



ASSESSMENT OF GREEN HOSPITAL CRITERIA: CASE OF TRABZON

YEŞİL HASTANE ÖLÇÜTLERİNİN İRDELENMESİ: TRABZON ÖRNEĞİ

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ABSTRACT

Globalization affects the whole world and brings with it such problems as environmental pollution, rapid consumption of natural resources and excessive energy use, resulting in a focus on sustainability in design. The concept of sustainability aiming at efficient use of energy, water, material and space, preserving natural resources and using eco-friendly and renewable materials is also addressed in healthcare field as well as other fields. The amount of energy, water and material consumed, and chemical waste disposed are high in hospitals, which, therefore, damage the environment a lot. This fact makes the concept of green hospitals that take building, environment and human health as a whole more and more important every day. Green hospitals are sustainable buildings that aim to use natural resources efficiently, support recycling and minimize environmental and medical waste use. In order for a hospital to be a green building, it should meet such criteria as waste, environment, water, energy and hazardous substances management, material selection and sustainable facility size. Turkey, however, has very few hospitals that completely satisfy the green hospital design criteria. The aim of this study is to draw attention to this low number and to emphasize the significance of green building designs that focus on sustainable use and management of natural resources. The study sample consists of hospitals in the city center of Trabzon. The hospitals were selected for ease of transportation and user preferences. Hospital managers were interviewed to determine whether the hospitals in question satisfy the green hospital design criteria; waste, environment, water, energy and hazardous substances management, material selection and sustainable facility size.

Key Words: Hospital, Green Hospital, Sustainability, Design

ÖZET

Bütün dünyayı etkisi altına alan küreselleşme kavramı ve beraberinde getirdiği; çevre kirliliği, doğal kaynakların hızlı tüketimi, fazla enerji kullanımı gibi sorunlar tasarımlarda sürdürülebilirlik kavramına yönlendirmektedir. Doğa dostu, kullanıcının sağlığını göz önünde bulunduran, enerjiyi, suyu, malzemeyi ve bulunduğu alanı etkin şekilde kullanan; sürdürülebilirlik kavramı her alanda olduğu gibi sağlık alanında da hâkim olmaktadır. Enerji, su, malzeme tüketiminin ve kimyasal atık malzeme miktarının yüksek olduğu hastane yapılarının çevreye verdiği zarar da fazla olmaktadır. Bu yüzden; yapı, çevre ve insan sağlığını bir bütün olarak ele alan yeşil hastane yapıları günümüzde daha fazla önem kazanmaktadır. Yeşil hastaneler; doğal kaynakları verimli kullanmayı amaçlayan, geri dönüşümü destekleyen, çevresel olumsuzlukları, tıbbi atıkları en aza indirmeyi hedefleyen sürdürülebilir yapılardır. Bir hastanenin yeşil bina olarak isimlendirilmesi için atık yönetimi, çevre yönetimi, su yönetimi, enerji yönetimi, tehlikeli maddeler yönetimi, malzeme seçimi ve sürdürülebilir tesis boyutları gibi kriterlere uyması gerekmektedir. Fakat Türkiye’de yeşil hastane kriterlerine tamamen uyan çok az sayıda hastane bulunmaktadır. Bu çalışmada, bu sayının azlığına dikkat çekmek ve doğal sistemlerin varlığını ve geleceğini tehlikeye sokmadan yerine getirmeyi hedefleyen yeşil binanın önemine vurgu yapmak amaçlanmaktadır. Çalışma kapsamında, Trabzon merkezde yer alan ulaşım kolaylığı ve kullanıcı tercihleri doğrultusunda seçilen hastaneler ele alınmaktadır. Hastane yöneticileri ile görüşmeler yapılarak seçilen hastane yapıları yeşil hastane ölçütlerinden; atık yönetimi, çevre yönetimi, su yönetimi, enerji yönetimi, tehlikeli maddeler yönetimi, malzeme seçimi ve sürdürülebilir tesis boyutları kapsamında irdelenmektedir.

