlight specific places or identify specific elements. As a result, color is used as a real architectural element, not just for the purpose of ornamentation and surface finishing. Color as any other real element, which works to evoke emotions of humans, changes the views of humans to spaces. There are many examples of modern and historic architecture in which color is represented as an essential element and is an integral part of the work itself (Scaglione, 2010).

Color is the characteristic of human visual perception expressed through color groups such as red, yellow, green and blue (Wikipedia, 2017a). Color is considered as a method that is used to interpret and understand the surrounding environment (Mahnke, 1992). In addition, color has an intensive influence on our feelings and emotions because it inundates every aspect of our lives principally in the manufactured color form. There is a close relationship between colors and emotion according to the positive or negative emotion evoked by the color. Several emotions can be associated with more than one color and there are some colors that can be associated with numerous different emotions. The emotion can be classified as feelings and moods. The feeling represents an emotive state that is the result of sensation and more immediate perceptual response. While, the mood represents a mind state or the disposition that may take into account the context, language, memory and psychological state (Zraati, 2012).

The color in our environments can create stress and ease the stressed in life. Many of the effects of color on our moods may be caused by social and psychological associations with a particular color. In other words, color impacts human lives physically, psychologically, physiologically and sociologically. Research has shown

that certain colors directly affect human emotions and behaviors (Mahnke, 1992; Zraati, 2012). Color preferences can vary across people (Hurlbert & Ling, 2007).

Hutchings (1998) showed that color can be associated with culture and can also carry many meanings within one culture. Thus, color must be studied within its perspective. Nevertheless, researchers disagree about the relationship between the preferences of color and the culture. For instance, Malkin (1992) indicated that a study conducted T. R. Garth consisted of children from six different culture groups American, Japanese, Mexican, Indian, Filipino, white and black. The differences in color preferences between each group were minimal. The study concluded that differences in color preferences that appear in adulthood belong to elements associated in nurturing (cited in Tofle, Schwarz, Yoon, & Max-Royale, 2004).

Color within a hospital is considered as an environmental factor that can have both positive and negative impacts on adults and children. The colors that are used in waiting areas of hospitals are applied on all surfaces and materials. Stress and anxiety of the patients in these areas can be reduced by using suitable lighting, color and furniture. Quiet environments can be achieved by good design and choosing colors and other architectural elements properly. Welcoming atmosphere can be created by providing suitable seats with the arrangements of small groups. Whenever daylight and views of the exterior are introduced waiting areas are more comfortable and welcoming (Zraati, 2012). Children are color dominant, as a result, extensive care and consideration are required for children in the usage of use of color. Color preferences among adults and children can vary since a hospital stay can be a poignant experience for children. There have been studies regarding children and hospital environments, however childrens' color preferences regarding culture and gender differenes were not considered. This study aims to fill this gap regarding culture differences.

1.1. Aim of the Study

The aim of this study is to understand the children's color preferences in a waiting room of a hospital and to investigate the effect of gender and culture differences on color preferences in the waiting room. Since previous studies regarding children and hospital did not consider the affects of culture and gender in color preferences. In addition, to understand the impact of colors on children when they are in the waiting room of a private hospital.

1.2. Structure of the Thesis

The thesis consists of five chapters. The first chapter is the introduction in which the importance of color in the physical environment and differences in color preferences among people and culture are stated. In addition, the aim of the study and the structure of the thesis are stated.

In the second chapter, color is defined with respect to color basic. The color systems are described with respect to the Munsell system, CIELAB color system, RGB system and NCS system. The psychological and physiological effects of color are stated and individual differences regarding age, gender and culture are stated.

The third chapter explores the hospital environment by focusing on the public areas, circulation and care areas. In addition, children are discussed in relation to hospital environments.

The fourth chapter includes the case study in which the aim of the study, the research questions, hypotheses, method of study with respect to sample group description of the site and procedure are described. The results of the case study are evaluated and discussed. In the last chapter, major conclusions about the study and suggestions for future research are stated.

2. COLOR

Color is one of the most dominant design elements. It is in all aspects of life and affects every part of our lives. Color is defined as “a specific visual sensation produced by visible radiation, or colour stimulus that occurs when light from a natural or artificial source is interrupted by an object or a dust particle” (Meervein, Rodeck, & Mahnke, 2007, p. 4). Color is considered as a means for communication and it is the basic building block of optical codes. Color is considered highly particular and personal in which it is used as a guide for making sense of our environment and affects our behavior by its informational and cultural role. Dalke et al. (2005) defined color as “an inherent property of all materials and surfaces including everything from light and paint to art, from aesthetics to functionality and as an inseparable element of design” (p.343).

2.1. Basics of Color

Color has three basic and independent characteristics that consist of hue, chroma (saturation) and value (lightness). Hue represents the color pigment. Chroma denotes to saturation, in other words, it refers to the deepness or the richness of the color where highly saturated colors have high ratio of pigment. Value represents the darkness or lightness grade according to the neutral scale that extends from the pure white to the pure black (Fehrman & Fehrman, 2000).

Hue

Hue is the name of a color and represents the chromatic aspect. It allows us to differentiate one color from another such as red from yellow, or green from blue (Fehrman & Fehrman, 2000; see Figure 2.1). The color that we see represents this dimension and moves around the outer edge of the color sphere from yellow to red,

to blue, to green. Colors can move clockwise and anticlockwise on the hue scale (i.e. a blue can move to the green side and become aqua or a blue can move to the red. Likewise, a red can be made either bluer (maroon or purple) or more yellow (orange). Thus, a yellow can be made redder (orange) or greener (chartreuse).



Figure 2.1. Color wheel

(https://commons.wikimedia.org/wiki/File:BYR_color_wheel.svg)

Chroma (intensity, richness, saturation)

Chroma or saturation occasionally denotes to the richness and intensity level for the hue that is measured radially from the center of each slice (Figure 2.2). Thus, it represents the amount of pigment in a color (Fehrman & Fehrman, 2000). It allows us to distinguish a strong color from a weak one by representing the distance of a color sensation from that of white or gray. Colors with high saturation contain on the higher portion of pigment and less of gray.

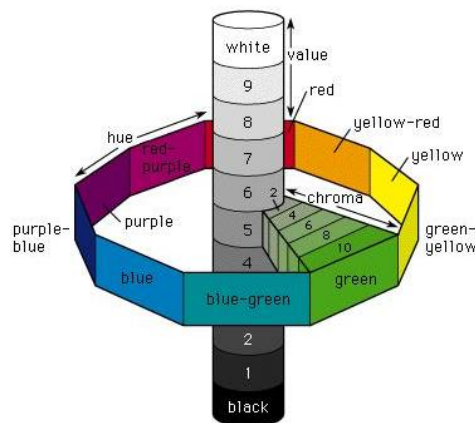


Figure 2.2. Hue, chroma and value

(<https://global.britannica.com/science/Munsell-color-system>)

Value (lightness or darkness)

The third dimension is value, also known as lightness, represents the lightness or darkness of a color (Fehrman & Fehrman, 2000). The brightness value of the color denotes to the darkness or lightness degree of color which extend from the white to black (Sung & Kim, 2013). Value differs upright along the color solid, from black (value 0) at the bottom, until the white (value 10) at the top. Neutral grays locate alongside the vertical axis between black and white (Figure 2.3).

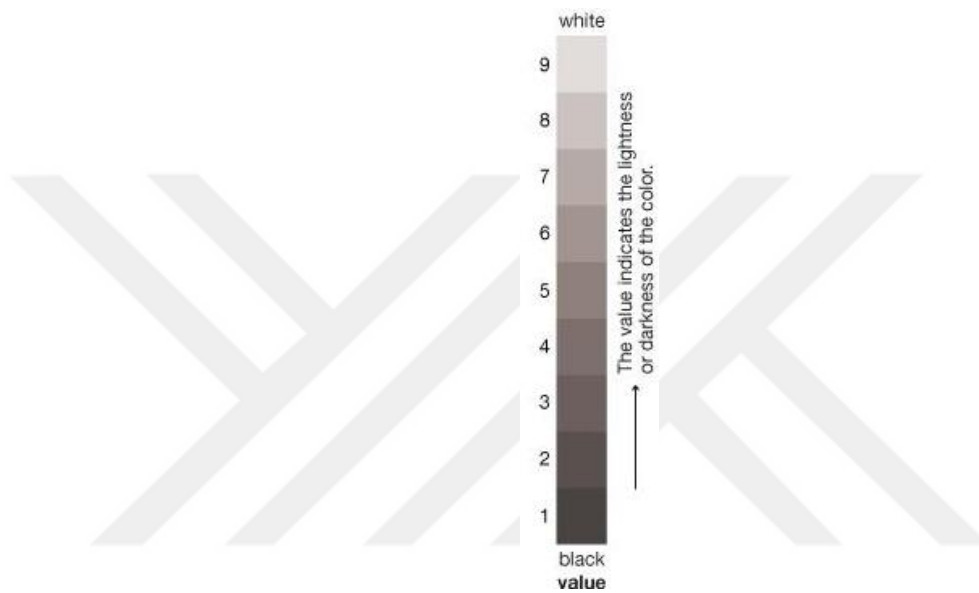


Figure 2.3. Value

(<https://global.britannica.com/science/Munsell-color-system>)

Colors are divided into primary and secondary colors. The primary colors consist of red, yellow and blue while the secondary colors consist of green, orange and purple. The secondary colors are created by mixing the primary colors while there is another group called the tertiary colors that are produced from mixing the primary with the secondary colors (Lertsithichai & Suriyapat, 2005; see Figure 2.4).

