Enhancing the Hospital Healing Environment through Art and Day-lighting for User's Therapeutic Process

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Abstract
The ideology behind healing is a psychological and spiritual concept of health. Over the past few decades, the integration of a healing environment into medicine has taken a more holistic approach, and has transformed the hospital atmosphere into an exhilarating place, which affects both staff and patients' wellbeing. Investigators have revealed that visual stimulation of nature, natural lighting, artwork, relaxing colours, and therapeutic sound can greatly accelerate the therapeutic process and create a less stressful hospital premises. This paper focuses on the hospital interior spaces and its positive influence to facilitate patients' wellness and staff task satisfaction through art and daylighting. The research techniques adopted include, related frameworks, on-site observations, and 50 administered controlled questionnaires. Apparently, artwork and natural daylight have the potentials to facilitate better healing condition on patients' wellbeing and hospital care providers' task satisfaction. Although, further research will still be required to quantify and validate this hypothesis.

Keywords: Artwork, Daylighting, Psychological Response, Physiological Response, Healing Environment, Therapeutic Process, Patients' Wellness, Staff Task Satisfaction.

1. Introduction

The healing environment approach is not a new concept. From historical background, the interest on healing environment is backdated to about 2,300 years ago (Ghazali and Abbas, 2012). However, it was treated in diverse methodologies, such as holistic and spiritual, and was termed as complementary or alternative Medicine (Huelat, 2003). Researches have shown that the creation of healing environment has rapidly increased globally and has stimulated interest in recent years (Ananth, 2008). For example, healing environment for a more human-friendly, cheerful and safe hospital has been initiated around the globe such as in the united states, United Kingdom, Europe and Malaysia (Ghazali and Abbas, 2012) and this concept

has been adopted by some hospitals in North Cyprus, such as Near East University hospital in Lefkosa. This concept of healing environments was also treated and documented by Florence Nightingale about 200 years ago, when she discovered that patients would recover more quickly from illnesses if they were cared for in an environment that had natural light, ventilation, cleanliness, and basic sanitation (Nightingale, 1860; Altimier, 2004).

In the 1970s, hospital designs began to transform when users' minds started drifting to hospitals with more aesthetic appeal, such as beautiful objects, art work, sculptures, and fascinating colours. As a result of this transformation, the appearance of the hospital environment became a significant marketing strategy. Healing environment is now the emphatic expression of the 21th century hospital design to promote patient, family, and staff satisfaction or comfort. The concept of a healing environment reveals that the hospital environment can make a great difference in patients recovering (Altimier, 2004). Scientific writings have indicated that patients experience a positive satisfaction in an environment that integrates natural light, inciting natural elements, blended colours, desirable sounds, and pleasant views that are aesthetically organised. Shorter length of stay, take less pain medication, and have fewer negative comments documented in the nursing notes than those patients placed in a traditional hospital environment (Rubin, 1997; Altimier, 2004).According to Ulrich, (1984) a patient in a ward with a view of trees recovers more quickly than those with a view of a brick wall

2. Art / Art Work and Healing Process

For more than 1000 years, palaces, castles, town halls and cathedrals in Europe have been constructed for the purpose of achieving worldly glory and posthumous remembrance (Barron, 1996). Depicting of the Art work in European hospitals emanated since in the 14th century. Church buildings were used as a hospital for the care of the sick and needy, and art was portrayed in a very specific way. The 18th century, mark a change, a more business-minded approach began to advance. For example, William Hogarth painted two canvases in 1734, for St Bartholomew's Hospital in London; these paintings emphasized the virtues of charity and compassion. Hogarth's works at that time were not really designed for the patients, but was to strike the emotions of visiting royalty and grandees who were stimulated to drop a donation to the hospital governors for the support of Arts Project (Behrman, 1997; Macnaughton, 2007).

Patients and arts have been associated together for thousands of years, at first with the aim of healing and more recently to beautify the hospitals. Today the visual environment of many hospitals, both old and new, is enhanced by works of art displayed for the delight of patients, staff and visitors. They may also possess certain functions such as having therapeutic values and giving comfort to patients and medical staff (Barron, 1996). Figure 1, shows the art decor in the middle of Near East University Hospital to evoke the minds of patients and visitors that comes into the hospital.

Figure 1. The works of art deco in the atrium –Near East University

Several researchers have investigated people's emotional reactions towards environmental aesthetics through different methodology, the results demonstrated a direct effect and correlation with human physiological reactions. For example, human beings changed their emotions according to environmental stimulation such as colours, objects, (Figure 2 & 3) and sound. Crowded or noisy environment invoked negative emotions, while with therapeutic music and a comfortable environment people are more relaxed (Fang, Wu, Lee, and Liu, 2012).

According to Behrman, (1997), several medical practitioners are now positively convinced of the healing effect of an aesthetically charged environment. The remark of James Scott, a consultant orthopaedic surgeon at the Chelsea & Westminster hospital shows that Medical staff agrees with him that the arts in this hospital have transformed the atmosphere, and is an exhilarating place which affects patients' wellbeing. He was also certain that the artwork in the hospital environment reduces the feeling of being isolated from the outside world. Art also brings the community into the hospital. In other words, the patients do not feel as if they are in an environment where sick people recover from illnesses. It is difficult to provide rigorous proof of the positive effects of the arts on patients' health. However, quite a number of researchers have provided evidence that the overall hospital environment in which art can have a significant role does have an important impact on patients psychologically (Behrman, 1997). As Wiltsher noted in 1992, the spirit needs healing as well as the body (Behrman, 1997).