Anahtar Kelimeler: Hastane, Yeşil Hastane, Sürdürülebilirlik, Tasarım

1. INTRODUCTION

In today's global environment, institutions compete with each other in terms of quality, cost, flexibility and speed, and most recently, environmental awareness. Environmental pollution and climate change have made environmental sensitivity an important competitive factor for institutions (Porter, 1995; Soysal, 2014). Human interaction with nature changes both of them. The interaction in the early ages was affected by cultural and social changes and the concept of sustainability and sustainable development have reached different dimensions together with advances in technology (Ozmehmet, 2008). Eco-friendly buildings, also known as sustainable, ecological, green or eco-friendly buildings, are assessed according to land selection, designed in a holistic and socially and environmental responsible manner, contain low-consuming and renewable energy sources and recyclable materials with low carbon release suitable for climate data and conditions and encourage cooperation and are sensitive to ecosystems (URL-1, 2019). Residences, offices, hotels and hospitals become more and more sensitive to environmental concerns with the increase in

ecological awareness, and therefore, the number of energy-saving green buildings made from healthy and natural materials increases.

Hospitals operate in a global competitive environment and provide 24/7 health services and use complex biomedical technologies. Weather conditions, cooling, generator systems and medical equipment play a very important role in health care provided by them. Health care services are heterogeneous and involve complex engineering services. Therefore, hospitals are very hard to manage in terms of green sustainability (Zawawi, Kamaruzzaman, Ali and Sulotion, 2010; Hoşgör, 2014). The aim of this study is to draw attention to the low number of green hospitals and to highlight the significance of “green building” which aims to protect natural systems and use natural resources effectively. The study sample, therefore, consists of hospitals in the center of the city of Trabzon. The hospitals were selected based on ease of transportation and user preferences. The study addresses seven green hospital criteria: waste management, environmental management, water management, energy management, hazardous substances management, material selection and sustainable facility. These criteria were determined based on interviews with hospital managers and experts.

2. GREEN BUILDING

Eco-friendly and ecological buildings have become important in the construction sector due to global warming, increased production, carbon dioxide emissions, environmental pollution and consumption of natural resources and reduction in natural resources. The growing interest in eco-friendly buildings has led to the construction of green buildings, which are certified according to certain standards. Green buildings are ecological and comfortable buildings that use natural resources efficiently, respect the nature, ensure the integration of people with nature and protect their health (Şimşek, 2012). They emerged at the end of the nineteenth century and at the beginning of the twentieth century and have recently become popular. With their sustainable developments and designs, green buildings have made significant contributions to sustainability since the 1980s. The concept of green building is addressed with reference to developments in sustainable architecture (Wu and Low, 2010). Green buildings have numerous advantages. They;

- ✓ Reduce the emission of carbon dioxide;
- ✓ Minimize environmental damage during construction;
- ✓ Reduce operating costs;
- ✓ Allow the use and development of renewable energy;
- ✓ Allow the reuse of debris;
- ✓ Allow rainwater harvesting (green roof);
- ✓ Allow the use of natural light;
- ✓ Save energy;
- ✓ Reduce heating and cooling costs (insulation systems);
- ✓ Increase the value of the building;
- ✓ Provide users with a healthier and more productive environment;
- ✓ Add value to urban spaces (Erdede, Erdede and Bektaş, 2014).

Globalization, urbanization and rapid consumption change life rapidly and increase the value of the concepts of sustainability, ecology and green building. Green buildings provide users with functional, efficient, durable and eco-friendly spaces. The next section defines the concept of green hospital, draws attention to their scarcity and presents example to highlight their significance.