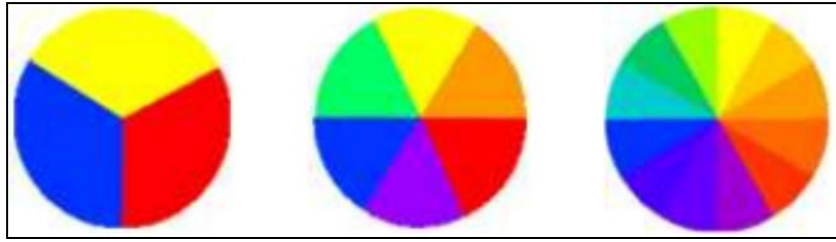


Figure 2.4. Primary, secondary and tertiary colors

(<https://www.colormatters.com/color-and-design/basic-color-theory>)

Complementary colors are two colors that are opposite to each other in the color wheel for example orange and blue and red and green (Figure 2.5).

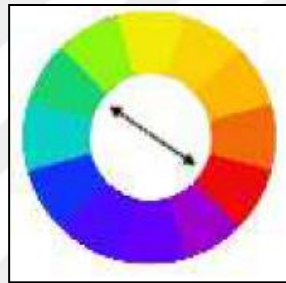


Figure 2.5. Complementary colors (Lertsithichai & Suriyapat, 2005).

Three colors that are side-by-side on a color wheel are called analogous colors for example green, yellow-green and yellow as seen in Figure 2.6.

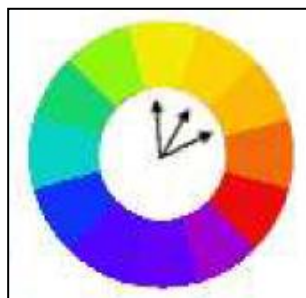


Figure 2.6. Analogous colors (Lertsithichai & Suriyapat, 2005).

In addition, there are other groups of color that are monochromatic, split complementary and achromatic. Monochromatic in the color system uses one color such as the blue color and its varying tints and shades. Split complementary consists of three colors: any hue and the two adjacent to its complement for instance, red, yellow-green, and blue-green. Achromatic denotes to black, white, and the grey scale in between (Lertsithichai & Suriyapat, 2005).

According to the psychologists, colors can be divided as warm and cool colors. The warm colors are taken from the daily life that is usually talking about warm atmosphere, warm friendship, and warm greeting. The warm colors are understood as comfortable, cozy and pleasant. Warm colors in spaces provide more comfortable area that cool colors (Pile, 1997). The cool colors consist of green, blue and violet and they give the feeling of coolness or calmness. Also, these colors give the feeling of relaxation and calmness (Kalia, 2013).

The neutral colors include three colors that are white, black and gray. They are located between the cool and warm colors and they have less intense psychological impact. They neutral colors are highly used in practical application with adding a minimum value of the emotional content even though they seem very boring (Kalia, 2013). It is not possible to know how the person can experience one color because that experience of colors differs from person to another. For instance, the experience of a particular person to the shade of yellow color can seem differently from another person (Singh, 2006).

2.2. Color Systems

Color systems were developed to differentiate color from each other. The primary objective of the color system is to give order to the variables of color and to differentiate and use color in a systematic way (Fehrman & Fehrman, 2000). Different systems systematize color in various ways, each being convincing of its own rightness (Holtzchue, 2006). There are different color ordering systems that are

developed such as the the Munsell Color System, CIELab System, RGB System and Natural Color System (NCS).

2.2.1. Munsell Color System

In the first decade of the twentieth century, the first acceptable and widely used color system was developed by the artist Albert Henry Munsell (Wikipedia, 2017b). The Munsell Color System has been provided the theoretical framework to many color systems that have existed in the modern era and is used by the American National Standards Institute and the USDA. The system involves two parts: the color charts or “atlases,” that represent available samples of color, and the theoretical system that defines the human experience of color, similarly named the perceptual “color space”. Munsell illustrated the theoretical structure in the notion of color and in 1915 he issued the first colored paper samples in the Atlas of the Munsell Color System. The theoretical structure of Munsell Color System has not changed over time in spite of changing the samples according to more search and refinement (Cochrane, 2014).

It identifies surface colors in terms of three attributes; hue, value and chroma (Fehrman & Fehrman, 2000). There are ten major hues in the hue circle of the Munsell System that appear in an order (clockwise) (see Figure 2.7). Five principal hues are red, yellow, green, blue, and purple. Five intermediate hues are yellow-red, green-yellow, blue-green, purple-blue, and red-purple. These five intermediate hues are after-images of the principal hues, forming the basis for Munsell’s complementaries (Hunt, 1987). In the Munsell color system, the brightness of 0 is utilized for pure black whereas the brightness of 10 is used for pure white (Bakhshi & Gilbert, 2015).

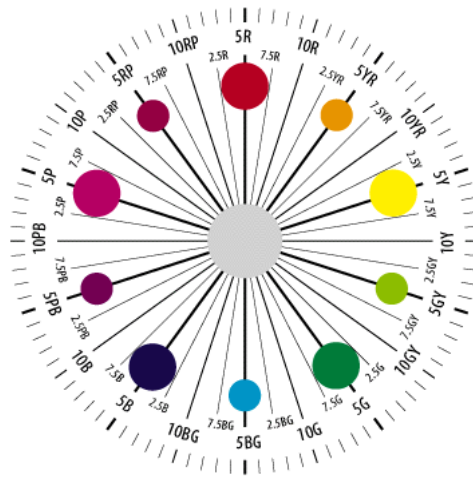


Figure 2.7. Munsell color wheel

(<http://www.uwgb.edu/heuerc/2D/ColourSystem.html>)

2.2.2. CIELAB Color System

This system is “based on spectrophotometric measurements of color samples illuminated by specific types of lighting and related to the visual response of a standard observer” (Fehrman & Fehrman, 2000, p. 209). Color attributes, hue, saturation and brightness have X, Y, Z values in this system (Agoston, 1987).

In 1976 the Commission International Eclairage (CIE) adopted the $L^*a^*b^*$, or CIELab color space that represented the international criteria for color measurements. L^* represents the luminance or lightness element and ranges from 0 to 100, and parameters a^* (from green to red) and b^* (from blue to yellow) are the two chromatic elements and range from -120 to 120 (Leon, Mery, Pedreschi, & Leon, 2006). “The $L^*a^*b^*$ space is perceptually uniform, i.e., the Euclidean distance between two different colors corresponds approximately to the color difference perceived by the human eye” (Leon et al., 2006, p. 1085).

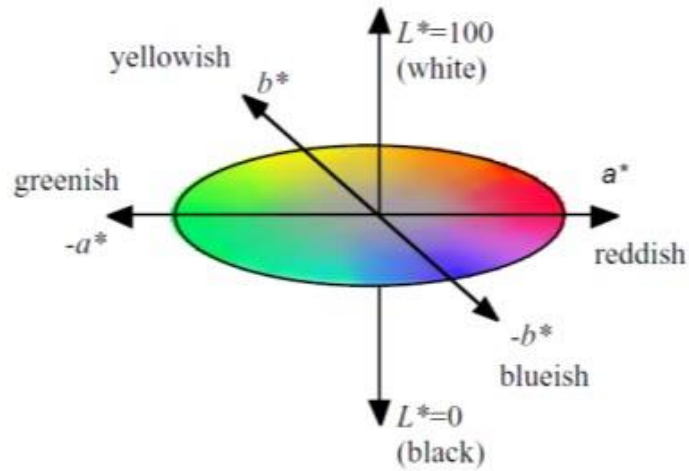


Figure 2.8. CIE Lab color system

(<https://www.fhwa.dot.gov/publications/research/safety/13018/002.cfm>)

In CIE*Lab or CIE Lab, 'l' represents luma component that is illumination information and 'ab' represents the chroma information. $L^*=0$ provide the black color and $L^*=100$ provides white color. The a^* , the values $a^*<0$ that indicate green while the values $a^*>0$ indicate magenta. The b^* , the values $b^*<0$ indicate blue and values $b^*>0$ indicate yellow (Kaur & Kranthi, 2012, p. 31).

2.2.3. RGB System

The RGB system is an additive color model in which red, green and blue are the primary colors. RGB is a device-dependent color model. The main aim of the RGB color model is for the sensing, representation and display of images in electronic systems, such as televisions and computers (Wikipedia, 2017c), in other words, the RGB color space represents additional famous color space that is commonly used in the computer monitors and television screens. The RGB color space is not perceptually constant (Kadihasanoğlu, 2007)

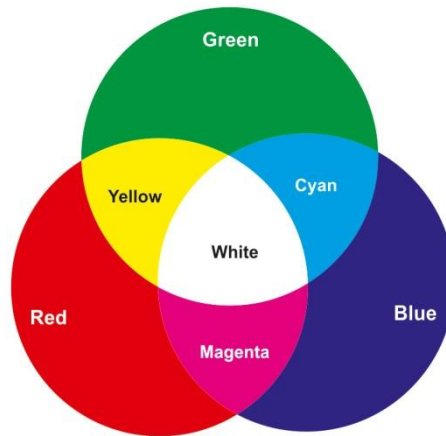


Figure 2.9. RGB color system

(<http://www.poeticmind.co.uk/research/rgb-cmyk-colour-systems/>)

As seen in Figure 2.9, there are three primary and three secondary colors in this system. Red, blue and green are the primary colors, and the secondary colors are yellow, magenta and cyan. Furthermore, orange, yellow-green, cyan-green, cyan-blue, blue-magenta and red magenta are the tertiary colors in RGB color mode. A combination of all these colors make the white light.