Figure 2. Depicting artwork with blended colours in a paediatric unit of Near East University Hospital

Figure 3. Portraying artwork in the nurses' station in Near East University Hospital

Art Therapy offers a safe way to express or release feelings which would otherwise remain hidden. Moreover, whatever the situation, most people who are referred to Art therapy could think about making changes in their way of thinking and consequently move forward. Heywood, (2003) summarises the benefit of art therapy as:

> *(a)-addresses personal issues, (b)-increases autonomy and confidence, (c)- helps maintain a sense of identity, (d)- offers an active rather than a passive role, (e)-increases sense of well-*

being, (f)- addresses issues around body image, (g)-helps in the management of pain, (i)-helps in adjusting to diagnosis, (j)- facilitates release of emotion, (k)-offers a stimulating change of surroundings, (l)-fulfils a natural need to be creative, (m)-offers an opportunity to make changes, (n)-helps patients to move forwards, (o)-offers emotional support, (p)-offers an effective non-verbal way to communicate, (q)-helps to address feelings of isolation (Heywood, 2003).

3. Natural/ Day lighting and Healing Process

Hospital is a complex building with a variety of functions. Proper lighting is of paramount importance in a hospital environment. The eye needs sufficient lighting in the indoor spaces to see well (McCullough, 2010). Lighting design is of vital importance in the creation of a pleasant, ambient environment (Dalke et al., 2006). Lighting is of two fold- the natural daylight and artificial lighting. In comparison to artificial lighting, natural light has no benefits over artificial for the performance of visual tasks. However, day-lighting in the hospital buildings is preferred by most users since it offers dynamic interiors and views. Figure 4 illustrates the impact of daylighting in the Near East hospital atrium.

Figure 4: The impact of daylighting in the Near East Hospital Atrium

Natural lighting maximizes user comfort, and provides more enjoyable and fascinating indoor environment with higher performance and productivity. It saves energy use and it is associated with reduced environmental emissions. In terms of visual comfort and energy-efficient building design, daylighting is very beneficial (Leslie, 2003; Li and Wong, 2007; Alzoubi, Al-Rqaibat, and Bataineh, 2010). Lighting varies in intensity, duration of exposure, and pattern. In other words, artificial light is hectic and causes visual fatigue and headaches. Designing a healing environment through thoughtful design can alleviate stress and even promote captivating eccentricity and imaginative thinking. In other words, healing environments stimulate positive awareness and connection with nature, culture, and people (staff and families). Softening the hospital environment with natural lighting can generate a healing environment (Altimier, 2000; McCullough, 2010).

Research has also shown that ultraviolet light enhances healing by increasing protein metabolism, decreasing fatigue, stimulating white blood cell production, increasing the release of endorphins, decreasing blood pressure, and generally promoting emotional well-being (Ott, 1985; Buchanan et al, 1991). Natural lighting also helps with the implementation of day/night cycling in humans and animals. Cognitive disturbances can occur if there is a lack of natural light for patients and staff. Some research evidence has shown that bright light can improve nursing performance, leading to a decrease in errors. Other studies have shown that natural light offers both patients and care-givers substantial health benefits (physically and mentally) that coincides with a general economic benefit to the facility (Figueiro et al., 2001). Natural

lighting is also beneficial to patients who have long hospital stays by aiding their ability to look out of the windows to see the time of the day and observe the weather and natural landscape along with natural light. A recent study at the University of Texas in Austin, has portrayed that comforting colours and views of nature aid in the healing process of patients (Boyce, Hunter, and Howlett, 2003; McCullough, 2010).Several scientific writings have demonstrated that natural daylight or view out reduces depression among patients with seasonal affective disorder and bipolar depression and also decreases length of stay in hospitals (Benedetti, Colombo, Barbini, Campori, and Smeraldi, 2001; Choi, Beltran, and Kim, 2012). It is obvious that proper day- lighting reduces the length of stay and isolation in the hospital premises, an example of this concept as shown in Figure 5.

Figure 5. Natural impact of daylight in the inpatient ward of Near East University Hospital

Several evident studies have defined the benefit of natural lighting from a different perspective, such as; improves sleep, lessens agitation, can be used to treat hyperbilirubinemia among infants (Ulrich, Quan, Zimring, Joseph, and Choudhary, 2004; Walch et al., 2005; Joseph, 2006). Lighting can have an impact on peoples' perceptions and responses to the environment and also can affect patient recovery rates, improving the quality and overall experience of patients, staff and visitors. When hospital lighting is carefully designed, it transforms the appearance of the space, making it attractive, welcoming and either restful or stimulating. It also enhances the architectural appearance of the space. Appropriate day-lighting is also a powerful tool for coding, navigation and way finding; and can also promote a sense of well-being and independence. Putting it in a different way, the visual environment, including the quality of daylight and electric light, is a vital element influencing hospital staff morale and productivity (Dalke et al., 2006).Example of daylighting impact for proper navigation and way finding can be seen in Figure 6.

Figure 6.Day-lighting for way-finding in the inpatient ward of Near East University Hospital

Dalke, et al., (2006), revealed that an enhanced visual environment has produced improved faster recovery rates by as much as 10%. In fact, these improvements have been attributed to particular elements of the visual environment, which includes the use of appropriate colours in interior design, display of certain

types of artwork and the provision of sunlight and attractive views out. Dalke et al., (2004) pointed out that the view out reduces feelings of isolation and claustrophobia. Moreover, it provides contact with the outside world and can add interest to the environment, particularly if things are happening outdoors. More importantly, visitors can find their way around the hospital if there is a proper view out (Dalke, Littlefair and Loe, 2004; Dalke, et al., 2006). The impact of view out to reduce the feeling of isolation is portrayed in Figure 7.