3. GREEN HOSPITAL

Hospitals consume a lot of energy and water, produce a large amount of chemical and non-chemical waste and potential hazardous substances and contain a large number of equipment. The concept of “green” has become a current issue for hospitals due to limited resources, insufficient waste storage and disposal areas, narrow-scoped personnel training on the use and disposal of hazardous substances and little incentive for the use of renewable energy sources. The implementation “green” to hospitals aims to use alternative sources, promote more efficient use of energy, water and materials, reduce wastefulness and design eco-friendly buildings (Terekli, Özkan and Baygın, 2013). In the short term, sustainable health service seeks to reduce the

negative effects of the built environment on human health. In the long term, its objective is to ensure that buildings contribute to the physical and mental and spiritual well-being of people. Hospitals reduce their environmental impact, and thus, pollute the environment less. For example, they reduce the amount of pollutants in the air and soil by disposing of or incinerate toxic waste (Wittmann, 2010; Palteki, 2013).



Figure 1. İstanbul Şişli Florence Nightingale Hospital (URL-2, 2019)

There has been a growing interest in the construction of green hospitals in Turkey in only recent years, and therefore, there are only a few of them. Having been designed as a smart hospital, Istanbul Florence Nightingale Hospital is the first in Turkey to receive TUV Hessen Green Building Certificate and be awarded the title of “Green Hospital.” The 219 bedded hospital in Şişli has 11 operating rooms and 2 delivery rooms equipped with laminar airflow where the number of particles and microorganisms, temperature, humidity, fresh air, ambient air pressure and air movements are monitored (URL-3, 2019).



Figure 2. Pittsburgh Children's Hospital (URL-4, 2019)

Located on 10 acres of land and consisting of two buildings constructed using the latest technology, Pittsburgh Children's Hospital ranks first in the 30 most eco-friendly hospitals in the world. It has erosion control, effective natural light and water and energy use, good indoor air quality and smoke control technologies and heating system and showers with humidity control. The applications that make it a green hospital are: a water-efficient garden design, use of certified wood products, non-toxic cleaning agents and micro-fiber cloth, recycling programs for paper, cardboard, plastic, batteries and bulbs, and a green education program for hospital staff, patients and their family members (Stevens, 2014; Savaş, 2018).

Green hospital is a recent concept for Turkey, and therefore, the number of green hospitals is few (Kılıç and Güdük, 2018). Hospitals serving 24/7 are of paramount importance for human health, comfort and sensitivity. With new laws and regulations, most countries aim to increase the number of green hospitals.

3.1. Green Hospital Criteria

The seven green hospital criteria are waste management, environmental management, water management, energy management, hazardous substances management, material selection and sustainable facility (Figure 3). This section addresses them one by one.



Figure 3. Green Hospital Criteria

3.1.1. Waste Management

Creating an action plan is an important element of waste management. The action plan should include:

- ✓ Modification of a process in a way to reduce waste generation (e.g., keeping records in electronic format);
- ✓ Purchase of eco-friendly products;
- ✓ Waste management (waste sorting);
- ✓ Analysis of materials in terms of environmental risk before purchase and use;
- ✓ Reduction of the number of products or equipment containing polyvinyl chloride (PVC);
- ✓ Determination and reduction of toxic substances and avoiding the use of bioaccumulative substances;
- ✓ Regular evaluation of waste and waste resources and review of opportunities for waste disposal and recycling (Wissenschaftszentrum, 2005; Palteki, 2013).

3.1.2. Environmental Management

Health institutions focus not only on patient care, but also on creating high-performance and therapeutic environments. Environmental designs help prevent hospital infections, increase patient satisfaction and staff productivity and reduce injuries. Research associate's environmental management in health institutions with benefiting from daylight, access to external spaces and in-door air quality, and reduction in drug administration errors, length of hospital stay, and patients' and family members' stress (Özkan, Bayın and Terekli Yeşilaydın, 2014).

3.1.3. Water Management

Hospitals use water for different purposes. Water management in green hospitals involves using water resources efficiently, reducing the polluting effect of waste water and controlling the water cycle. Therefore, hospitals should develop water flow charts and identify water use areas and quantities and develop strategies to reduce water consumption. These strategies can be listed as follows:

- ✓ Including sterilizable bubble particles in water stream and creating automatic water volume control to measure the amount of water consumption;
- ✓ Using smart shower and thermostat systems to save water;
- ✓ Installing cisterns for rainwater harvesting (Soysal, 2014).