2.2.4. Natural Color System (NCS)

NCS is in the form of a color atlas and has been developed as the practical application of Hering's color theory. Currently, the NCS system is considered one of widely used describing colors systems that are used in most parts of the world and has international recognition certificate (Natural Color System, 2007). This color system provides a wide range of opportunities to describe colors and the relationships between them (Hård, Sivik, & Tonnquist, 1996).

In the NCS system, the hues red, yellow, green and blue are unique hues because they cannot be described in terms of any combinations of other colors (Hunt, 1987). Together with white and black, these four unique hues make six basic colors that constitute one additional color pair (Hunt, 1987; see Figure 2.10). Furthermore, each

individual hue is designated into color triangles consisting of the pure hue along with its relationship with black and white (Swedish Standards Institution, 1996; see Figure 2.11).

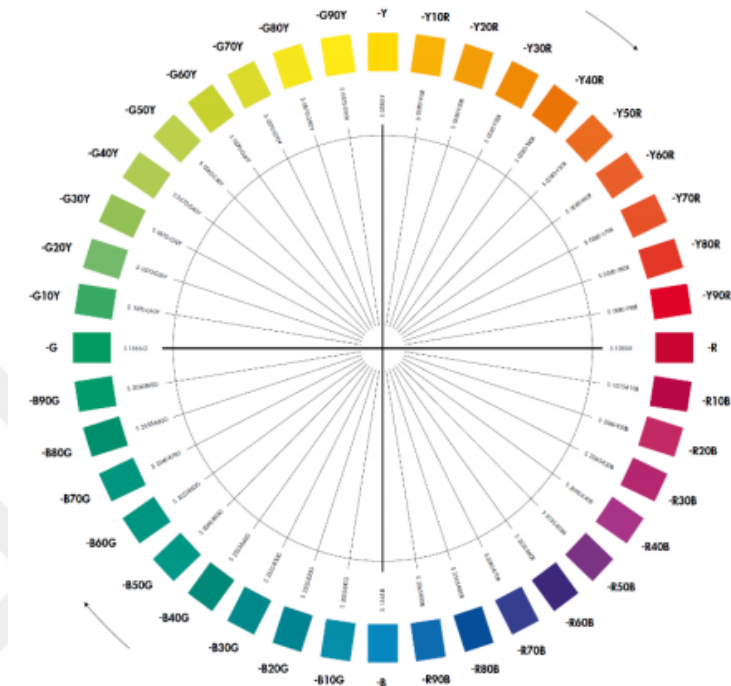


Figure 2.10. NCS Color System (Swedish Standards Institution, 1996)

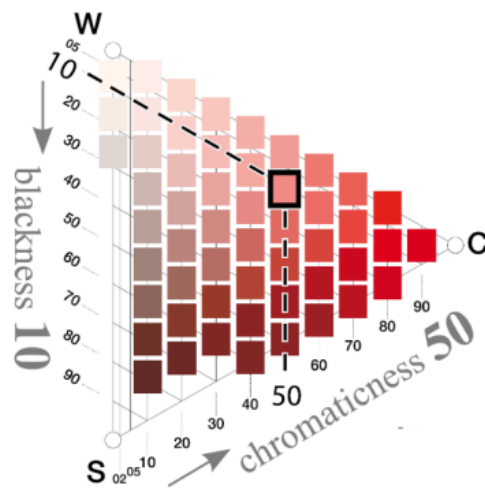


Figure 2.11. NCS Triangle (Swedish Standards Institution, 1996)

In the NCS, colors are defined by the relative amounts of the basic colors that are perceived presented by percentages (Hunt, 1987). For example, a medium grey that includes equal amounts of whiteness and blackness is defined as having a whiteness of 50% and a blackness of 50%. A pure red color with no yellow or blue or white or black is defined as having a redness of 100%. Therefore, the notation of Y50R in the color circle represents a 50/50 mixture of unitary yellow and unitary red. Similarly R50B, B50G, and G50Y represent 50/50 mixtures (Agoston, 1987).

2.3. Effects of Color

Color is one of the most important elements that affect our lives. It works as a guide for making sense of our environment and affects our behaviour by its informational and cultural role (Martinson & Bukoski, 2005). Color influences us both psychologically and physiologically.

2.3.1. Psychological Effects

Color can have strong influences on people's moods and emotions. Color preferences are highly dependent on emotional associations and individual's feelings about a certain color (Kaya & Crosby, 2006) and on cultural associations (Martinson & Bukoski, 2005). In the literature, the psychological responses to color are generally studied with their qualitative descriptions such as anxiety, aggression and happiness. Different colors in different situations have been used by researchers even if these colors bear the same name without clear evidence on the effectiveness of colors on the human behavior (Bakker, van der Voordt, de Boon, & Vink, 2013).

Kaya and Crosby (2006) reported that color associations are based on individual and emotional aspects. It was reported that red represented energy, vitality, power, happiness and joy, purple represented fun and creativity, and blue represented truth, serenity, harmony, relaxation and calmness. Shehata (2000) claimed that orange

represented energy, yellow represented mental stimulation, and green represented harmony and balance.

In spite of the studies and researches that have been produced in order to study the effects of colors on the psychological behavior of human, there is a little knowledge on the actual impact of colors on human and their behavior (Tofle et al., 2004). Nevertheless, the conclusions and the findings of these studies are still not clear and inconsistent because different reasons may play a role (Tofle et al., 2004).

Every color has a particular set of meanings. Emotional characteristics can be related to any given color (Ladau, Smith, & Place, 1988). However, there are universally accepted meanings for red, orange, and yellow which are associated with fire, and for blue, green, and violet which are associated with cool oceans, deep forests, and shadows (Fehrman & Fehrman, 2000).

Studies comparing adults' and children's preferences towards colors indicate that adults are more prone to colors of white, black, grey and brown, in comparison to children; however, even in adults these colors were mostly associated with negative emotions (Gaines & Curry, 2011). Many studies try to find an optimal environment for patients in order to reduce pain, medication and the length of stay (Dijkstra, Pietserse, & Pruyn, 2008). The negative impacts of neutral colors such as white and grey should be taken into consideration since these colors are widely used in spaces such as schools, hospitals and offices (Dijkstra et al., 2008).

In a study done by Dijkstra and colleagues (2008), the effect of color white was compared to green and orange in a healthcare environment. The participants were students who were randomly exposed to photographic simulations of a hospital room with either green walls (as the experimental setting) or white walls (as the control setting). The participants were asked to imagine being hospitalized after a successful surgery in one of the above mentioned rooms after looking at them for at least 15 seconds. Afterwards, the participants were asked to complete a stress arousal checklist. The results indicated that the wall color was only affective in determining

the level of stress in participant with a low stimulus screening ability (low-screener). Low-screening participants, experienced more stress in the white room in comparison to the green room. The second phase of the experiment used orange as the wall color (as the experimental setting) and white (as the control setting) and the results indicated that the orange room was more arousing and more attractive than the white room (Dijkstra et al., 2008).

Kwallek, Woodson, Lewis and Sales (1997) demonstrated the effect of white on productivity and happiness in the office users. The study compared a red office with a green/blue office and a white office. The results of the comparisons between red and blue office indicated that participants experienced more dysphoria when in the red room. The anger and depression rates were higher in the white room in comparison to the red room. The authors explained this observation by stating that the color white lacked contrast and pigment that can be disturbing for participants with lower screening abilities resulting in lower productivity and efficiency, more errors, and lower levels of happiness in the users (Kwallek et al., 1997).

2.3.2. Physiological Effects

According to Gaines and Curry (2011), the color red improved the sense of smell, raised blood pressure and pulse and densifying the muscles. On the other hand, exposure to blue color caused lower body temperature, loss of appetite and slower the heart rate. Yellow and green were associated with positive effects on breathing and an increase in speech skills respectively. Furthermore, orange and pink has comforting effects because of the changes they caused in the circulation and the nervous system (Gaines & Curry, 2011).

Each color and color combination can affect not only people's emotions but also their brain waves, hearth rates, blood pressures and respiratory rates (Martinson & Bukoski, 2005), secretions of hormones, reactions to stresses, the autonomic nervous system and the cerebral cortex where emotions are located (Jin, Yu, Kim, Kim, &

Chung, 2009). Jin et al. (2009) indicated that the color red caused emotional changes and directly affected subjects' parasympathetic nerve system activity that adjusted the blood pressure, the heart rate and the respiratory rates below the normal level.

The lightness and the saturation of the color can also be responsible in physiological responses (Gaines & Curry, 2011). Zemach, Chang and Teller (2007) indicated that bright and high saturated colors are easier to elicit a change in the human-being. The changes in human's vision, the level of development of the brain and color interpretation can lead to physical responses that vary from one individual to the other.

2.4. Individual Differences in Color Preferences

Individual differences with respect to age, gender and culture can have an effect on the color preferences.

