İNÖNÜ ÜNİVERSİTESİ SANAT VE TASARIM DERGİSİ
İnönü University Journal of Art and Design
ISSN: 1309-9876 E-ISSN: 1309-9884
Cilt/*Vol.* 6 Sayı/*No.*13 (2016): 355-369

RESTORATIVE GARDEN AS AN USEFUL WAY TO RELIEVE STRESS IN MEGACITIES, A CASE STUDY IN ISTANBUL

Sima Pouya[1]*, Elif Bayramoğlu[1], Öner Demirel[1]

[1]: Karadeniz Teknik Üniversitesi, Orman Fakültesi, Peyzaj Mimarlığı Bölümü, Trabzon.
***:** Sorumlu Yazar.
DOI: *http://dx.doi.org/10.16950/iüstd.55348.*

ABSTRACT

The stress and disorders of the urban life and the pollutions in the large cities such as Istanbul, have made the social and individual health decrease, and therefore it is necessary that some tact be considered in order to diminish these negative effects. The aim of this study is to examine whether there is a relation between restorative gardens in the city and stress. In other words, can restorative gardens surrounding residential homes in cities help to create a less stressful everyday environment? This paper will begin with a cursory overview of a broad concept of stress, health and wellness and proceed to examine in detail Ulrich's Theory of Restorative Garden Design and its implications for gardens in cities. Research shows that benefits would accrue to society as a whole if these design features were implemented on a wide scale.

Keywords: Stress, Restorative garden, Health factor, Ulrich's Theory.

BÜYÜK KENTLERDE STRESTEN KURTARMANIN EN KOLAY YOLU OLARAK RESTORATİF BAHÇELER: İSTANBUL ÖRNEĞİ

ÖZET

Kentsel yaşamdan kaynaklanan stres ve hava kirliliği özellikle İstanbul gibi büyük şehirlerde toplumsal ve bireysel olarak insan sağlığını olumsuz yönde etkilemektedir. Bu sebeple son zamanlarda bu olumsuz etkileri azaltmak amacıyla bazı uygulamalar gündeme gelmiştir. Bu çalışmanın amacı, kentsel alanlarda restoratif bahçeler ve stres arasında bir ilişki olup olmadığını araştırmaktır. Diğer bir değişle konut evlerini çevreleyen restorafif bahçeler şehirlerde daha az stresli olan günlük bir ortam yaratmak için yardımcı ve etkin olabilirmi? Çalışmada stres, sağlık ve iyileşme kavramları geniş bir alanda incelenip, restoratif bahçelerin tasarımı ile ilgili araştırılmıştır. Ulrich'in teorisinin detayını ve onun kent bahçeleri üzerine etkileri incelenmiştir. Araştırmanın sonucu olarak tasarım özelliklerinin detaylı olarak uygulanması halinde kent kullanıcılarına bir bütün olarak yararlı olacağı belirtilmiştir.

Anahtar kelimeler: *Stres, Restoratif bahçe, Sağlık faktörü, Ulrich Teorisi.*

RESTORATIVE GARDEN AS AN USEFUL WAY TO RELIEVE STRESS IN MEGACITIES, A CASE STUDY IN ISTANBUL

1. INTRODUCTION

A state of wellness is achieved when the many dimensions of a person's life are in balance - when a person is whole. Many models exist which portray dimensions of wellness – a detailed discussion of models of wellness is beyond the scope of this paper. This particular model portrays a balance between six dimensions of life and health -physical, social, environmental, emotional, spiritual, and intellectual (Erickson, 2012).

The health of the individual affects the health of the society directly. The physical environment created by urban design element decisions directly affects the psychological, physical and social health of the individual and, in turn, society as a whole. Urban places (such as streets, parks, green space, squares, open space, etc.) should be located so the user may easily find them and use them. Once there, the user should be able to move freely and feel comfortable, interacting with social groups, with the environment providing security and comfort. The quality of environment directly affects the health of the individual. Although the health of an individual is determined to a large extent by eating and drinking habits, economic status, genetic history, factors such as urban planning and design are also important. Urban planning elements play an important role in an individual's life habits like walking, physical movement and driving. In printed form for filling in statistics (Anonymous, 1997), the matters about urban planning and design, which affect urban health (in terms of physical, psychological and social areas), are explained in details (Uslu et al., 2009) (Şekil 1/Figure 1).

1.1. Istanbul

Istanbul has lived through two major growth spurts during 20th century that have determined its urban shape (Inceoglu and Yüreklı, 2011). Istanbul is Turkey's leading centre of population, commerce, education and culture. It is a dynamic multi functional city with port, CBD, industrial, retail and administrative areas as well as a variety of residential suburbs (old, new, poor, and rich). This residential differentiation is related to the different socio-economic status of inhabitants and is expressed in the size and style of dwellings and grounds in which they are set. Differentiation results in the development of wealthy and poor suburbs. With high population growth and density most people live in high rise apartments with no surrounding grounds. High rates of urbanisation have led to major problems of urban blight, inadequate housing, traffic congestion and inadequate infrastructure, with narrow roads and broken footpaths. Evidence of haphazard urban planning and redevelopment appears piecemeal because of the pattern of ownership of land (Bliss, 2004; Tuğal, 2008; Municipality of Istanbul, 2013).

Figure 1. Nature as a healer in the city.