3.1.4. Energy Management

Energy-saving building designs take into account such variables as climate, direction and prevailing wind and focus on efficient use of energy. They require appropriate active and passive supervision, high performance in terms of heating, cooling, ventilation and daylighting and energy conservation control (Dikmen, 2011).

- ✓ Using solar panels;

- ✓ Using energy effective lighting elements;
- ✓ Using film or thermal insulation glass in windows to prevent heat loss;
- ✓ Using natural ventilation in addition to mechanical ventilation;
- ✓ Developing building automation systems;
- ✓ Using more than one boiler;
- ✓ Installing an insulation system (Terekli, Özkan and Bayın, 2013).

3.1.5. Hazardous Substances Management

Hazardous substances management is an important daily activity of hospitals. Some of the potential hazardous substances used in hospitals are organic and inorganic compounds, corrosive substances (acid/base), disinfectants and other compounds containing carcinogenic, mutagenic or reproductive toxins. Minimizing their impact on staff, patients, visitors and the environment is critical. Therefore, green hospitals can prevent potential hazards by using less hazardous substances (Özkan, Bayın and Terekli Yeşilaydın, 2014).

3.1.6. Material Selection

Building materials are also part of the ecosystem and, therefore, should be eco-friendly and natural. Ecological designs should consist of materials that are produced and transported cheaply and do-little damage to nature (Aktuna, 2007). Materials should harm the environment as little as possible during construction, use and demolition and should be able to be reused after demolition. Some criteria should be determined to assess materials in terms of building biology.

- ✓ The amount of energy required during production;
- ✓ Waste and by-products as harmful substances during production;
- ✓ Recyclability of materials;
- ✓ Reusability of materials;
- ✓ Availability of materials from local sources;
- ✓ Production and application possibilities aside from center major facilities;
- ✓ The reusability and recyclability of materials reduces the consumption of natural resources, which should be taken into account when selecting materials (Stahel, 1990; Çilhoroz and Işık, 2018).

3.1.7. Sustainable Facility

In order to satisfy this criterion, hospitals should have:

- ✓ Natural ventilation;
- ✓ Sufficient number of windows for daylighting;
- ✓ Outdoor recreation areas for visitors and non-bedridden patients;
- ✓ Transportation options;
- ✓ Adequate parking spaces (Çilhoroz and Işık, 2018).

4. STUDY AREA

The study sample consists of Numune, Fatih State, Farabi, Yıldızlı Medical Park, Karadeniz Medical Park and Imperial Hospitals situated in the city center of Trabzon. The hospitals were selected for ease of transportation and user preferences. However, we could not access the data of Karadeniz Medical Park and Imperial Hospitals. Another reason for the selection of these hospitals is that they have different departments (dentistry, cardiology, etc.). Table 1 shows the location of the hospitals.