2.4.1. Age

In early childhood, the recognition of colors develops where children between 5-7 years old can recognize the whole colors as compared with age between 2-4 years old. Children in age between 5-7 years old can recognize black, red and orange colors while more than 60% of the children between 2-4 years old can recognize green, red, yellow and black. Some researchers stated that the child until 6 years old usually can recognize 4 basic colors (Roberson, Davidoff, Davies, & Shapiro, 2006). Nevertheless, others scientists and researchers found that children in 2-3 grades do not differ from adults in their color which they use for inversely characterized drawings (Žardeckaitė-Matulaitienė & Pranckevičienė, 2008). Some studies conducted on children and adults show a bias towards red in early childhood; however, as the child grows up, blue tends to be preferred over other colors (Zentner, 2001).

The colors which use in early childhood are more instinctively as compared with colors use in a natural neutral way. Children between the ages 3-6 often prefer colors to shapes and this process is to be counterproductive in the later stages of their development. The bright red color is used by children to come across anger and the wish of destroying something. The black color of night is used in order to refer to the depressive anguishes. The yellow of the sun is used for self-expression and the desire of communicating. The strong, intense and warm colors are always attracting the younger children. With a passage of time, colors appear in softer shades and less violent. This process will continue for the duration of life and people will prefer the subdued colors in aging. The results that have been mentioned about the color differences for each age group refer that colors should be organized to suit each age group (De Bortoli & Maroto, 2001). In the study conducted by Park (2009), color preferences of children between the ages of 7 to 11 in healthcare settings were analyzed and the results indicated that white was the least preferred color and was associated with negative emotions

2.4.2. Gender

Many scientists and researchers found that the contents and colors that are used by children drawings differ according to male and female. There are differences between genders in color preferences. Shehata (2000) indicated that yellow had a higher affective value for boys than girls, blue was more and red was less preferred by boys while red was more, blue was less preferred by girls.

Iijima, Arisaka, Minamoto, and Arai (2001) stated that females aged 5 to 6 used more colors than males in their drawings. Also, females choose flesh and pink colors whereas males used grays and blues. Turgeon (2008) examined drawings by elementary school children and found that males used more cold colors, such as black and gray, while females used more pink, purple, and yellow in their drawings. Previous research demonstrated that younger children prefer warm colors but as they get older preference shifts to cooler colors. Milne and Greenway (1999) conveyed

that younger males under 10 years' old used more colors as compared with older male children between 10 and 14 years old. Nevertheless, the number of colors that are used by younger and older females are equal. In addition, they mentioned that because of the inhabitation of the emotional respond, they decline to use a fewer number of colors.

According Mohebbi (2014) color preferences for boys and girls were dramatically different. The results of the study indicated that the average of color preference point scales for the blue color in girls was 4.74 while in boys was 3.36. For pink color, the average for girls was 5.06 while for boys was 2.08. Also, the black color displayed a significant difference where the average in girls was 6.68 while in boys was 4.58. The maximum in color preference between male and female with age appear in the yellow color where the preference of color according to the age of 7, 8 and 9, was 4.26, 2.90 and 4.23, respectively (Mohebbi, 2014).

Ellis and Ficek (2001) found that female college students preferred to use the warm colors which include yellow and red, while male college students preferred to use the cold colors which include green and blue. There is a controversy that gender differences in color preference may be associated with the labor evolutionary division with females growing to recognize red leaves, yellow fruit, purple and red berries in their role of gatherer (Hurlbert & Ling, 2007).

In addition, He et al. (2011) mentioned that females prefer white, pink and purple, while males prefer green and blue. Furthermore, they have associated their results to the hunter-gatherer theory that states that hunters prefer the green and blue colors because they consider calm colors and associate directly with nature such as the colors of the sky. On the other hand, women often prefer warm and peaceful colors that consist of purple, white and pink (Wright & Black, 2013).

2.4.3. Culture

Some colors have meanings which cross the boundaries of culture and language and extend to distant ancestors and represent a shared bank of memories, whereas other colors are specified according to culture, time and language. In addition, through history, our responses toward environment, nature, art and clothing are highly specified to the symbolic associations that we have with colors (Turner, 2009; Hasan, Al-Sammerai, & Kadir, 2011). Colors in different cultures express the beliefs, traditions, thoughts, science and society. The culture of colors varies from one society to another and the people use the colors as a mean to express the art and culture throughout history.

Red

In the Chinese culture, it is known as the bride color and good fortune and refers to success, whereas in the west it refers to excitement, love and passion. In Africa, it is known as the mourning color, whereas in the Indian culture, it refers to purity. In Japan, it refers to life. The red color in the Arabic culture refers to everything positive (Nunn & Cedillo, 2006).

White

In Europe, this color is considered the angels color, marriage and peace while in Japanese, it refers to death. In China, it refers to mourning and death. In the Hindu culture, the white color expresses unhappiness while in the Arabic culture it expresses peace and the end of the war (Nunn & Cedillo, 2006).

Yellow

In the European culture, it expresses joy, hope, and happiness while in the Chinese culture it refers to the kings. Also, in the Japanese culture, it is considered the brave color, while in India, the yellow color is the colors of the traders. This color in the Arabic culture refers to the weakness and disease and the color of the earth (Nunn & Cedillo, 2006).

Blue

This color in the European culture is known as the depression color, whereas the blue color in the Chinese culture refers to immortality. In the Middle East, blue expresses security while in the Iranian culture it refers to the sky and spirituality (Nunn & Cedillo, 2006).

Black

The black color in the European culture expresses the mourning, death, and rebellion while in the Chinese culture, it is considered the color of children. In addition, in the Asian culture, it refers to evil and bad luck and in the Arabic culture it refers to death and grief (Nunn & Cedillo, 2006).

Green

In the Chinese culture, green symbolizes exorcism and in the Islamic culture, it refers to hope and everything positive. In the west culture, it is considered the color of spring and the beginning of a new phase. In the American culture, green is considered the color of sands (Nunn & Cedillo, 2006).

2.4.3.1. Color in the Libyan Culture

In addition to blue and yellow, Arabs recognize eleven basic colors that include white, black, green, blue, red, yellow, gray, brown, pink, orange and purple. Colors that have the longest history among the whole colors terms in all the languages in the world are white and black colors (Hasan et al., 2011).

White (Abiad)

The main symbolism of the white color is the color of nature in which it is associated with clouds, water and air. The extended meaning is clear, clean and pure. Additional meanings of the white color are peace, wedding, virgin, pryers, dove and coffin (Hasan et al., 2011).

Black (Aswad)

The main symbolism of the black color is the black eye or black hair. This color this color refers to things which people do not like in the world. Negative meanings for black can be stated as death, black hell in which hell is frequently related to dark and black, suffering and punishment, past decades, black crowd, black heart, bad luck and black cat. On the other hand, there are positive connotations such as black petrol, black eyes and black dress which implies elegance, stylish, and smart (Hasan et al., 2011).

Green (akhdar)

The green color is the third color which has been developed in the Arabic culture. In Islamic culture, the green color represents a traditional color of Islam and is associated with nature. In addition, green is associated with truthfulness and goodness. Additional meaning of green can be stated as green hand, green land, green flag, green age and green light (Hasan et al., 2011).

Red (Ahmar)

The main symbolism of red is blood and red rose. The extended meaning of red is passion and love. In addition, it refers to red cheeks which means being shy and red eye which means anger (Hasan et al., 2011).

Blue (Azrak)

The main symbolism of this color is nature. It is related to the meaning of divinity. Negative meanings of the color blue are envy, jealousy, death and illness, gloomy and depression (Hasan et al., 2011).

Yellow (Asfar)

The main symbolism the yellow color is the color of nature such as the color of the sun, the color of the Arab land. The extended meaning indicates a positive connotation, for example with 'gold'. Negative meanings for the yellow color are being envious, sick, mean, cruel, dishonest and untruthful and hurting other people (Hasan et al., 2011).

2.4.3.2. Color in the Turkish Culture

The meaning of colors varies from one culture to another. So, in the Turkish culture, many meanings of colors and special characters symbolizing each color can be found. Sunlight delivers seven colors which are purple, blue, green, yellow, red, orange and violet. Red, green and yellow represent the colors of the Ottoman flag and the green color represents the life and red color refers to the power and yellow refers to sovereignty and holiness.

White

In the Turkish culture, the white color is commonly used as a spiritual faith that refers to the power and justice. In addition, it refers to the symbol of purity and sense of integrity and trust (Çeken & Yıldız, 2015). Also, the white color represents the mother of the other colors where the ancient Turkish people considered the white color as the color of power and justice. Since the era of Genghis Khan, the Turkish people considered the white color as the color of purity and Genghis Khan was wearing white clothes because he thought that white color was the presidential color. As well as, the Seljuks and Ottomans have considered the white color as the color of power and in the Anatolia, the person who has the white beard was considered a good and peaceful man. The Turkish women wore white headscarves after marriage because they thought that it referred to joy (Yardımcı, 2016).

Red

The red color in the Turkish heritage refers to the ability and enthusiasm, also it refers to wars and fighting and it has dread at the Turks and considered it the color of power and in the Anatolia, it refers to the Prophet Ibrahim (Yardımcı, 2016).

Blue

The blue color is considered the symbol of the sky and the gods in the sky, and the origin of the word ‘mavi’ dated back to the Arabic language. In addition, it refers to love, friendship, and loyalty. Thus, Atatürk has used the blue color in the education field (Yardımcı, 2016).