In the Istanbol, many people spend long hours at work. Regardless of economic issues, psychological disorders considered as one of the most important occupational risks.1 Stress is one aspect of psychological disorders that is defined as response to physical and psychological, the lack of coordination exists between business needs and abilities, capabilities and desires of the individual (Cervero, 2002). Some conditions including overwork and demanding, insufficient time for rest, long shifts can lead to stress and defensive reactions such as increased heart rate, muscle tension and deep breathing (Anonymous, 1997). If this

situation persists, other organs may also be affected. In the recent 20 years, many studies have shown an association between, mood disorders, stomach upset, cardiovascular diseases, skeletal disorders with occupational stress (Dumbaugh, 2005; Coley, 1997; Mutlu, 2003).

If the printed form for filling statistics is examined carefully, health problems, which appear in physical, psychological and social areas, have more than one cause. For instance, while dense populations and traffic patterns affect urban health physiologically, they also aggravate problems such as loneliness, individualism, etc. Elements which affect urban health have a mixed structure and they are related to the physical conditions and socio-cultural reasons at the same time. While the urban setting brings many attractive elements, it also brings many problems. People living in urban areas are faced with an array of problems that stress is more imortant case of them. All of the world's urban settings, either developed or developing, are faced with these problems in the same manner. On the other hand, the solutions of these problems, which are created by the urban life conditions, also lie in the urban setting. These conditions can be improved with rational planning and administration (Uslu, 2009).

The fact that the urbanization tendency is so strong means that urban populations will continue to grow, and in turn, many more people will be affected by the problems mentioned above. The spread of the urban spaces like an invasion into the rural areas causes environmental problems and this condition threatens the world's future. With the increase in the urbanization ratio, balance between environmental quality and human health is changing continually. Because of that, finding more healthy places in urban areas can be difficult and is the common trouble for the entire world's urban regions nowadays (Anonymous, 1997).

The aim of this study is to examine whether there is a relation between restorative gardens in the city and stress. In other words, can restorative gardens surrounding residential homes in cities help to create a less stressful everyday environmen? Current knowledge relative to restorative garden design has progressed. This paper will begin with a cursory overview of a broad concept of stress health and wellness and proceed to examine in detail Ulrich's Theory of Restorative Garden Design and its implications for gardens in healthcare facilities.

2. BACKGROUND

2.1. What is stress?

What is the primary driving force underlying human beings' social behavior; what makes them work, play or take an interest at all in the surrounding world? Psychologists have long debated these questions. Today, many maintain that curiosity, the joy of discovery, the will to solve problems and learn constitute one driving force, which has also been called "competence pleasure" (Havnesköld & Risholm Mothander 1995). In order for this force to function, however, human beings must be rewarded in the form of having opportunities to cope or to regularly satisfy their curiosity. They must also have a chance to take a good rest, to recover. If there is a balance between interest, activity, reward and rest, the competence pleasure of the body is cared for, and depression caused by exhaustion is avoided (Maslach 2001). Today, stress is regarded as one of the most important factors related to ill-health in modern society. But stress reactions are basically the same reactions that helped our ancestors survive by heightening their readiness for fight or flight. For our ancestors, muscular strength, quickness, suppleness and the body's own mechanisms of adaptation played a crucial part. Normal stress reactions include increased muscle tension, increased blood pressure, reduced gastrointestinal function, increased sweat-gland production, increased pulse, increased adrenalin production (our "fighting hormone"), increased cortisol production (our "wakefulness

hormone"), reduced melatonin production (our "sleep hormone"), and so forth. Originally, all these reactions were functional in that they made us alert to situations requiring fighting or fleeing (Maslach, 2001).

Yet contemporary everyday life is charac-terized by another type of stress – an imbalance between what we are able to accomplish and what is demanded of or expected from us, which can lead to a feeling of being unable to control our life. As a consequence, we experience the same fight or flight stress reactions as our ancestors did when facing physical danger. The results are sleep problems, loss of appetite, constipation, stiff muscles, and so forth (Grahn and Stigsdotter, 2003).

Stress reactions helped our ancestors flee or fight when threats or dangers were at hand. Examples of stress reactions are increased muscle tension, increased blood pressure, reduced gastrointestinal function, increased sweat-gland production, increased heart rate, increased adrenalin and cortisol and reduced melatonin production (Maslach, 2001). These reactions can also assist us today, eg during a working period they can keep us sharp and awake. In other words, stress can be positive during a limited time period. But if we do not have opportunities for proper rest and recuperation, the body is put under strain that can worsen or even trigger serious illnesses (Atkinson et al., 1996).

Stress-related illnesses have been designated as a new type of national illness. The illnesses most often afflicting long-term sick-listed individuals are stress-related depression and pain, as well as backache, irritation, tiredness and ache in the back of the head (Social departementet, 2002; Grahn & Stigsdotter, 2003). Research shows that the three illnesses stress, irritation and fatigue are closely linked together (Grahn & Stigsdotter, 2003; Klingberg Larsson, 2001; Dinan, 1996; Kaplan, 1990). When the term 'stress' is used in this article we refer to a factor called Sensitivity to Stress (SS), which consists of all three illnesses.

2.2. Nature and Health Relations

The World Health Organization defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (Organization, 1946). The relationship between the health of the urbanite and the physical condition of the city cannot be denied. The overall health of the citizen is affected positively with the possibility of physical activities and the inclusion of peaceful, quiet, relaxing places and socialization areas in the urban design. As a matter of fact, many researches about urban health and environmental conditions support that idea. There is a strong relationship between the health and well being of the citizen and the existence of nature in urban environments; and between the style of urban planning and health in different fields (such as medical, public health, city planning, etc.) (Pouya et al., 2015).