Table 1. Location of Hospitals

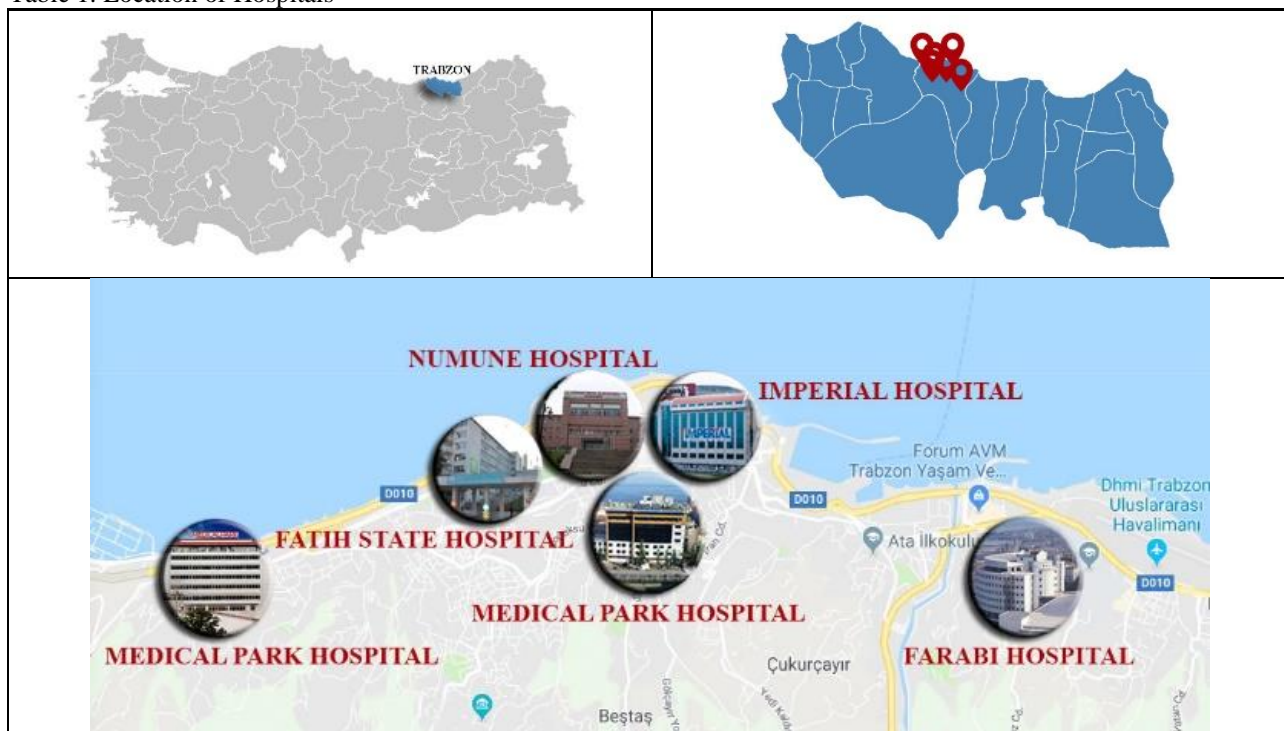





Table 2 provides the addresses and construction years of the hospitals.

Table 2. Id of Hospitals

Hospitals	IDs
Numune Hospital	 <p>Address: İnönü Neighborhood, Maraş Street Numune Kampüsü, 61250 Merkez/Ortahisar/Trabzon Year of Construction: 1937</p>
Fatih State Hospital	 <p>Address: İnönü Neighborhood, İnönü Street No:177, 61040 Ortahisar/Trabzon Year of Construction: 1958</p>
Farabi Hospital	 <p>Address: Üniversite Neighborhood, Farabi Street No:64, 61080 Trabzon Merkez/Ortahisar/Trabzon Year of Construction: 1986</p>
Medical Park Hospital	 <p>Address: Merkez Neighborhood, Sahil Road Street. No: 46, 61310 Akçaabat/Trabzon Year of Construction: 2015</p>

5. FINDINGS

This study analyzes Numune, Fatih State, Farabi, Yıldızlı Medical Park Hospitals in terms of waste management, environmental management, water management, energy management, hazardous substances management, material selection and sustainable facility. Interviews were conducted with experts working in the hospitals. Data were tabulated and interpreted.

Table 3. Waste Management

Waste management	Numune Hospital	Fatih State Hospital	Farabi Hospital	Medical Park Hospital
Waste management guide	Yes	Yes	Yes	Yes
Examination of materials in terms of environmental risk before purchase and use	Yes	Yes	Yes	Yes
Warehouses for storing waste before recycling	Yes	Yes	Yes	Yes
Deposition, decomposition and storage	Yes	Yes	Yes	Yes
Regular inspection of waste and waste resources	Yes	Yes	Yes	Yes
Waste transport	Yes	Yes	Yes	Yes
Achieving targets for waste reduction	Yes	Yes	Yes	Yes
Regular training on waste management for staff	Yes	Yes	Yes	Yes

Table 3 investigates whether the hospitals meet the criteria of waste management. All hospitals apply a comprehensive written waste management program. There are warehouses where waste is kept before being transferred to recycling units. However, Farabi Hospital does not have a special storage for waste vegetable oil. None of the hospitals produce nuclear waste. They all follow guidelines for collection, separation, storage and disposal. They regularly inspect waste and waste resources. Waste is transported from the hospitals to private contractors or landfills. They have written objectives and seek ways to reduce the production of hazardous or non-hazardous wastes. The results show that the hospitals meet the criteria for waste management.