Figure 7: View out reduces feelings of isolation in Near East University Hospital

4. MethodologicalApproach and Material

4.1. Aims and objectives

This study aimsat investigating artwork and day-lighting impacts on patients' well-being and staff task satisfaction in a hospital premises.

The study focuses on the hospital interior spaces and its positive impact on users healing, considering relevant points with respect to art therapy and daylighting: It elucidates the status and design trends towards the creation of a proper healing environment for hospital occupants' satisfaction. Emphasises the role of art work and natural daylight in hospitals as a major factor for the improvement of hospital environment and better healing processes for users.

4.2. Hypothesis

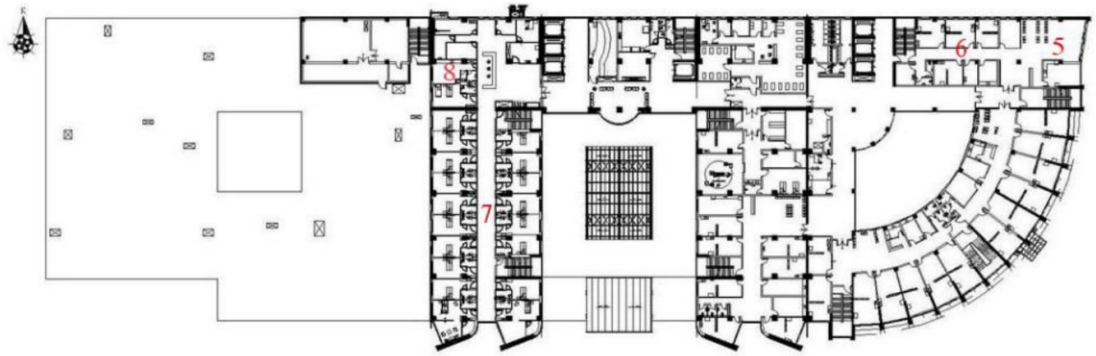
This study is conducted to understand if artwork and daylighting can facilitate healing condition on patients' wellbeing and hospital care providers' task satisfaction in a hospital premise.

4.3. Hospital building description

An empirical study was conducted upon a recently built Hospital in Near East University, North Cyprus. The nine storey appearance hospital building, located on one of the highest points in Northern Nicosia and has a 55,000 square-meter closed area, and accommodates 209 single patient rooms including 22 VIP rooms, 8 operating theatres equipped with the most modern equipment for surgery, anaesthesia and monitoring during surgery. It also houses 30 Intensive Care Units, 17 Neonatal Intensive Care Units, a laboratory where a wide array of tests is carried out, Radiology, Nuclear Medicine and Radiotherapy centre equipped with the latest and highest technologies to ensure the most accurate and fastest medical scanning, diagnosis and treatment for cancer cases.

Plan (A) and Plan (B)schematically provides the Near East University Hospital spatial plan organisation/zoning, where: 1 (entrance hall), 2 (information desk), 3 (atrium), 4 (cafeteria), 4 & 5 (paediatrics and Maternity inpatient services), 7 & 8 (delivery room and gynaecology policlinic, and (c) indicates the main entrance approach view of the hospital, as demonstrated in Figure 8.

(a)



(b)

Source: (a) and (b), Design and Physical Development Office Achieves, Near East University

(c)

Figure 8: Portrays (a) 1st Floor Plan, (b) 3rd Floor Plan, and (c) Pictorial View of the Near East University Hospital

4.4. Data Collection Procedures

In order to subjectively measure a variety of responses and evaluate a number of issues in Near East University Hospital (NEUH), several techniques were used to collect the relevant information, as shown in Figure 9. The intent of the survey was to assess the general level of users' performance/satisfaction in a hospital with arts and day-lighting.