Stress reactions may be reduced with exercise, which rids the body of some of the fighting and wakefulness hormones. Exposure to daylight may reduce stress reactions by adjusting hormone levels, especially cortisol and melatonin (Küller & Lindsten, 1992; Küller & Wetterberg, 1996). Moreover, the design of the environment itself may signal danger or safety. Research shows that the body reacts involuntarily to natural elements, whereas artifacts such as houses, streets, etc. do not provoke the same quick and strong reactions (Ulrich, 1993). Finally, research findings indicate that nature helps people to concentrate better and to recover from "directed attention fatigue" (Kaplan, 1990), because nature contains a wealth of restful information that does not cause tiredness in humans (Kaplan et al., 1998). This means that the body, consciously and unconsciously, integrates a variety of information that supports either stress or recovery. It should, then, be possible to design an environment that

contributes to a positive condition of health and well-being. Such an environment should preferably be easy to access, induce recovery and provide the visitor with an opportunity for rest. Hence, we have focused on public urban open green spaces, within or just outside the city limits.

The relationship between mind and body has long been a controversial issue. According to ancient religious creeds, health is a matter of maintaining a good balance with the world around us; thus health constitutes a spiritual product of mind and body together and in harmony with nature (Romanucci- Ross et al., 1997). Ancient civilizations, from Greece to Rome and throughout the Middle Ages, believed in a unity of or a strong relationship between mind and body (Gatchel et al., 1989). Descartes, however, drew a sharp dividing line between mind and body as well as between logic and emotion. For several centuries, this paradigm was predominant in the scientific tradition and in medicine. Today, however, the correctness of this sharp distinction is being questioned (Antonovsky, 1996). Thus, there are research findings showing how emotionnal experiences can have a directly measurable impact on bodily functions. If we assume, then, that the human body is built for a life of movement, exposure to daylight, and that the driving force behind human activity is curiosity, and learning to cope with difficult tasks, what happens when people fail to look after their competence pleasure? Is it possible that we are seeing the answer manifestted in many Swedes as stress and stress-related illnesses? (Grahn and Stigsdotter, 2003).

Many works have studied the effects of the qualities of city design features on human health (Jiang, 2014) (Table 1). Nicholson stated that living in nature was in the human genetics (Nicholson, 2003). According to him, although human beings are living in the cities which are opposite to their nature, they can adjust to these conditions.

Restorative landscapes have long been an important aspect of human life. When people first began erecting dwellings, restorative places could be found within nature through sacred groves, special rocks and caves. In the Western world, monastic communties supported infirmaryyes that were based in the use of herbs and prayer and almost always included a cloistered garden. Modern advances in technology towards restorative has largely diminished the importance of nature in the restorative process and this has been one unfortunate result of the “cure over care” phenomena found within many aspects of the healthcare field. More recently, there has been a growing interest in the restorative effects of natüre.

Table 1. Findings from the literature review: categories of landscapes and reported health effects.

No	Authors	Categories of landscapes compared	Reported health effects
1	Ulrich (1979)	Nature (in roman) versus urban (in italics) Nature scenes; dominated by green vegetation including cultivated fields Urban cenes; commercial landscapes and industrial areas.	Improved well-being and reduced anxiety: increased positive affect factors and reduced fear arousal factor Increase in sadness, decline in attentiveness.
2	Moore (1982)	Rolling farmland and trees Prison courtyard	Stress reduction compared to prisoners viewing prison courtyard. Prisoners viewing prison courtyard had a 24% higher frequency of sick-call visits, compared to those viewing farmland.

3	Ulrich (1984)	Natural scene; trees	Shorter post-operative hospital stays, lower scores for minor post-surgical complications, received fewer negative comments in evaluative nurses' notes and took fewer strong analgesics than the patients looking at brick wall.
		Brick building wall	Longer post-operative hospital stays, higher scores for minor post-surgical complications, higher frequency of negative evaluative comments from nurses' notes, higher number of doses of strong analgesics than patients looking at natural scene.
4	Hartig et al. (2003)	Natural environment: tree views/natüre reserve (1600 ha of vegetation and wildlife)	Reduced stress and improved mood: reduced stress levels/lower blood pressure. Increase in positive affect and decrease in anger/aggression.
5	Kaplan et al. (1988, reported in Kaplan, 1993)	View including natural elements	Fewer ailments and higher job satisfaction with nature in view.
		No view or view without natural elements	Higher number of ailments and lower job satisfaction among workers with no view or view without nature than among workers with nature in view.
6	Parsons et al. (1998)	Natural scenes; forest (1) and golf (2)	Inter-beat interval: golf more complete recovery than urban (passive stressor). Blood pressure: forest and mixed more complete than urban (passive stressor). Golf quicker recovery than urban (passive stressor), urban quicker recovery than golf (active stressor).
		Urban scenes; mixed residential and light development (1) and urban (2)	Skin conductance level: urban greater than others. Urban slower recovery than mixed.
7	Ulrich et al. (1991)	Natural scene: vegetation and vegetation with water	Lower fear and anger, higher levels of positive affects and intake/attention, faster and more complete recovery, greater stress reduction heart period deceleration (nonsignificant differences between scenes with and without water).
		Urban scenes; with light or heavy traffic, few or many pedestrians (mall)	Slower and less complete recovery, lack in recovery in pulse transit time (PTT) for traffic environments, heart period acceleration. The traffic settings produced more recuperation than did the pedestrian mall exposures.
8	Ulrich (1981)	Nature scenes; dominated by vegetation including cultivated fields	Positive influence on psycho-physiological state; significantly higher alpha; positive influence on emotional state.
		Nature scenes with water	Positive influence on psycho-physiological state; significantly higher alpha; particularly positive influence on emotional state.
9	Stigsdotter (2004)	Workplace greenery; four levels from no view of and no access to garden to view of and access to garden at workplace	View or access to garden gave improved comfort, pleasure and well-being (''trivsel'' in Swedish) and lower stress levels. No view or no access gave lower values of comfort, pleasure and well-being (trivsel) and higher stress levels than employees with access to or view of garden.