Table 4. Environmental Management

Environmental management	Numune Hospital	Fatih State Hospital	Farabi Hospital	Medical Park Hospital
Waste management guide	Yes	Yes	Yes	Yes
A guide (if there is one) that contains environmental protection	No	Yes	Yes	Yes
Defined environmental protection responsibilities and informed staff	Yes	Yes	Yes	Yes
High performance and therapeutic environments	Yes	Yes	Yes	Yes
Staff responsible for waste, chemicals, energy, pollutants, radiation safety and hygiene	Yes	Yes	Yes	Yes

Table 4 evaluates the hospitals in terms of environmental management. They have guidelines containing environmental management and protection. All hospitals, except for Numune, have defined responsibilities related to environmental protection and informed staff. They aim to construct high performance and therapeutic environments. They have staff (albeit few in number) responsible for waste, chemicals, energy, pollutants, radiation safety and hygiene.

Table 5. Water Management

Water management	Numune Hospital	Fatih State Hospital	Farabi Hospital	Medical Park Hospital
Using water-saving faucets	No	No	Yes	No
Regular inspection of faulty installations	No	Yes	Yes	Yes
Using low-flow showers, thermostats and dual flush toilets	No	No	No	Yes
Cutting off regional flow to prevent water leakage	Yes	Yes	No	Yes
Rainwater harvesting	No	No	No	No
Considering the amount of water to decide on the garden landscape	No	Yes	Yes	No

Table 5 evaluates the hospitals in terms of water management. Unlike waste management and environmental management, the hospitals have shortcomings in water management. Yıldızlı Medical Park Hospital has dual-flush toilets and low-flow faucets, does regular inspections to prevent leaks and discharges dialysis wastewater in accordance with the law. Fatih State Hospital does regular inspections to prevent leaks, has regional flow-cutting equipment to prevent water leakage, takes into account the amount of water needed in the garden and discharges dialysis wastewater and lab chemicals properly. Numune Hospital does regular inspections to prevent leaks, has dual-flush toilets and water-saving faucets and has a radioactive decay system for nuclear medicine wastewater.

Table 6. Energy Management

Energy management	Numune Hospital	Fatih State Hospital	Farabi Hospital	Medical Park Hospital
Reducing energy consumption	Yes	Yes	Yes	Yes
Thermal insulation	No	No	Yes	Yes
Solar panels	No	No	No	Yes
Energy-saving lighting systems	Yes	Yes	Yes	Yes
Low-energy electronic devices	No	Yes	Yes	Yes

Table 6 evaluates the hospitals within the scope of energy management. They all seek ways to reduce energy consumption. Yıldız Medical Park and Farabi Hospitals have thermal insulation. It is only Yıldızlı Medical Park Hospital that has solar panels. They all have energy-saving lighting systems, and all of them, except Numune, have energy-saving electronic devices.

Table 7. Hazardous Substances Management

Hazardous substances management	Numune Hospital	Fatih State Hospital	Farabi Hospital	Medical Park Hospital
A program for hazardous substances	Yes	Yes	Yes	Yes
Hazardous waste storage	No	Yes	Yes	Yes
Using mercury-containing materials	Yes	No	No	No

Table 7 analyzes the hospitals in terms of hazardous substances management. All hospitals have a program to reduce hazardous substances and all, except for Numune, store hazardous substances properly. Yıldız Medical Park, Fatih State and Numune Hospitals do not use mercury-containing materials. Farabi Hospital uses mercury-containing materials but makes efforts to reduce their use.