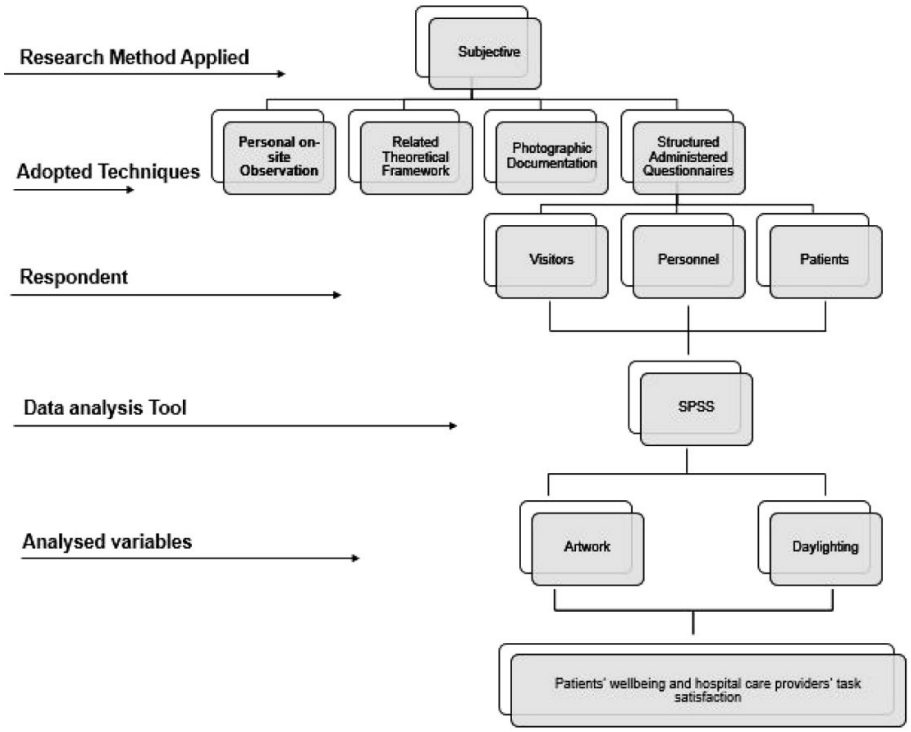


Figure 9.Treelike outline of the research methodological approach

The data collection tools for this survey includes personal on-site observations, which include tape recording, photographic documentations, structured questionnaire distributed to the users of the hospital, which includes hospital personals, patients and visitors, and related literature review.

4.1.1. Personal on-site observations

The site was first visited to get familiarized with the entire hospital environment. Subsequently, a personal observation of the hospital premises was completed during successive visits, and was aided with photographic (visual) documentations.

4.1.2. Questionnaires and interviews with the hospital occupants

Interviews were conducted with the users of the hospital, considering different age groups and sex. For an effective result, the conducted interview survey took 7 hours each day for seven consecutive days, and centred mainly on experience nurses and doctors to uncover the detailed explanation of their tasks and visual comfort within 24-hours in the hospital environment. At the end, 50 questionnaires were administered and statistically analysed. These include the type of task and satisfaction within an environment with art and day-lighting.

In addition, patients and their families were also included in the oral interview to obtain their perception about the artworks/artistic piece and day-lightings in the hospital surroundings. However, penitents' family viewpoints are not within the scope of this paper. The interview questions were used to formulate part of the questionnaire which was later distributed and was collected after 14 days to elucidate the user's task satisfaction and visual comfort within the hospital environment.

4.1.3. Data analysis

Data were entered and statistically analysed using the English version 20 "Statistical Package for the Social Sciences" (IBM SPSS) software. Data screening and missing value analysis were first conducted to confirm

the data quality. There were no variables with less than 5% or more missing values. The analyses conducted are of three fold, a descriptive analysis of survey responses, which consisted of analysing subject demographics, frequencies and percentages of responses. Next, analysis of variance was used to assess differences in perception across demographic and work related variables such as gender, age, working hours, length of service in the hospital, and department or units. Finally, the measurement of the patients' well-being and hospital care providers' task satisfaction in relation to the artwork and daylighting perception results were established. Also guided by the ideas gained from the experienced doctors and nurses, relevant questions were structured after the conducted oral interview.

5. Results Analysis and Discussion

5.1. Respondents' characteristics

The target sample for this pilot-study was conducted among health care providers (doctors, nurses, and administrative or managerial personnel) and patients in a university hospital in north Cyprus, Near East University Hospital. Only qualified hospital personnel were used for the questionnaire answers. Patients in the intensive care units, hospital wards, psychiatric units and paediatric units were included in the survey.

From the conducted survey, out of 50 respondents, (n=28) 56% were female and (n=22) 44% were male. Virtually half of the respondents (n=21) 42% were aged between 25 and 34 years while on the other hand, the percentages of respondent end of the population were (n=5) 10% and (n=2)4% for age groups 15-24 and 65-74 respectively (Table 1.1).

The respondents to the questionnaires comprises of three major categories, nurses (n=9) 18%, doctors (n=10) 20%, patients (n=18) 36% and others, which includes family members and visitors (n=13)26%. During the survey, (n=10) 20% and (16) 32% of the respondents has been working in the hospital field for the period of 4-7 and 10-15 years respectively. Only (n=1) 2% of the hospital personnel have been working for the period of 18-21 and 21-24 years.

The survey also deduced that most of the respondents (n=17) 34% work between 6 and 9 hours per day. Also, only (n=6) 12% and (n=7) 14% work between 3-6 and 12-15 severally. The department of general surgery (n=8) 16% responded more to the disturbed questionnaire, followed by cardiac and chest surgery (n=6) 12% and accident and emergency (n=6) 12%.Next was the Operating theatre (n=4) 8%. In line with that, respondents in Pharmacological (n=1) 2%, Gastrointestinal (n=1) 2%, oncology (n=2) 4%, and haematology (n=2) 4%, were so reluctant in answering the questionnaires distributed to them in their respective departments. Others are from the remaining 27 departments within the hospital. A descriptive analysis of the demographic of patients and work related characteristics of hospital personnel is given in Table 1.1.