2.3.1. Ulrich's Theory of Restorative Design

Dr. Roger Ulrich's theory of restorative garden design is based on theory and research in the behavioral sciences and health-related fields (Figure 2). His theory proposes that gardens in healthcare situations are important stress mitigating resources for patients and staff because they foster:

- Social support
- Sense of control
- Physical movement and exercise
- Access to nature and other positive distractions (Ulrich, 1999).

Research-based evidence exists to show that each of the four restorative components mentioned above can reduce stress and thereby improve other health outcomes. It must be noted that gardens at healthcare facilities serve a wider population group than the patients / residents. Families and visitors, as well as staff, are also important users of these outdoor spaces. An engaging garden can provide a venue for activity, topics of conversation, and memory cues for both visitors and patients.

These garden features can enhance the quality of the visit, which in turn enhances health outcomes for the patient and brings visitors back more frequently. Staff are another important user group for outdoor spaces at healthcare facilities. Staff often have stressful jobs and frequently have no place to go for a break. Garden spaces can provide a sorely needed escape from the pressures of the job.

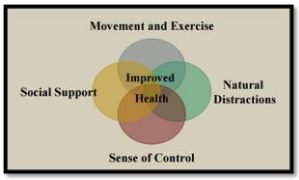

Figure 2. A Therapeutic garden is designed to produce a given effect and outcome for a defined user group or population.

2.3.1. Social Support

Social support is the first major component in the theory of restorative garden design model. Generally, social support refers to perceived emotional support or caring, and material or physical aid, that a person receives from others (Brannon & Feist, 1997). A large body of research has shown that people who receive higher levels of social support are usually less stressed and have better health status than persons who are more socially isolated (Cohen & Syme, 1985; Shumaker & Czajkowski, 1994) In fact, low social support maybe as great a risk factor in mortality as is cigarette smoking (Berkman & Syme, 1979) (Figure 3).

Figure 3. Social support is the first major component in the restorative garden.

Design considerations. Social support benefits of gardens will be increased by design that promotes social interaction among small groups. While there may be instances when design for larger social groups is desirable, providing spaces for small groups should always be part of the garden design. Garden settings that do not accommodate the need for privacy will likely be underutilized. Consideration should also be made for diversity in the way different ethnic groups and cultures enjoy using outdoor spaces. For example in some cultures it is customary for large family groups to gather as a way of offering social support to a sick family member. In these instances provision should be made for a large group to gather in the garden.

2.3.2. Sense of Control

Providing a sense of control is the second major component in the theory of restorative garden design model. Much research has shown that a sense of control is an important factor affecting a person's ability to cope with stressful

situations. Control refers to people's real or perceived ability to determine what they do, and to determine what others do to them (Gatchel et al., 1989). Generally, people who feel they have some control over situations cope better with stress and have better health status than people who feel they lack control. Lack of privacy is also considered a stressor, related to lack of control over regulation of personal exposure. Stress related to lack of control has been shown to have many negative effects, including depression, reduced cognitive performance, elevated blood pressure, higher levels of circulating stress hormones, and suppression of immune functioning (Schulz, 1976; Weiss et al., 1990; Pouya et al., 2014).

Much of the stressfulness of hospitalization has been linked to loss of control, for example, loss of privacy, inability to choose clothing, meals, and room temperature, unfamiliarity with buildings, and complex wayfinding. In response to these stressful aspects of facility design and operation, many hospitals and residential healthcare facilities have begun to offer more patient-centered care, allowing for more choices and autonomy for patients and visitors. Healthcare staff can also be positively affected by providing a sense of control in their workplace. Greater involvement in decision-making processes has been shown to improve job satisfaction and reduce turnover in a study of nursing home aides (Waxman et al., 1984).

Well-designed gardens offer an opportunity for patients, staff, and other garden users to increase feelings of control. This phenomenon has been well-studied in parks and other recreational facilities (Ulrich et al., 1991a). However, only a small amount of research has focused directly on gardens in healthcare facilities. Cooper Marcus and Barnes (1995) found that garden users reported restoration from stress when they had the opportunity to exercise control over their situation and "escape" to the garden (Figure 4).