Green

The green color refers to the vegetables and fruits and it has sanctity especially for Muslims and the green color refers to the old person where the trees become green once a year and the number of the greening of trees is equal to the age of its life (Yardımcı, 2016). The green color represents the fertility, abundance, and health besides the quietness, in addition, it is the color of nature and at Islam is a symbol of origin (Çeken & Yıldız, 2015).

Yellow

The yellow color refers to joy. During the Ottomans, yellow belt was used on the clothing and they believed that the yellow color increased the greatness. Ottomans used the yellow color on the thrones of the kings. In the myth of the Turks, yellow refers to fears, flooding and problems. The yellow dragon refers to fear and threat and in the Anatolia, it symbolizes disease (Yardımcı, 2016). Furthermore, the yellow color symbolizes the luxury and a symbol of human value (Mazlum, 2011).

Black

The black color according to Turkish people refers to fear and being lost in the dark. In addition, they consider the black color as the symbol of the north because the lightning and storms come from the north of Turkey and the black color has many meanings in the Turkish culture including land. The word 'kara' refers to the lack of luck and in the Anatolia, the black color symbolizes the non-acceptance and hatred of black animals (Yardımcı, 2016). Also, it is considered as a symbol of mourning, death, and sadness where they wear black clothes in their sadness (Mazlum, 2011).

3. HOSPITAL ENVIRONMENT

The hospital can be defined as a place or the institution where the injured or sick person is treated. Also, the hospital nature is considered complex. The patients in hospital buildings get good treatments as well as continuous support. The appropriate design and building of hospitals contribute in creating suitable therapy environments. Hospitals are designed in a way that makes them a healing environment in which the priority is creating a sustainable healthy environment and a healthy working environment. Healing architecture is an expression that has been adopted and developed in order to create suitable healing and psychological environment (Lawson, 2002).

Therefore, a suitable healing environment can ultimately provide patient satisfaction in many aspects and the most important of them is to reduce the length of stay, reduce stress to the lowest possible extent. One can agree with the impression that the design of hospitals and healthcare environments in the form of sustainable healing environment can be achieved by the suitable design of the physical environment (Hussain & Babalghith, 2014).

3.1. Public Areas

The public areas can be analyzed under three general aspects that include entrance areas, waiting areas and reception.

3.1.1. Entrance Areas

The first and last impression of the hospital begins and ends at this area because it is the area where the journeys of patients, visitors, and staff start and end. This area

gives the overall impression of the hospital and the characteristics of the provided service. The colors that are used in these areas must be attractive and give a feeling of relaxation from daylight until evening without being very unambiguous. Thus, the process of choosing colors, which are placed in these areas, is not an easy task and the selected lights that are placed or will be placed must be taken into consideration. Some natural tones and beige can take on very unattractive green or orange hues under diverse type of lights. What looks to be a very neutral and soft decor by daylight can turn into a disagreeable color at night (Dalke, Littlefair, Loe, & Camgöz, 2004).

The interiors of hospitals and healthcare are significant because they represent a connected environment with the exterior environment by the physical and cultural contexts. Furthermore, these areas are located in a place that gives the overall impression of the hospital and the healthcare environments. People entering the hospital have to pass the entrance before they can experience all parts of the hospital. So, entrances can contribute to a heavy extent in the healing process. Consistent with The American Institute of Architects Academy of Architecture for Health, the entrances must be on a high level of precision; they must be accessible by disable persons and highly separated from the inclement weather (AIA, 2001). When a person is in the entrance, he/she must recognize the welcoming signs, the departments within the hospital and his/her stress must be reduced (Ergenoğlu & Aytuğ, 2007).

3.1.2. Recognition Area

When people are in the hospital, they should access the reception area easily and this should be in the form of a direct line to the reception desk. Since the reception desk is the first contact point in the hospital, it should be in a heavy contrast with the surrounding environment. Thus, the reception area and the reception clerk should be the brightest area in the visual field. Contrast and colors must be used in order to help the visually impaired people on the orientation immediately to the required

place. The use of color combinations and target spotlightings by using special landmarks can help on specifying the landmarks of the space, employees of desk information and seating. The colors used in the reception areas must be extended to the used colors in the entrances and bring the outside environment to the inside (Dalke et al., 2004).

It is recommended that the reception desks are open, light and notable well. Thus, in order to make the desks more obvious, the colors that are used should be strong. The height of the reception desks must be suitable to the whole people including people with wheelchairs (Dalke et al., 2006).

3.1.3. Waiting Areas

The process of waiting inside hospitals and healthcare environments is always stressful both for the patients and accompanying people. The waiting areas are divided into different areas that consist of large areas in entrance lobbies to the small waiting areas for certain treatments. The colors of furniture that are used in waiting places can contribute to ease tensions and make the place smother. Good design can help in creating a visually calmer environment and the attractive decoration can provide a source of welcoming. The floor color should be in the form of warm colors. Walls are preferable to be in a quite form with slightly grayed in order to help in creating a relaxing and comforting environment in the waiting areas. The neutral colors can configure a framework to a stronger version of colors. The environment that belongs to the very young should be safe and an amusing environment while the environment involving teenagers must be interesting (Dalke et al., 2004).

The colors in waiting areas must cover the whole materials and surfaces where the furniture colors help on decreasing the tensions dramatically. Daylight must be provided to the waiting areas as well as, the exterior view should be decorated by trees as much as possible in order to make the waiting area highly pleasant. Many studies refer that the images of nature help the patient on alleviating the pain and

reduce the stress. Thus, the soft wall colors help on promoting the calming effect and these colors include the earth tones, blue, green or yellow (Zraati, 2012).

3.2. Circulation

Hospitals can have complex and different types of circulation that include stairs, corridors, lifts, and escalators. Visitors should have the ability to access to a specific place inside the hospital easily and they should find a mean to leave the building afterward. The color coding in the circulation areas may be restricted to a signage specific features for instance cornices and doors, skirting or a wall and the floor may be given a specific color. In addition, landmarks can be associated with specific colors in order to make them remembered by the people. Lighting should be based on drawing attention on signage, not distracting it (Dalke et al., 2004).

3.2.1. Corridors

The main circulation network in big buildings and hospitals are corridors. Corridors have more importance than just being transit places since they are considered important locations for corridor conversations that provide social interaction and knowledge transfer. Corridors must be wide enough in order to accommodate a small group of people. Nevertheless, there are concerns that corridors are not given a lot of care even in the optimal examples of design (Rashid, 2006). Long corridors can contribute to an increase in noise and make the wayfinding system more difficult especially for old patient and visitors (Karlin & Zeiss, 2006; Ampt, Harris, & Maxwell, 2008).

The characteristics of a good design of corridors are to make the wayfinding systems easy. Wide corridors are always needed in different forms such as the use of colors in order to increase the effect of visual interest and decrease the feeling of boredom. Corridors are considered optimal for the execution of wayfinding devices by using colors. The wayfinding devices can be placed on corridors walls, flooring

and dado rails where the patient can be led to and from the landmarks. Nevertheless, the use of colors dramatically may lead the patient or visitor to distract if the schemes are very vibrant (Dalke et al., 2004).

3.2.2. Stairs and Lifts

The stairs can cause a great concern to the visually impaired people or to those with imperfect navigation. The color design that contributes to reducing these problems must be studied carefully. The stair and escalator approaches must be marked carefully at the bottom and top in order to warn people who feel the visual and tactile clues indicating that a change of surface is approaching. These parts can take aesthetic colors and it is not necessary to take black color to achieve the contrast for people who suffer from poor vision. In order to provide contrast between risers and treads, stairs should be lit enough. The lifts are considered an important part of the circulation systems especially for wheelchairs people so their doors should stand out well from the surrounding walls. The colors of doors must be significantly contrasted from the colors used on floors in order to make them appropriately visible from people inside the building. If the lifts are central to a color-coding or scheme of wayfinding, that may conclude the used colors but it must work from both outside and inside the lift (Dalke et al., 2004).

3.3. Care Areas

Nowadays, most of the authorities, who are responsible for hospitals and healthcare environments, prefer that patient rooms must be composed of one bed. The process of making a patient room with a single bed has been ensured in a survey that consisted of many patients to give their opinions about privacy, dignity, security and calmness. In addition, the patients want space to store their personal items, room for their visitors, the existence of natural light in the room and an attractive and pleasant environment (Ergenoğlu & Aytuğ, 2007).

The existence of color and lighting in the care areas may contribute in optimizing the efficiency of employees and the whole ambiance in the hospitals and healthcare environments. Color is a powerful factor that changes the psychological condition, mood and perception of time of the patients. Warm, light and tranquil colors are appropriate in the care areas. In addition to comfort and relaxation, patients should feel that they are under highly medical care in order to help them as can as possible in quick recovery or convalescent. However, a significant point that must be taken into consideration is the type of color that will be used in accordance with the accommodation period and the age of the patient (Dalke et al., 2004).

Special careful design should be considered in care areas with patients who are supine and can just see the ceiling. Actually, patients who are prone for long periods of time will raise a tinted ceiling associated possibly with wall color with some subtle texture or pattern. As well as, it is preferable to make walls be treated best with colors that have 50–60% reflectance values and could be associated to the ceiling tint. Walls away from the window may have gone up to 70% light reflectance to recompense for less daylight (Dalke et al., 2004).