Table 1.1: Demographic information of the respondents

	Scale/category	*N*	*%*
Age Group (yrs.)	15-24	5	10
	25-34	21	42
	35-44	10	20
	45-54	6	12
	55-64	6	12
	65-74	2	4
Gender	Male	22	44
	Female	28	56
Working hour (hr)	3-6	6	12
	6-9	17	34
	9-12	12	24
	12-15	7	14
Length of service/ experience	1-4	6	12
	4-7	10	20
	7-10	7	14
	10-15	16	32
	15-18	7	14
Department/ Unit	Accident and Emergency	6	12
	Pharmacological	1	2
	Gastrointestinal	1	2
	Urology/Infectious diseases	3	6
	Orthopaedics	3	6
	Cardiac and Chest surgery	6	12
	Administrative Unit	3	6
	Medicine Critical Care (ICU)	3	6
	General Surgery	8	16
	Clinical Neurology	3	6
	Oncology	2	4
	Haematology	2	4
	Operating Theatres	4	8
	Paediatrics/ Neonatal	3	6
	Others	2	4

5.2. Hospital Occupants Artwork Perception and Impacts

The survey, conducted with (n=18) 36% patients in the hospital environment conveyed that the majority of the patients strongly have the impression that the artwork affects them positively, and that the artwork is very substantive to them. However, some of the patients admitted that using effective artwork has influence on them, psychologically and physiologically. The respondents' satisfaction or physical wellbeing rating within the hospital artistic environment is depicted in Figure 10. The majority of the patients accepted that they feel more dependable, comfortable and relaxed when receiving treatment in their respective rooms, covered with colourful wallpapers. Studies with sophisticated psychological analysis have shown that:

> *Images are proverbial, deeply linked to our emotions and unconscious mind. In line with this emotional cogitating, whenever we say that a painting, a photograph, a piece of music or the smell of a flower moves us in a way we cannot express, we are admitting the power of images* (Simonton, Simonton, and Creighton, 1981).

Research on healthcare design and planning has fore grounded substantial relationships between physical environmental factors (including colour) and wellness (Monti, Agostini, Dellabartola, Neri, Bozicevic, and Pocecco, 2012). Research has shown that colour evokes emotional and physiological responses that produce feelings of serenity or agitations that can aggravate or alleviate stress. Colour can also affect individuals' emotional state, as well as cheerfulness, and calmness (Marberry and Zagon, 1995; Pile, 1997; Jue and Kwon, 2013).

In correlation with these research evidences, it wasnoticed that different colour use in the hospital artistic environment excited curiosity on the majority of the participants, and thus have a positive effect on patients healing process/recovery, in relation to reducing pain and stress. A large number of the respondents (n=14) 28%was stimulated and actuated by the yellow colours all around them in the hospital, having the feeling that it enhances their confidence and alleviate pain and stress during their hospital stay. Figure 10, diagrammatically illustrates the respondents' perception and motivation to colour in the hospital premise.

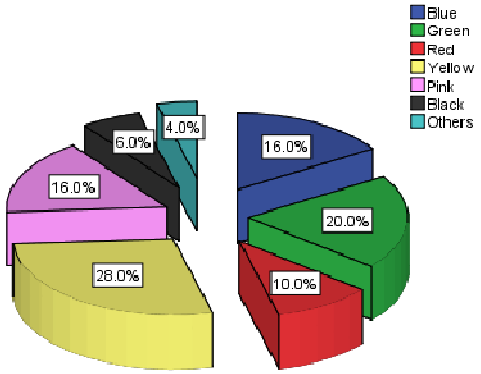


Figure 10.Colourperception and motivation

There were evidences that the participants (patients and staff) admitted the fact that they were comfortable in the artistic environment. This satisfaction ranges between (n=20) 40%*"Somewhat Satisfied"* and (n=16) 32% *"Very Satisfied"*, which suggested that they relatively ascertain comfort within the hospital artistic environment. While on the contrary,(n=4) 8% revealed that it was *"Very dissatisfying"* for them, when asked how comfortable they were within the artistic environment. Figure 12 shed light on the artistic comfort within the hospital environment.

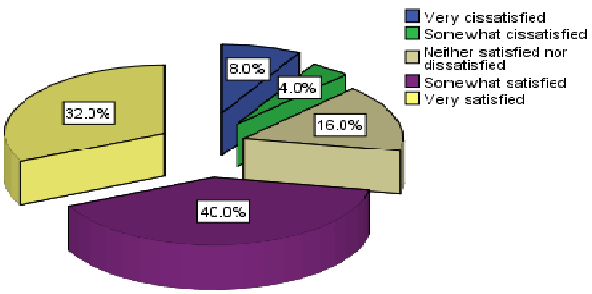


Figure 12.Responses for comfort within the hospital artistic environment

A trivial number of patients indicated that the hospital environment was like a relaxing hotel or home rather than a therapeutic environment. In line with that ideology, the occupants were asked to describe the artistic work in the hospital setting. A uniform score ranking was obtained for *"Interesting", "Inspiring", "Unattractive" "Others", and "More than one option", (n=1) 2%,* and similarly for, *"Extraordinary", "Entertaining", "Amusing""Comfortable", and "Ordinary"* which have *(n=2) 4%*independents. The order of description of the remaining artistic attributes is as follows: *"Resorted" (n=7), "Fascinating" (n= 6) 14%, "Captivating" and "Real world"* which are *(n= 5) 10%* respectively and *"Relaxing" (n= 3) 6%*. All of the attribute described were ranked lower than *"Attractive" (n=8) 16%*, with the highest description rate. This attribute is depicted in Figure 13 below.