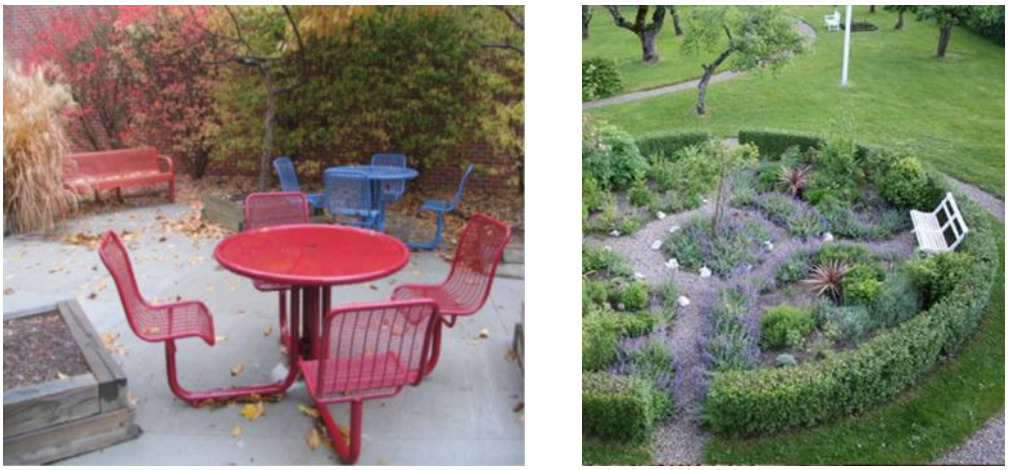

Figure 4. Choices in seating, both in type and location, provide a sense of control for all of residents.

Design considerations. One of the most important design considerations in a garden is accessibility. Accessibility is manifested in several ways —can users find the facility without difficulty? Is the door unlocked? Does the garden design allow users to interact with the garden, either actively or passively? (Cooper Marcus & Barnes, 1999). Garden designs that allow control by garden users will offer choices whenever possible. These choices may relate to seating, social grouping, and environment, to name a few. For example, seating may

be provided as individual chairs or benches, with or without armrests, fixed or moveable, and alone or in small or large groups. Garden paths and seating may be located in sunny and shady areas. Privacy should also be a consideration, for garden users as well as for patients who may have rooms with windows that look out onto the garden.

2.3.3. Physical Activity and Movement

Providing opportunity for physical activity and movement is the third major component in the theory of restorative garden design model. Regular physical activity goes beyond benefitting the physical dimension of wellness, and in addition contributes significantly to other dimensions. Many psychological or emotional benefits of exercise have been recorded in scientific literature. For example, exercise has been linked to alleviating depression and producing other positive psychological changes in physically impaired older adults, such as patients with chronic obstructive lung disease (Emery & Blumenthal, 1991). Similar positive outcomes have been observed in younger age categories (Ulrich, 1999). It is important to note that beneficial physical exercise does not need to be rigorous -- even mild exercise has been linked to positive health outcomes (McNeil et al., 1991).

Design considerations. Gardens can be effective vehicles for encouraging both exertion and rehabilitation, offering a much more pleasant setting than facility corridors or the physical therapy laboratory (Figure 5).

Other garden user groups should also be considered when designing opportunities for physical activity and movement in the garden. As mentioned previously, the garden is an important place for staff to escape from the rigors of their work. Another important user group is visitors — usually friends and family members of a patient. Nature can engage a patient's interest (thereby distracting from pain, stress, or feelings of sickness), without requiring energy input (Kaplan, 1995). Others agree, yet caution that a well-designed garden with optimal restorative design features will engage all the senses, and not just visual sensations (Stigsdotter & Grahn, 2002). Garden designers will do well to heed her caution (Figure 6).

Figure 5. Providing opportunities for physical activity and movement is an important element of restorative garden design.

Figure 6. wide sidewalks allow plenty of space for circulation in the garden, even for those in wheelchairs. Moving benches off the path enhances feelings of privacy.

2.3.4. Access to nature and other positive distractions

Ulrich (1992) notes that positive distractions, such as those found in nature, may block or reduce worrisome thoughts, and foster beneficial changes in physiological systems such as lowered blood pressure and stress hormones. Even views of certain nature scenes can significantly reduce stress. Stressed patient groups in a variety of settings from a dental office to a pre-surgery ward all experienced more positive health indicators when exposed to serene nature scenes (Heerwagen, 1990; Katcher et al., 1984). Although studies are rare that examine potentially favorable influences of gardens on patient stress and other medical outcomes, it appears that even acutely stressed patients can experience significant restoration after only a few minutes of viewing nature settings with greenery, flowers, or water. It is also important to note that viewing gardenlike scenes apparently mitigates pain (Ulrich, 1999).

Design considerations. It is important to note that sunlight can have distinctly healthful influences on many patients, but negative effects on others. In one study, 25% of the people interviewed in healthcare gardens mentioned sunlight as a garden quality that helped foster improved mood and restoration (Cooper Marcus & Barnes, 1999). Sunlight also plays a key role in enabling humans to benefit from intake of vitamin D. Gardens will tend to ameliorate stress effectively if they contain verdant foliage, flowers, nonturbulent water, park-like qualities (grassy spaces with scattered trees), nature sounds such as birds, breezes, and water, and visible wildlife (Ulrich, 1999). Incorporating these features into a garden, in concert with information about garden uses and users, will provide restorative benefits to garden users (Figure 7).

Figure 7. Lush vegetation and flowers are important restorative elements of nature.