Furthermore, the nurses' workstation, which is visited by visitors and patients, is where the nurses and other healthcare staff can sit when not dealing with the patients and do their duties. This area must be taken into consideration in terms of colors and decoration (Piotrowski, 2011).

The nurses' workstations are considered the heart of the care area and comprise a lot of things and important units that include the combination of receptions desks for patient and visitors, calling center, office area and places for visiting the medical staff. It must be placed in a place that is easily visible especially in the day. The colors used in nurses' stations may be coordinated with the colors used in the corridor instead of the colors used in the care area. Also, the quality and design of nurses' workstations can provide an inviting and convenient place for patients and visitors.

3.4. Children and Hospital Design

Since the 18th century, the design of hospitals has taken into consideration the well-being of the patients and this has highly affected the design of the healthcare facilities. It is found that children are always scared when they are in hospital because of their distancing from their families and friends and enforced to stay in unfamiliar and unpleasant environment. As a result, the hospital designers must take these issues into their consideration by paying care to reduced stays or preferably ambulatory treatment; playing room, wellbeing of parents and staff provision to deal with patients' and parents (Verschoren, Annemans, Van Steenwinkel, & Heylighen, 2015).

When children are taken from their houses and familiar environment and put in hospitals, this can make the child to loose control of his temper within the environment. Thus, designers must design a familiar environment and provide different types of services such as relaxing through walk, put animations to guide their emotions and surround them with things that can identify them to make them feel as they are at home (Verschoren et al., 2015). All of these elements together make children and teenagers behave positively, rationally and help them to communicate positively that contribute to increase their sense of happiness. The key features in relative to each of the three components comprise artwork, color, and brightness (Bishop, 2009).

Children between 5 to 11 years old have perfect vision about their capabilities in the hospitals. Their priorities are clear that able to preserve their daily activities. Thus, they want to feel safe and stay close from the people they love, eating the food they like and the existing of nice areas for playing while waiting for things to happen. They dislike to feel hot or cold, the existing of bad smell, noise and too much light (Estates, 2004).

In respect of interior design, a study conducted by Coad and Coad focused on the color preferences for children and young people in terms of their preferences for the

thematic design of their hospital in a new children unit. The innovation of the method was driven by the children preferred choices and young people through the use of child-friendly interviews and questionnaires. Three ranges were used to analysis the data at both stages and were blue–green, red–pink–purple and orange–yellow spectrums. Generally, the color that was preferred the most was the mid blue–green colors. Nevertheless, some of the young people with age of 11 and more preferred the darkest range of mid, warm yellow-oranges, ‘bold’ pinks, silver and black. While, in the red–pink–purple color range, only 18 (N = 18/180) contributors presented a preference for mid red–pink–purple. The study was not like the previous studies that pointed that all of the chosen colors were bright colors but rather pale to mid-color ranges. The preferences of colors for samples and objects vary from interiors and surroundings (Zlotkowska & Cassidy, 2010).

In another study that addressed children’s preference of color in healthcare environments, Park (2009) examined color preferences among pediatric outpatients, pediatric inpatients, and healthy children aged between 7 to 11 using the Munsell color system for five hues—red, yellow, green, blue and purple. These colors were selected according to the pilot study in which nine brightness/saturation combinations for each hue were tested to identify children’s most favorite and least favorite colors. White was also included because its prevalence in healthcare environments. Ten models were built in which everything was the same, with the exception of one interchangeable sidewall where the different colors were displayed. In the actual study, the children saw one model, but with different colored walls sequentially. There was not a statistically significant difference in color preference among the three groups of children, and, therefore, the study did not support the hypothesis that pediatric patients would have different color preferences than healthy children. It was noted that white was the least preferred color. Lower preference scores for yellow in patients compared with healthy counterparts were reported in the study (Park, 2009).

4. CASE STUDY

4.1. Aim of the Study

The aim of this study is to understand the children's color preferences in a waiting room of a hospital and to investigate the effect of gender and culture differences on color preferences in the waiting room. Since previous studies regarding children and hospital did not consider the affects of culture and gender in color preferences. In addition, to understand the impact of colors on children when they are in the waiting room of a private hospital. While investigating the children's color preferences in a waiting room, the emotional attitudes of the children are also investigated.

4.1.1. Research Questions

Q1. Is there a significant effect of gender on the color preference of children in the hospital waiting room?

Q2. Is there a significant effect of culture on the color preference of children in the hospital waiting room?

4.1.2. Hypotheses

1. There is a significant effect of gender on the color preference of children in the hospital waiting room.

2. There is a significant effect of culture on the color preference of children in the hospital waiting room.

4.2. Method of the Study

4.2.1. Sample Group

The sample group of the study, which was chosen by a random sampling method, consisted of 64 children with 37 boys and 27 girls. In addition, the selected sample was composed of 32 Turkish children and 32 Libyan children whose age range was between 6-17 years old (Table 4.1). The mean age was 10.3 years and the standard deviation was 2.45. The majority of the Libyan children who participated in the questionnaire were mainly 9 and 10 years old (18.8% for each age group) and the majority of the Turkish children were within the category of greater than 12 years old with a ratio of 15.6%.

Table 4.1. Gender and culture distribution of the children

	F	M	Total
Turkish	15	17	32
Libyan	12	20	32
Total	27	37	64

4.2.2. Description of the Site

The Private Koru Hospital in Ankara, Turkey, is located within the Balgat region of the Çankaya municipality. The children's waiting room is located on the first floor of Private Koru Hospital and consists of a reception unit that includes a table in a light brown color and a red chair. The walls of the room are in a light green color and the room contains a number of blue seats and a number of children's seats with different colors including orange, blue, pink and gray. In addition, the room contains carton panels for children, TV unit and some toys. The floor material is linoleum that consists of light gray, dark gray and blue colors and on the ceiling there are two large lighting units (see Figure 4.1).



Figure 4.1. A view of the children's waiting room in Private Koru Hospital

4.2.3. Procedure

The study was conducted between the months of November and December of 2016 and the questionnaire was completed within one and a half months with the children who were presented in the children's waiting room of the Private Koru Hospital.

4.2.3.1. Questionnaire

The study was conducted in two phases. In the first phase, the participants filled a questionnaire that consisted of 12 questions (see Appendix A). In the first part of the questionnaire, demographic information about the child was collected and the second part consisted of questions related to color preferences and color preferences in the waiting room. The duration of the questionnaire was approximately 3 to 5 minutes.

Schematic facial expressions developed by Sullivan, Kirkpatrick and MacDonald (1995) were used in this study. Studies conducted by Camras and Allison (1985)

and MacDonald, Kirkpatrick, & Sullivan (1996) indicated the validity of schematic facial expressions. As an example, in Camras and Allison's (1985) study, it was found that happiness and sadness were easily identified by preschool children. Furthermore, anger was the most accurately defined emotions by children of 5 to 9 years of age (Camras & Allison, 1985; MacDonald et al., 1996). As a result, basic emotions of anger, sadness, moderate and happiness were chosen in this study (Figure 4.2).

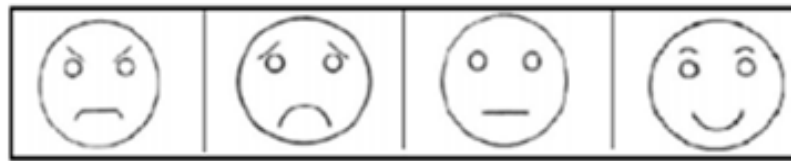


Figure 4.2. Schematic facial expressions of emotions (Sullivan et al., 1995)

4.2.3.2. Selecting the Colors

Since the color of the children's waiting room in the Private Koru Hospital was light green, three colors were chosen to be evaluated in the study. Red, which is the complementary color of green, orange, which is a warm color and white, which is an achromatic color were chosen. The original photograph of the waiting room was changed by the Photoshop program by using the RGB system. The original photograph of the waiting room with the three different colored alternatives were shown to the children (see Appendix B), and the children were asked to indicate their feelings and the most preferred waiting room according to color.

4.5. Results

The wall colors of the children's bedrooms showed differences according to culture. Twenty-five percent of the Libyan children had blue colored bedroom walls and 56.2% of the Turkish children had white colored bedroom walls (see Table 4.2).

Table 4.2. Wall colors of Libyan and Turkish children's bedrooms

Wall Colors	No. of Libyan children's bedrooms	No. of Turkish children's bedrooms
Green	3	2
Purple	2	4
White	4	18
Blue	8	1
Yellow	4	3
Pink	4	4
Red	4	0
Gray	3	0

For the Turkish children white was the most used color on the bedroom walls, but for the Libyan children after the blue color, white, yellow, pink and red were the next preferred colors on the children's bedroom walls.

The favourite colors for the Libyan and Turkish children were the same in which blue was rated as the most favourite color (see Table 4.3). According to the Libyan children, the reason why they preferred blue as their favourite color was that it was the color of the sea and for the Turkish children, the reason was that it did not irritate the eyes.

Table 4.3. Favourite colors for Libyan and Turkish children

Colors	No. of Libyan children	No. of Turkish children
Green	0	3
Purple	4	2
White	2	4
Blue	10	8
Brown	1	0
Yellow	4	4
Pink	4	4
Red	4	4
Orange	1	0
Black	2	3

The feeling types of the children towards the colors were rated by indicating one of the schematic facial expressions for each color. For the Libyan children, blue was rated as happiness (62.5%), orange was rated as being moderate (53.1%), purple was rated as sadness (25%), and black and purple were rated as anger (28.1% for both them; see Table 4.4).