> *One of the patient suffering from depression and cardiac illness, declared that she feels more resorted in the space whenever she wakes up from sleep; it's a real world, so captivating. She further admitted that the colour, texture, and artwork mingled in the hospital space, enhanced her conditions after two days of my hospitalization.*

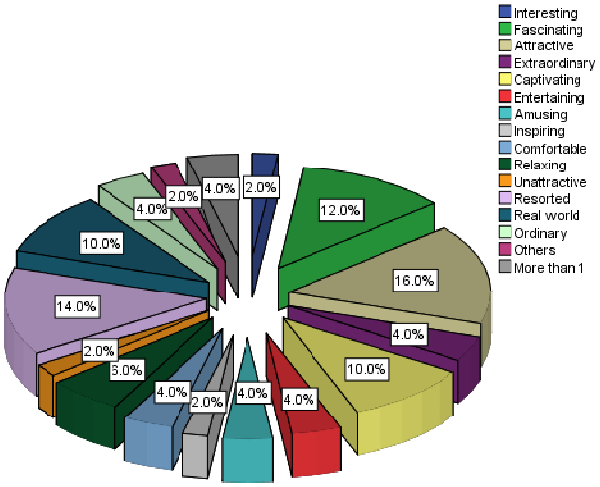


Figure 13.Artwork description within the hospital premises

In view of explaining the therapeutic effects of the artistic work on children in the hospital paediatric unit, a significant question based on "Yes" or "No" was administered to participants (including parents, nurses, and doctors) in the paediatric unit. However, the differences in perception and responses between respondents identified that ill children in the paediatric unit were satisfied within the distracted blended colourful artwork in the hospital environment.

A study conducted to evaluate the effects of pictorial intervention in a paediatric hospital environment, demonstrated that children respond differently to stressful events depending on their level of cognitive, social, and personality maturity (Monti et al., 2012). There is significant evidence that scenes of naturalistic artwork could provide a positive distraction, producing positive feelings, promoting sustained attention and interest, and reducing worrisome thoughts and postoperative anxiety (Ulrich, Zimring, Quan, Joseph, and Choudhary, 2004).

> *The distraction theory approach was highlighted in a review of evidence-based health care, which proposes that viewing naturalistic scenery may have a positive influence on the experience of pain, distracting patients through a pleasant stimulus that can divert attention, enhancing pain reduction (Ulrich, Zimring, Zhu, DuBose, SEO, Choi, et al., 2008). On the other hand, evolutionary theory suggests that nature art will best promote restoration across diverse groups of people if it contains calm or slowly moving water, verdant foliage, flowers,*

foreground spatial openness, park-like or savannah-like properties, and birds or other nonthreatening wildlife (Ulrich, 1999).

In this context,(n=21) 42% of the respondent gave an irrefutable response to the question, if the artistic work available in the hospital serves as a substantial treatment facilitator or effective therapy tool. A schematic interaction of this variable is given in Figure 14 below. From one point of view, the respondents divulged that despite severe reported illnesses, children were distracted with the artistic environment, and in the same manner facilitate their healing process.

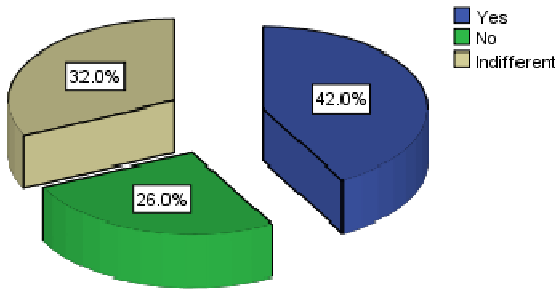


Figure 14.Responses on artistic work as a healing process facilitator

A number of the respondents admitted that it is more natural and realistic to work in a hospital environment with artwork rather than working in a hospital with just plain surfaces. Most of the hospital care-providers that participated in the survey reported that they had never abstained from duty due to the pleasant hospital environment they work in, especially the paediatric unit which is decorated and blended with different eye-catching colourful artworks. They suggested a strong feeling in relation to the hospital colourful physical environment. A number of them (n=16) 32% enunciated that the hospital artistic environment is like their individual home, day in and day out. Only (n=4) 8% of the workers disclosed that the environment is not conducive for them, that the colourful visual atmosphere makes them sleepy and sick. To support this literary argument, a study has documented that the use of individual environmental control systems can increase productivity, and therefore also reduces absenteeism (Rostron, 1997).

5.3. Hospital Occupants Day-lighting Perception and Impacts

Research evidence has explored the effect of space occupancy on indoor daylight quality in hospitals and explicitly stated that the overall, daylighting in a hospital environment has a positive influence on both patients' physiological and psychological health (Alzoubi, Al-Rqaibat, and Bataineh, 2010).To evidently support these facts in relation to the role of daylight within the hospital envelop, (n=9) 18% nurses and (n=10) 20% doctors were asked *if the daylighting has any correlation with their working task and comfort.* In general, most of the staff that responded to the questionnaire unfolded that workers' productivity can increase with the quality of day-lighting. The survey conveyed that daylighting in the hospital environment increases their attention and alertness to work effectively, and more also increases task visibility in their various workstations. There is also a significant difference in the perception over the adequacy of sunlight in patients' rooms, (n=4) 8% agreed that the sunlight was not sufficient in their rooms, while on the other hand,(n=19) 38% acknowledged that the sunlight was on average level. Some (n=13) 26% rated it as *Somewhat Satisfied.* The percentages between these results show that most of the patients have a doubtful interest about the adequacy of sunlight in their respective rooms. A descriptive analysis of the questionnaire responses is given in Table 1.2 below.