3. CONCLUSIONS

However, this adaptation comes with a costly price for human beings. Moreover, people whose adaptation is high are facing some kind of problems because of living in urban areas. These problems include some illnesses such as depreşsion, winter blues, cancer and sick building syndrome. At the root of these problems there are such causes as insufficient oxygen in the air, air pollution, insufficient natural light (sun light), use of construction materials such as concrete and asphalt altogether with insufficient vegetation. Light and oxygen are the necessary main substances for both physical and mental health. If the ratio of oxygen in the air is less than 10-12% and sun light is insufficient, it affects the secretion of the hormone melatonin. It is also a known reality that cancer cells increase in anaerobic environment rapidly. The lack of natural environs in the cities creates environments which produce stress for human beings. However, there are reasons that bring hope. The discussions, now international in scope, concerning these ideas are including suggestions about the importance of restorative garden which can create appropriate, healthy urban life conditions that will actually nurture human nature. One of these suggestions is that cities are transformed from parks to restorative garden. Restorative gardens placed in urban areas have positive effects on both ecology and on the physical and social aspects of human health.

More recently, there has been a growing interest in the restorative effects of nature (Kaplan, 1998; Ulrich, 1981; Cohen and Weisman, 1991; Cooper-Marcus and Barnes, 1999; Pouya and Demirel, 2015). From ancient restorative springs to medieval monastic cloisters and continuing on to tuberculosis sanatoria in the early twentieth century, contact with nature was believed to be beneficial for individuals who were troubled in body, mind, or spirit. However, during the twentieth century the connection between restorative and nature was gradually severed, as technology took on a greater role in the medical community — indeed, in Western culture as a whole. Healthcare designers and administrators became preoccupied with creating environments that were functional and efficient. The need to accommodate modern technologies in healthcare facilities overshadowed previously-held beliefs about the importance of providing therapeutic elements such as gardens. As a result, this new functional emphasis produced environments that were efficient but starkly institutional. These types of environments are now considered stressful and unsuited to the emotional and psychological needs of patients, visitors, and staff (Horsburgh, 1995; Malkin, 1992; Ulrich, 1992). By the late twentieth century, however, a growing awareness appeared in regards to the benefits of patient-centered healthcare facilities (Erickson, 2012).

The four factors — social support, sense of control, physical movement and exercise, and nature as distraction — all work together to provide restoration from stress and buffering. According to Ulrich's theory, this restoration then leads to improved health outcomes. Any landscape can be designed with these principles in mind, to promote the restorative quality of the particular space, and promote balance and wellness for the users of the space (Table 2).

As described above, a wealth of research exists which gives convincing evidence that contact with nature is linked to positive outcomes for human health and wellness. Kellert (2008) writes that with humility and understanding, effective biophilic design can potentially enrich both nature and humanity. In addition, he maintains that human wellbeing is highly contingent on contact with the natural environment, which is a necessity rather than a luxury for achieving lives of fitness and satisfaction even in modern urban society (emphasis added). However, Kellert writes that human affinity for contact with nature, biophilia, is a weak biological tendency that is reliant on adequate

learning, experience, and sociocultural support for it to become functionally robust.

Modern urban society, therefore, must integrate contact with nature into the design of places where people live, work, learn, and play in order to achieve maximum wellness for people individually and for society as a whole. This may be a difficult challenge, on two fronts. People are spending more and more time indoors in sedentary pursuits, often in front of a screen of some type — television, computer, electronic games for example. When people do venture outdoors, they may lack access to natural environments, or even environments with restorative properties (Louv, 2005; 2011).

All people may not respond the same way to natural environments. Certainly some elements, such as inner peace and a deep experience of love are universal to nearly all people as restorative qualities. There are also common conditions of healing, such as care from friends and family, laughter, music, and great art. There are also unique conditions of restorative which apply to individuals and which are based on individual personality and preferences (Lerner, 1996).

Table 2. Benefits of therapeutic gardens and design approach.

	Benefits	Design Approach
Movement and Exercise	• Rehabilitation • Reduces stress, improves mood and even lowers depression	Safe, measured opportunities for walking, exercise, therapy and education; • Paved walking paths around campus • Distance markers, obstacles and challenge elements • Places of respite every 100 feet • Open lawn or paved areas for group activities • provide trip destinations within a garden to motivate walking and wheelchair use Provide looped walkways
Social Support	• Patients, Family, Staff • Contact with emotionally supportive persons reduces stress and improves health. • Design Approach: provide variety of spaces with movable seating close to patient rooms and waiting rooms	Provide areas where patients, visitors and staff can gather and talk. Individuals who are isolated have higher levels of stress; • Groupings of benches and seating • Moveable tables and chairs • Group gathering spaces
Sense of Control	• Temporary Escape, Access to Privacy, Choices • A sense of lack of control is a major problem in healthcare settings causing stress and worsens outcomes.	• Provide an environment for patient/family to escape and regain control
Access to Nature and other Positive Distractions	• Plants, Water, Natural Sounds, Wildlife • Design Approach: Provide natural features and situations to promote stress reduction or restoration	Provide access and views to outdoor areas where patients, visitors and staff can experience patterns, colors, sounds, scents and textures; • Small perennial, rose or flower gardens • Water features, sculpture and art • Seasonal colors and scents • Plantings that attract birds, butterflies and wildlife

REFERENCES

1. Atkinson, R.L., Atkinson, R.C., Smith, E.E. Bem, D.J. and Nolen-Hoeksema, S. 1996. Hilgard's Introduction to Psychology. Fort Worth: Harcourt Brace College Publishers.