Table 4.4. Feeling types of Libyan children towards the colors

Feeling	No. of children and type of feeling towards the colors							
	Green	Purple	White	Blue	Yellow	Orange	Red	Black
Happy	16	11	19	20	19	6	13	8
Moderate	6	4	11	8	5	17	12	10
Sad	6	8	2	2	7	6	4	5
Angry	4	9	0	2	1	3	3	9

For the Turkish children, black was rated as happiness (18.8%), purple and white were rated as being moderate (12.5% for both them), purple and white were rated as sadness (34.4% for both them), and blue was rated as anger (71.9%; see Table 4.5).

Table 4.5. Feeling types of Turkish children towards the colors

	No. of children and type of feeling towards the colors							
Feeling	Green	Purple	White	Blue	Yellow	Orange	Red	Black
Happy	1	5	3	0	4	3	4	6
Moderate	3	4	4	2	3	3	0	1
Sad	9	9	11	7	9	11	9	7
Angry	19	14	14	23	16	15	19	13

The children were asked to rank the eight colors from the most to the least preferred. The Libyan children indicated the color red as their first preferred color and the color purple as the least preferred color (Table 4.6). Eleven out of 12 children indicated that the color red made them feel comfortable as a result this color was the first preferred color for them.

Table 4.6. Order of color preference for the Libyan children

Order of color preference	Colors	No. of Libyan children
First preferred color	Red	12
Second preferred color	Blue	10
Third preferred color	Yellow	8
Fourth preferred color	White	9
Fifth preferred color	Black	8
Sixth preferred color	Orange	8
Seventh preferred color	Green	7
Last preferred color	Purple	14

For the Turkish children, the first preferred color was blue and the least preferred color was black (see Table 4.7). Seven out of 13 children indicated that the color blue made them feel comfortable as a result this color was the first preferred color for them; however six children did not indicate any reasons for their first preferred color.

Table 4.7. Order of color preference for the Turkish children

Order of color preference	Colors	No. of Turkish children
First preferred color	Blue	13
Second preferred color	Yellow	7
Third preferred color	Red	6
Fourth preferred color	White	8
Fifth preferred color	Green	7
Sixth preferred color	Orange	7
Seventh preferred color	Purple	8
Last preferred color	Black	10

The photographs of the four different colored waiting rooms were shown to the children and the children had to indicate their feeling towards each waiting room by indicating one of the schematic facial expressions for each colored waiting room. For the Libyan children, white and orange were rated as happiness (50% for both them), green and red were rated as being moderate (43.8% for both them), green and red were rated as sadness (18.8% for both them), and green was rated as anger (15.6%; Table 4.8).

Table 4.8. Feeling types of Libyan children towards the different waiting room colors

Feeling	No. of children and type of feeling towards the different waiting room colors			
	Green	Red	White	Orange
Happy	7	15	16	16
Moderate	14	14	8	11
Sad	6	2	6	3
Angry	5	1	2	2

For the Turkish children, red was rated as happiness (15.6%), orange was rated as being moderate (18.8%), green and white were rated as sadness (43.8% for both them), and red was rated as anger (59.3%; Table 4.9).

Table 4.9. Feeling types of Turkish children towards the different waiting room colors

	No. of children and type of feeling towards the different waiting room colors			
Feeling	Green	Red	White	Orange
Happy	3	5	2	4
Moderate	5	3	3	6
Sad	14	5	14	11
Angry	10	19	13	11

The children were asked to rank the four different colored waiting rooms from the most to the least preferred. The Libyan children indicated the waiting room with red walls as their first preferred waiting room color and the waiting room with green walls as the least preferred waiting room color. For the Turkish children, the waiting room with white walls was their first preferred waiting room color and the waiting room with red walls was the least preferred waiting room color (Table 4.10).

Table 4.10. Preference order for the colored waiting rooms for the Libyan and Turkish children

Culture	1st preferred waiting room	2nd preferred waiting room	3rd preferred waiting room	4th preferred waiting room
Libyan	Red	Orange	White	Green
Frequency	11	13	10	16
Turkish	White	Orange	Green	Red
Frequency	17	14	10	10

The children were asked to indicate the color that they would prefer in the waiting room of the hospital. The Libyan children mostly preferred the color green (28.1%), whereas the Turkish children mostly preferred the color white (37.5%) as the color for the waiting room (see Table 4.11). The reason for preferring the color green for the Libyan children was that it made feel comfortable and for the Turkish children, the color white made them feel comfortable and it was indicated as a bright color.

Table 4.11. Color preferences for the waiting room for the Libyan and Turkish children

Color preference for waiting room	No. of Libyan children	No. of Turkish children
Green	9	5
Purple	1	3
White	7	12
Blue	7	3
Brown	1	3
Yellow	1	1
Pink	0	1
Red	6	4

According to the chi-square test, there was no significant relationship between gender and feeling towards the green color ($\chi^2=1.24$, $df=3$, $p=0.74$). There was no significant relationship between gender and feeling towards the orange color ($\chi^2=2.99$, $df=3$, $p=0.39$). Likewise, there was no significant relationship between gender and feeling towards the red color ($\chi^2=9.17$, $df=4$, $p=0.57$). However, there was a significant relationship between gender and feeling towards the white color ($\chi^2=9.68$, $df=3$, $p=0.02$).

In addition, the chi-square results indicated that there was no significant effect of gender and color preference of children in the hospital waiting room ($\chi^2=13.91$, $df=9$, $p=0.13$). However, the chi-square results indicated that there was a significant effect of culture and color preference of children in the hospital waiting room ($\chi^2=44.32$, $df=18$, $p=0.001$).

5. CONCLUSION

Color is one of the most dominant design elements that is in all aspects of life and affects every part of our lives. It is regarded as a method that is used to interpret and understand the surrounding environment (Mahnke, 1992). In addition, color has an intensive influence on our feelings and emotions because it inundates every aspect of our lives principally in the manufactured color form. There is a close relationship between colors and emotion according to the positive or negative emotion evoked by the color. Several emotions can be associated with more than one color and there are some colors that can be associated with numerous different emotions. As a result, color is considered highly particular and personal in which it is used as a guide for making sense of our environment and affects our behavior by its informational and cultural role.

Color preferences for children can vary according to age, gender and culture. This study focused on the Libyan and Turkish children's color preferences for a waiting room in a private hospital by focusing on the gender and cultural differences. The original photograph of the waiting room with three different colored alternatives were shown to the children; red, which is the complementary color of green, orange, which is a warm color and white, which is an achromatic color were chosen. Both the Libyan and Turkish children preferred the blue color as their favourite color. There were no significant relationship between gender and the feelings towards the green, red and orange colors except for the white color.

It was hypothesized that there would be a significant effect of gender on the color preference of children in the hospital waiting room. However, there was no significant effect of gender and color preference of children in the hospital waiting room. The results are in contrast with the results of Mohebbi (2014) in which there were gender differences in the color preferences.

In addition, it was hypothesized that there would be a significant effect of culture on the color preference of children in the hospital waiting room. The results indicated that there is a significant effect of culture and color preference of children in the hospital waiting room. The Libyan children preferred the color green, whereas the Turkish children preferred the color white. The reason for the color preference can be related to the color meanings within the cultures. In the Libyan culture, the green color represents a traditional color of Islam and is associated with nature. In addition, it is associated with truthfulness, goodness and youthful (Hasan et al., 2011). In the Turkish culture, the white color is commonly used as a spiritual faith that refers to the power and justice. In addition, it refers to the symbol of purity and sense of integrity and trust (Çeken & Yıldız, 2015).

In the study conducted by Park (2009), color preferences of children between the ages of 7 to 11 in healthcare settings were analyzed and the results indicated that white was the least preferred color and was associated with negative emotions. However, in this study, the white color was not associated with negative emotions, on the contrary, it was related to comfort and brightness. The findings of this study regarding the preference for the color white may be caused by the culture difference.

The results of this study can be useful for interior architects, designers and hospital owners who give importance to children color preferences in the waiting rooms to reduce stress and anxiety of the children in a hospital. For further studies the age differences with respect to gender and culture can be investigated to understand the color preference for children. Different environments can be considered to understand the differences in color preferences.

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APPENDIX A

Questionnaire for the Color Preference in Children's Waiting Room

1. Yaşınız:

6 7 8 9 10 11 12 Diğer

2. Cinsiyet: Kadın Erkek

3. Uyruğunuz:

T.C. Libyalı Diğer Lütfen belirtiniz.....

4. Odanızın duvar rengi nedir?.....

5. En çok sevdiğiniz renk nedir? Neden bu renk?

.....
.....

6. Belirtilen her renkte ne hissettiğinizi şematik suratlardan bir tanesini işaretleyerek lütfen belirtiniz. (kızgın, üzgün, normal, mutlu)

Kırmızı



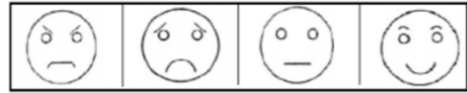
Sarı



Yeşil



Mor



Mavi



Beyaz



Turuncu



Siyah



7a. Aşağıda belirtilen renkleri 1'den 8'e kadar lütfen sıralayınız. En çok tercih ettiğiniz renge (1), en az tercih ettiğiniz renge (8) vererek belirtiniz.