Table 1.2: Descriptive analysis of seven questionnaire items

Item	*Response* (%)*					*Mean*	*SD*
	1	2	3	4	5		
Level of Daylighting in the Hospital Space	4.0	10.0	36.0	34.0	16.0	3.48	1.014
Electric Lighting System in the Hospital Space	6.0	16.0	40.0	22.0	16.0	3.26	1.103
Surface Reflectance of General Lighting Quality	8.0	6.0	52.0	22.0	12.0	3.24	1.021
Staff Workstation and Task Visibility	2.0	10.0	34.0	40.0	14.0	3.54	.9304
Adequacy of Lighting in Patient's Room	8.0	10.0	38.0	28.0	16.0	3.34	1.117
Adequacy of Sunlight in the Corridor	4.0	16.0	50.0	24.0	6.0	3.12	.8953
Adequacy of Sunlight in Patient's Room	8.0	24.0	38.0	26.0	4.0	2.94	.9981

*1: Very dissatisfied; 2: Somewhat dissatisfied; 3: Neither satisfied nor dissatisfied; 4: Somewhat satisfied; 5: Very satisfied

Sunlight has both physiological and psychological effects on human beings. In other words, the well-being of the people using a particular design space can be enhanced by introducing appropriate sunlight to the space and, where this is not feasible, may be for reasons of physical layout or seasonal shortage, the need for artificial lighting is paramount in this case.

Most of the hospital care–providers (n= 28) 56% that responded to the daylighting influence on task satisfaction indicated an affirmative response. Figure 15a supports this affirmation. More or less of the respondents acknowledged that it makes their work easier, for example, when dressing the bed of a patient. Figure 15b, portrays the respondents incontrovertible responds to day-lighting influences on job performance, which ranges from “Productive” (n=13) 26%to “More productive” (n= 20) 40%, despite these effective responses, more is needed to be done to improve the day-lighting level in the hospital premises.

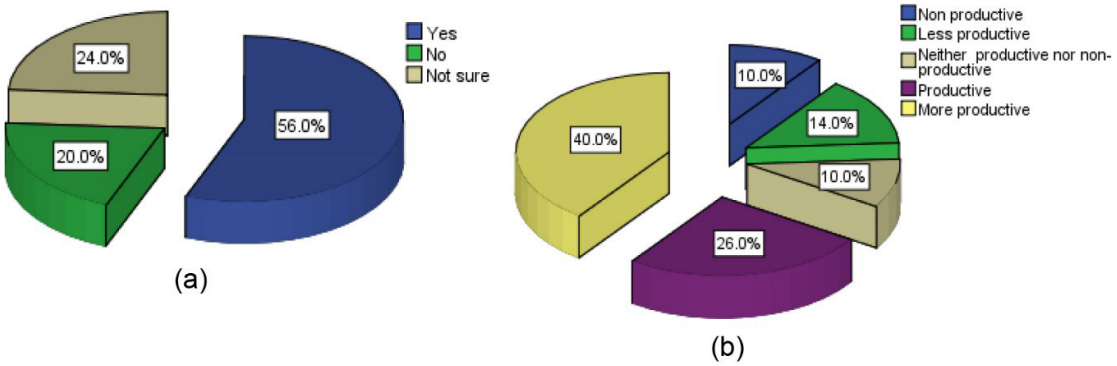


Figure 15. (a) and (b) respondent responses on day-lighting impact on task performance

To buttress the above propositions, a conducted considerable research has shown that daylight in hospitals can maximize occupant comfort, as well as provides more pleasant and attractive indoor

environment with higher performance and productivity (Ihm, Nemri, and Krarti, 2009).Other several general conducted studies have proven day-lighting to be a major contributor to the physical performance and visual comfort of human beings in buildings. Research evidence has pointed out the beneficial aspects of day-lighting on human health, productivity, in addition to economic significance. Day-lighting is a crucial physiological, psychological and environmental factor to be considered for human performance because it affects human beings psychologically and physiologically. Good day-lighting has a positive influence on health, wellbeing, alertness, and even sleep quality (Chaiwiwatworakul and Chirarattananon, 2004; Leslie, 2003; Van and Wout, 2006; Steffy, 2002; Croome, 2003)

An acceptable distribution of patients' wellbeing scores on the physiological and psychological impact of day-lighting varied from "Somewhat Satisfied" (n=21) 42% and "Very dissatisfied" (n=10) 20%. It was ascertained that (n=7) 14% ranked the daylighting impact on their wellbeing as "Very satisfied". However, the significant proportional differences between these five categories of responses indicated that greater daylighting were viewed to have greater importance for the patients' physiological and psychological wellbeing. There seems to be a well-founded difference of opinion in the perception of lighting preferences. The result substantiates that majority of the participants (n=25) 50%in the hospital room with adequate daylighting have the preference of natural lighting provided in their rooms than those participants (n=7) 14% with the preference of electrical lighting in their hospital rooms without sufficient daylighting. According to the findings of perceived daylighting preferences,(n=18) 36% patients acknowledged both dual lighting system utilisation (will increase visual comfort and facilitate the healing process in the hospital rooms). The diagrammatical expression is depicted as below in Figure 17.