2. Anonymous, 1997. Urban and rural areas 1996-2030. Department of

Economic and Social Affairs Population Division, United Nations Publication, (ST/ESA/ SER.A/166), Sales, No. E 97.XIII3, http://www-.un.org/ esa/population/p-ubsarchiv-e/ura/urapwld.htm.

3. Antonovsky A., 1996. The salutogenic model as a theory to guide health promotion. Health Promotion International 11(1):11–18.

4. Bliss S., 2004, Geography Stage 6 Urban Places Mega Cities Istanbul – Asian And European City, Nsw Manager Global Education Macquarie University.

5. Brannon, L., & Feist, J. 1997. Health psychology (3 ed.). Pacific Grove, CA: Brooks/Cole.

6. Coley R.L., Kuo F.E., Sullivan W.C. 1997. Environment and Behaviour, 29(4), 468-494.

7. Cohen, U. and G. Weisman, 1991. "Positive Outdoor Spaces" in Holding onto Home: Designing Environments for People with Dementia. (pp. 73-79). Baltimore: John Hopkins University Press.

8. Cohen, S., & Syme, S. L. (Eds.). 1985. Social support and health. New York: Academic Press.

9. Cooper Marcus. C. and M. Barnes. 1999. Healing Gardens. New York: John Wiley & Sons.

10. Dinan, T. 1996. 'Från stress till depression' in SERIP, 2. Dumbaugh E. 2005. Journal of American Planning Association, 71(3):283-300.

11. Erickson, M.S., 2012. Restorative Garden Design: Enhancing wellness through healing spaces, Art and Design Discourse, JAD June 2012, no.2.

12. Emery, C. F., & Blumenthal, J. A. 1991. Effects of physical exercise on psychological and cognitive functioning of older adults. Annals of Behavioral Medicine, 13, 99-107.

13. Gatchel, R. J., Baum, A., & Krantz, D. S. 1989. An introduction to health psychology (2nd ed.). New York:McGraw-Hill.

14. Grahn, P. and Stigsdotter, U.A. 2003. 'Landscape planning and stress', in Urban Forestry and Urban Greening, 2, 1-18.

15. Havnesköld L & Risholm Mothander P.,1995. Utvecklingspsykologi (Developmental psychology) [In Swedish]. Psykodynamisk teori i nya perspektiv. Liber AB, Stockholm.

16. Hartig, T., Evans, G.W., Jamner, L.D., Davis, D.S., Garling, T., 2003. Tracking restoration in natural and urban field settings. Journal of Environmental Psychology 23, 109–123.

17. Heerwagen, J. 1990. The psychological aspects of windows and window design. Paper presented at the 21st Annual Conference of the Environmental Design Research Association, Oklahoma City.

18. Horsburgh, C. R. 1995. Healing by design. New England Journal of Medicine, 11(333), 735-740.

19. Inceoglu A. and Yürekli I, 2011. Toulouse Urban transformation in Istanbul: potentials for a better city Enhr Conference 2011 – 5-8 July.

20. Jiang,S., 2014. Therapeutic landscapes and healing gardens: A review of Chinese literature in relation to the studies in western countries Frontiers of Architectural Research (2014) 3, 141–153.

21. Kaplan, S. 1995. The restorative benefits of nature: Toward an integrated framework. Journal of Environmental Psychology, 15(3): 169-182.

22. Kaplan, S. 1990. Parks for the future: A psychological perspective, in G. J. Sorte (ed.) Parks for the Future. Alnarp: Stad & Land, issue 85, pp.4-22.

23. Kaplan, S. and Talbot, J.F. 1983. Psychological benefits of a

wilderness experience, in Kaplan, R., Kaplan, S. and R. Ryan. 1998. “Restorative Environments” in With People in Mind. (pp. 67-77). Island Press.

24. Kaplan R, Kaplan S & Ryan RL.1998. With people in mind: Design and management of everyday nature. Island Press, Washington DC.

25. Katcher, A., Segal, H., & Beck, A. 1984. Comparison of contemplation and hypnosis for the reduction of anxiety and discomfort during dental surgery. American Journalof Clinical Hypnosis, 27, 14-21.

26. Kellert, S. 2008. Dimensions, elements, and attributes of biophilic design. In S. Kellert, J. H. Heerwagen & M. Mador (Eds.), Biophilic design: The theory, science, and practice of bringing buildings to life. Hoboken, NJ: John Wiley & Sons, Inc.

27. Klingberg Larson, S. 2001. Stressutlösta utmattningsreaktioner och utbrändhet. Stockholm: Liber. Küller, R. and Lindsten, C. (1992) ‘Health and behavior of children in classrooms with and without windows’, in Journal of Environ-mental Psychology, 12, 33-52.

28. Küller R & Lindsten C., 1992. Health and behavior of children in classrooms with and without windows, Journal of Environmental Psychology 12: 33–52.

29. Küller R & Wetterberg L., 1996. The subterranean work environment: Impact on well-being and health. Environment International 22: 33–52.

30. Lerner, M. 1996. Choices in healing: Integrating the best of conventional and complementary approaches to cancer: MIT Press.

31. Louv, R. 2005. Last child in the woods: Saving our children from nature-deficit disorder: Algonquin Books of Chapel Hill.