Mavi	()	Kırmızı	()
Sarı	()	Turuncu	()
Siyah	()	Beyaz	()
Mor	()	Yeşil	()

7b. Neden (1) numardaki renk sizin en çok tercih ettiğiniz renktir. Lütfen açıklayınız

.....
.....

8. Gösterilen her bekleme odasında ne hissettiğinizi şematik suratlardan bir tanesini işaretleyerek lütfen belirtiniz (kızgın, üzgün, normal, mutlu).

Yeşil bekleme odası



Kırmızı bekleme odası



Beyaz bekleme odası



Turuncu bekleme odası



9a. Belirtilen bekleme odalarını 1'den 4'e kadar lütfen sıralayınız. En çok tercih ettiğiniz bekleme odasına (1), en az tercih ettiğiniz bekleme odasına (4) vererek belirtiniz.

Yeşil bekleme odası	()
Kırmızı bekleme odası	()
Beyaz bekleme odası	()
Turuncu bekleme odası	()

9b. Belirtilen bekleme odalarını 1'den 4'e kadar lütfen sıralayınız. En az tercih ettiğiniz bekleme odasına (1), en çok tercih ettiğiniz bekleme odasına (4) vererek belirtiniz.

Yeşil bekleme odası ()

Kırmızı bekleme odası ()

Beyaz bekleme odası ()

Turuncu bekleme odası ()

10. Hangi bekleme odasını daha çok tercih edersiniz? Lütfen belirtiniz.

- | | |
|--------------------------|-----------------------|
| a. Beyaz bekleme odası | Turuncu bekleme odası |
| b. Beyaz bekleme odası | Kırmızı bekleme odası |
| c. Beyaz bekleme odası | Yeşil bekleme odası |
| d. Turuncu bekleme odası | Yeşil bekleme odası |
| e. Turuncu bekleme odası | Beyaz bekleme odası |
| f. Turuncu bekleme odası | Kırmızı bekleme odası |
| g. Yeşil bekleme odası | Beyaz bekleme odası |
| h. Yeşil bekleme odası | Turuncu bekleme odası |
| i. Yeşil bekleme odası | Kırmızı bekleme odası |
| j. Kırmızı bekleme odası | Beyaz bekleme odası |
| k. Kırmızı bekleme odası | Turuncu bekleme odası |
| l. Kırmızı bekleme odası | Yeşil bekleme odası |

11. Hastane bekleme odasında hangi rengi görmeyi tercih edersiniz? Lütfen açıklayınız

.....
.....

إستبيان

1. العمر :
 6 7 8 9 10 11 12
 اخرى

2. الجنس : ذكر أنثى

3. الجنسية : ليبي
 تركي
 اخرى
 اذكرها

4. ماهو لون جدران غرفة نومك ؟

5. ماهو لونك المفضل ؟ لماذا ؟

6. يرجى وضع علامة على احد الوجوه التي تعبر عن مشاعرك تجاه كل لون (سعيد , حزين , غاضب , معتدل)

الاحمر



الاخضر



الازرق



البرتقالي



الاصفر



البنفسجي



الابيض



الاسود



7. أ. يرجى ترتيب الالوان الاتية بحسب الافضلية بالنسبة لك , بحيث يكون الرقم (1) هو الافضل بالنسبة لك
والرقم (8) هو اقل لون مفضل لديك

- | | |
|---------------|--------------|
| () الاحمر | () الازرق |
| () البرتقالي | () الاصفر |
| () الابيض | () الاسود |
| () الاخضر | () البنفسجي |

8. ب. لماذا تفضل هذا اللون بالذات ؟

9. يرجى وضع علامة على الوجه الذي يعبر عن شعورك تجاه كل غرفة انتظار
الغرفة الخضراء



الغرفة الحمراء



الغرفة البيضاء



الغرفة البرتقالية



10. أ. أي غرفة انتظار تفضلها اكثر ؟
يرجى كتابة رقم (1) للغرفة الاكثر تفضيل لديك ورقم (4) للغرفة الاقل تفضيل لديك.

غرفة انتظار أ ب ج د

ب. اي غرفة انتظار اقل تفضيل لديك ؟
يرجى كتابة رقم (1) للغرفة الاقل تفضيل ورقم (4) للغرفة الاكثر تفضيل لديك .

غرفة انتظار أ ب ج د

11. اي غرفة انتظار تفضلها اكثر ؟

- | | |
|-------------------|-------------------|
| الغرفة البيضاء | الغرفة البرتقالية |
| الغرفة البرتقالية | الغرفة الحمراء |
| الغرفة الحمراء | الغرفة البيضاء |
| الغرفة البيضاء | الغرفة البرتقالية |
| الغرفة البرتقالية | الغرفة الخضراء |
| الغرفة الخضراء | الغرفة الحمراء |

أ. الغرفة البيضاء	ز. الغرفة الخضراء
ب. الغرفة البيضاء	ح. الغرفة الخضراء
ج. الغرفة البيضاء	ط. الغرفة الخضراء
د. الغرفة البرتقالية	ي. الغرفة الحمراء
هـ. الغرفة البرتقالية	ك. الغرفة الحمراء
و. الغرفة البرتقالية	ل. الغرفة الحمراء

12. ماهو اللون الذي تفضل أن تراه في غرفة الانتظار في المستشفى؟ لماذا؟



1. Age:

6 7 8 9 10 11 12 Other

2. Gender: Female Male

3. Nationality:

Turkish Libyan Other Please indicate.....

4. What color are your bedroom walls?.....

5. What is your favourite color? Why?

.....
.....

6. Please put a mark on one of the schematic faces that expresses your feeling towards each color (anger, sadness, neutral, happiness)

Red



Yellow



Green



Purple



Blue



White



Orange



Black



7a. Please arrange the following colors according to your favorite color, where the number (1) is your most preferred color and number (8) is your least preferred color.

- | | |
|------------|------------|
| Blue () | Red () |
| Yellow () | Orange () |
| Black () | White () |
| Purple () | Green () |

7b. Why is number (1) your most preferred color? Please explain

.....

.....

8. Please put a mark on one of the schematic faces that expresses your feeling towards each waiting room.

Green waiting room



Red waiting room



White waiting room



Orange waiting room



9a. Please write number (1) under the most preferred waiting room and number (4) under the least preferred waiting room.

- Green waiting room ()
- Red waiting room ()
- White waiting room ()

Orange waiting room ()

9b. Please write number (1) under the least preferred waiting room and number (4) under the most preferred waiting room.

Green waiting room ()

Red waiting room ()

White waiting room ()

Orange waiting room ()

10. Please indicate which waiting room you would prefer the most?

- | | | |
|----|---------------------|---------------------|
| a. | White waiting room | Orange waiting room |
| b. | White waiting room | Red waiting room |
| c. | White waiting room | Green waiting room |
| d. | Orange waiting room | Green waiting room |
| e. | Orange waiting room | White waiting room |
| f. | Orange waiting room | Red waiting room |
| g. | Green waiting room | White waiting room |
| h. | Green waiting room | Orange waiting room |
| i. | Green waiting room | Red waiting room |
| j. | Red waiting room | White waiting room |
| k. | Red waiting room | Orange waiting room |
| l. | Red waiting room | Green waiting room |

11. Which color would you prefer to see in the hospital waiting room? Please explain.

.....
.....

APPENDIX B



Figure B1. Original waiting room of the hospital



Figure B2. Orange waiting room

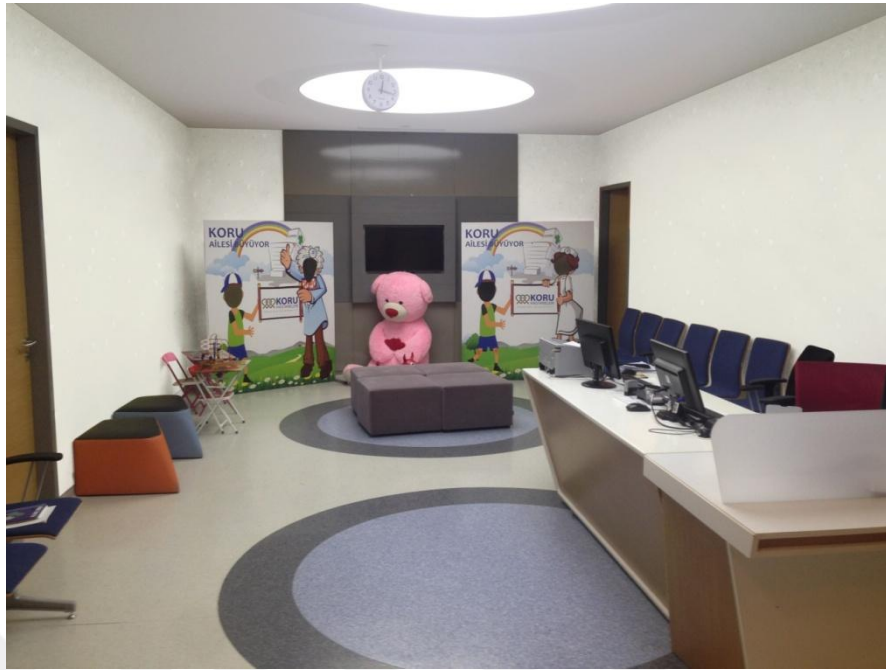


Figure B3. White waiting room



Figure B4. Red waiting room