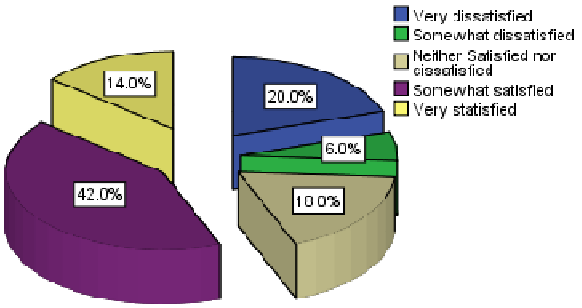


Figure 16.Patients'day-lighting impact rating on physiological and psychological wellbeing

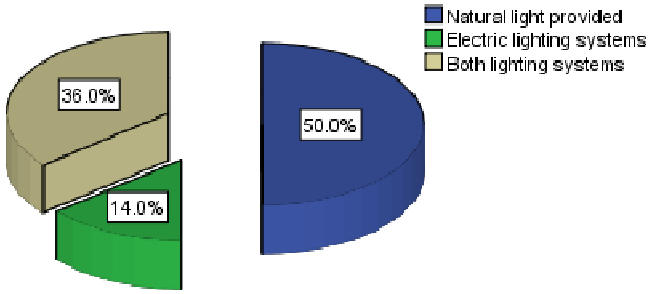


Figure 17.Participants Perception of Lighting Preferences

In line with the aforementioned, research has evidently suggested that sufficient lighting in the hospital premises is of great importance to both the recovery and rehabilitation of patients, as well as the health and wellbeing of hospital care-providers (Ulrich, 2001). A study documented by Joseph, (2006) on "*The Impact of Light on Outcomes in Healthcare Settings"*, cited the work of (Heerwagen and Heerwagen, 1986), which advocates that people prefer daylight to artificial sources of light for task and have the preference to be

towards the hospital room windows. More also, this study ascertained that office occupants opted daylight over electric lighting for several distinct motives, which includes psychological comfort, office appearance and pleasantness, general health, visual health, colour appearance of people and furnishings, work performance, and jobs requiring fine observation (Joseph, 2006).

Conclusion

According to Winston, (1941) *we shape our buildings and afterwards our buildings shape us.*

In climax, the study evidently revealed that art work and natural daylighting have the potentials to facilitate better healing condition on patients and staff task satisfaction. The review of literature revealed that art work conveys a sense of quality health care and daily life of the hospital, thus promoting the general well-being of staff, patients and visitors. Art works provide a caring, sympathetic and relaxing atmosphere for patients and their relatives. It also increases patients' physical and psychological well-being. It re-creates in the mind of all who visits the hospital, a positive and lasting impression of a quality service. It also helps in the orientation and communication in hospital spaces by utilizing the concept of the arts in the directional signing system. Art also builds on existing close community links with the hospital by increasing public interest and support for the Arts Project (Macnaughton, 2007).

Evidence has shown that natural daylighting can improve nursing performance, leading to a decrease in errors. Lewy et al., (1998) examined morning and evening light treatments on patients who were experiencing winter depression and established that morning light was at least twice as effective as the evening light in the treatment of seasonal affective disorder. In a nutshell, the study reveals that artwork and adequate daylight can facilitate better healing condition on patients' wellbeing and hospital care-providers' task satisfaction. In addition to the contributing, growing knowledge about occupants' perception of the hospital physical environment in the hospital premises, patients single room was used throughout the wards to increase privacy, patient satisfaction, safety and reduce infection rates. Provision of rooms for families and visitors interaction, which include rooms for relationship and psycho-social wellbeing (social spaces) were not an exception in the hospital design to promote the healing process for patients in the hospital environment. Appropriate, durablede sign-finishing were used for each functional space, for example, in the wards to avoid contamination and acoustic privacy.

Despite the affirmative response from the respondents', however, the hospitals artistic work and daylight needed to be improved to afford patients the best possible opportunity to heal and this can be achieved by incorporating stress-reducing elements into the hospital physical design. Such elements can reduce hospital environmental noise, decreases signs and symptoms of stress, anxiety and pain, isolation, offer proper privacy, enhances mood, add full-spectrum lighting, and blended relaxing colours.

Respondents' recommendations for improving the hospital environment for creating a better healing environment for patients, family members, visitors and hospital care-providers are as below:

> *Implement a therapeutic music in the hospital background to evoke the minds of the hospital occupants. A garden should be introduced in the hospital environment for ill patients, especially for the old and children. The hospital should provide periods of low light for sleep to forefend sleep hindrance. Position the patient to appreciate view of nature and natural light. Incorporate natural stimulating nature and artwork to support the existing ones in the hospital premises. Integrate more appealing healing colours in the hospital premises, especially in the patient rooms and large corridors to avoid isolation. Introducing smart curtains with natural view, will add an appealing and memorable figure to patients' rooms alongside with attractive views of nature. Art therapy or intervention provides a level of distraction that promote comfort level, thereby decreases pain, and other ambient*

environmental stressors in healthcare facilities. Therefore, Nurses and doctors should include art therapy in the routine care of patients with pain and psychological infirmities.

The study inference is contributing to the evidence base factors related to the physical environment in the hospital and serves as a guide for further comprehensive research on hospital healing premises. This papersheds light on how designers should ensure that the future potentials are exploited in designing hospital spaces that will facilitate healing for its users. However, results indicate the need for more instrumental measurement *(Specialised Computer Software Simulation)*on day-lighting and artificial lighting levels, plus the visibility provided by the electrical lighting system at the Near East University Hospital.

Acknowledgement

I am indebted to the Near East University staff that have answered queries and give access to the hospital premises and archives. I would also like to thank Asst. Prof. Dr. Münevver Özersay for her kind assistance, creating the opportunity for the Near East University (NEU) hospital management to allow usage of the hospital premises. I owe a special debt to Assoc. Prof. Dr. Notice Yıldız, who back translated the questionnaire and provided continual encouragement as well as necessary constructive criticism in the preparation of this script.

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