32. Louv, R. 2011. The nature principle: Human restoration and the end of nature-deficit disorder: Algonquin Books of Chapel Hill.

33. Maslach, C. 2001., Utbränd: Om omsorgens personliga pris och hur man kan förebygga utbränning. Stockholm: Natur & Kultur.

34. Malkin, J. 1992. Hospital interior architecture. New York: Van Nostrand Reinhold.

35. McNeil, J. K., LeBlanc, E. M., & Joyner, M. 1991. The effect of exer-cise on depressive symptoms in the moderately depressed elderly. Psychology and Aging, 6, 487-488.

36. Moore E.O. 1982. Journal of Environmental Systems, 11, 17-34.

37. Municipality of Istanbul, 2013. Sustainable Urban Mobility: The Example of Istanbul, A short Survey, Case studies in sustainable Urban Transport. Division 44, water, Energy, Transpoet.

38. Mutlu S., 2003. Late Ottoman Population And Its Ethnic Distribution Nüfusbilim Dergisi\ Turkish Journal of Population Studies, 25, 3-383.

39. Nicholson D. 2003. Green cities and why we need them, New Economics Foundation, London.

40. Organization, W.H. 1946. Preamble to the constitution of the world health organization. New York.

41. Parsons, R., Tassinary, L.G., Ulrich, R.S., Hebl, M.R., Grossman-Alexander, M., 1998. The view from the road: implications for stress recovery and immunization. Journal of Environmental Psychology 18, 113–140.

42. Pouya S, Demirel O, Düzgüneş E., Dikmen A., Çelik K.T. 2015. "Healing Garden", Poster presentation, 52nd World Congress International Federation Of Landscape Architects, Russia 2015.

43. Pouya, S. and Şafak, P. "Sensory Garden", 24 Ulusal Özel Eğitim Kongresi, 15-17 Eylül, 2014.

44. Pouya S., Demirel Ö, What is a Healing Garden, Akdeniz Üniversitesi Ziraat Fakültesi Dergisi (2015) 28(1): 5-10.

45. Romanucci-Ross L, Moerman DE & Tancredi LR (Eds.) 1997. The anthropology of medicine. From culture to method. Bergin & Garvey, Westport.

46. Salahesh N., Irani Behbahani H.,, Pouya S., Pouya S., 2013. The Principles and Practicalities' Evaluation of The Healing Gardens with the Aim of Increasing the Idea of Healing In Urban Spaces, The 3th International Conference on Environmental Planning and Management, 29-30 October, 2013, University of Tehran, IRAN (Oral Presentation).

47. Schulz, R. 1976. Effects of control and predictability on the physical and psychological well-being of the institutionalized aged. Journal of Personality and Social Psychology, 33, 563-573.

48. Stigsdotter, U.A. & Grahn P. 2004, A Garden at Your Doorstep May Reduce Stress – Private Gardens as Restorative Environments in the City. Proceedings of the Open Space: People Space Conference, 27-29 October 2004. Edingburg, Scotland, Paper 00015.

49. Stigsdotter, U.A. and Grahn, P. 2002. 'What makes a garden a healing garden?', in Journal of Therapeutic Horticulture, 13, 60-69.

50. Shumaker, S. A., & Czajkowski, S. M. (Eds.). 1994. Social support and cardiovascular disease. New York: Plenum.

51. Social departementet, 2002. Mål för folkhälsan, in Regeringens proposition, 2002/03:35, pp.61.

52. Tuğal C, 2008. The Greening Of Istanbul, Metropolitan Disorders, new left review 51.

53. Ulrich, R. 1992. How design impacts wellness. Healthcare Forum Journal, 20, 20-25.

54. Ulrich, R. 1981. "Natural Versus Urban Scenes: Some Psychophysiological Effects." Environment and Behavior, 13 (5): 523-553.

55. Ulrich, R.S. 1999. Effects of gardens on health outcomes: Theory and research, in Cooper Marcus, C. & Barnes, M. (eds.) Healing Gardens: Therapeutic Benefits and Design Recommen-dations. New York: John Wiley & Sons, pp.27-86.

56. Ulrich, R.S. 1984. 'View through a window may influence recovery from surgery', in Science, 224, 420-421.

57. Ulrich, R.S. 1993, Biophilia, biophobia, and natural landscapes, in Kellert, S.A & Wilson, E.O. (eds.) The Biophilia Hypothesis. Washington DC: Island Press/Shearwater, pp.74-137.

58. Ulrich, R.S., 1981. Natural versus urban scenes. Some psychological effects. Environment and Behavior 13, 523–556.

59. Ulrich R.S., Simons R.F., Losito B.D., Fiorito E., Miles M.A. and Zelson M. 1991, Journal of Environmental Psychology, 11, 201-230.

60. Uslu A., Kiper T. & Baris M.E. 2009, Public Health—Urban Landscaping Relationship and user's Perceptions, Biotechnology & Biotechnological Equipment, 23:3, 1399-1408.

61. Weiss, C. S., Pato, C. S., McAllister, G., Littman, R., Brier, A., Paul, S. M., et al. 1990. Differential effects of controllable and uncontrollable acute stress on lymphocyte proliferation and leukocyte percentages in humans. Brain, Behavior, and Immunity, 4, 339-351.

62. Waxman, H. M., Carner, E. A., & Berkenstock, G. 1984. Job turnover and job satisfaction among nursing home aides. The Gerontologist, 24, 503-509.