Table 8. Material Selection

Material selection	Numune Hospital	Fatih State Hospital	Farabi Hospital	Medical Park Hospital
Using recycled materials	No	Yes	No	No
Reusing materials	No	Yes	No	No
Using local materials	Yes	Yes	Yes	Yes
Using fresh vegetables and fruits	No	Yes	Yes	Yes

Table 8 examines the hospitals in terms of material selection. It is only Fatih State Hospital that recycles and reuses materials. All hospitals use local materials, and all, except for Numune, serves fresh fruits and vegetables.

Table 9. Sustainable Facilities

Sustainable facilities	Numune Hospital	Fatih State Hospital	Farabi Hospital	Medical Park Hospital
Sufficient number of windows for natural ventilation and lighting	Yes	Yes	Yes	Yes
Outdoor recreation areas	Yes	Yes	Yes	Yes
Transportation options	Yes	Yes	Yes	Yes
Adequate parking space	No	Yes	Yes	Yes

Table 9 examines the hospitals in terms of sustainable facility. All hospitals conform to the criteria of sustainable facility. They have a sufficient number of windows for natural ventilation and lighting, outdoor and indoor recreation areas and transportation options such as buses and minibuses. All hospitals, except for Numune, have parking spaces for private vehicles.

6. CONCLUSION

The concept of green architecture is becoming more and more important all over the world due to the ecological consequences of the global warming. Green buildings reduce energy consumption, ensure efficient use of natural resources, help to integrate with nature and protect human health. Increased energy and water consumption and the amount of chemical waste also force hospitals to be green. The aim of green hospitals is to use energy, water and materials less and more efficiently and to raise ecological awareness. To be green, hospitals should meet many criteria under the headings of waste management, environmental management, water management, energy management, hazardous substances management, material selection and material selection. The aim of this study was to draw attention to the low number of green hospitals and to emphasize the significance of green buildings. The study sample consisted of Yıldızlı Medical Park, Fatih

State, Numune, Karadeniz Medical Park, Imperial and Farabi Hospitals situated in the city center of Trabzon. They were selected for ease of transportation and user preferences. Hospital managers and experts were interviewed to determine whether the hospitals satisfy the criteria for green hospital designs.

Numune Hospital is largely in compliance with the criteria for waste management. In terms of environmental management, the hospital has a guideline for the quality of health care services, and the guideline contains regulations on environmental protection. However, the hospital has neither clearly defined environmental responsibilities nor informed staff. It also has shortcomings in water management. It carries out activities for energy management and has energy-saving light bulbs. It meets the criteria for hazardous waste management. It has a program to reduce or substitute hazardous substances but does not store hazardous substances properly enough and does not pay attention to using recyclable materials and serves canned and frozen food. It has a sufficient number of windows for ventilation and lighting but insufficient parking areas. It is, therefore, the only hospital that fails to meet some of the criteria for sustainable facility.

Fatih State Hospital implements a waste management program and meets the criteria for environmental management. However, it has shortcomings in water management. It has no dual-flush toilets and water-saving faucets. It concentrates on reducing consumption but does not have thermal insulation. It has energy-saving light bulbs and electronic devices. It complies with all the criteria for hazardous substances management. It uses recycled materials and does not serve frozen or canned food. It has a sufficient number of windows, recreation areas, transportation options and parking areas, and therefore, meets the criteria for sustainable facility.

Farabi Hospital has a written waste management program, storage units for medical, domestic, packaging, electronic, vegetable oil wastes, however, it has a partial capacity to store nuclear medical waste. It has staff responsible for waste, hazardous chemicals, wastewater, energy, pollutants, hazardous emissions, radiation safety and hygiene. It also has shortcomings in water management. It seeks ways to reduce energy consumption. It is partially insulated. It uses mercury-containing materials but tries to reduce the amount. It has not yet put the project of using recycled materials into effect. It has a sufficient number of windows, recreation areas, transportation options and parking areas, and therefore, meets the criteria for sustainable facility.

Star Medical Park Hospital has a written waste management program, storage areas for medical, domestic, packaging, electronics, vegetable oil wastes to be kept in until they are transferred to the disposal or recycling area, written objectives to reduce the production volumes of hazardous or non-hazardous wastes, carries out internal inspections on waste regulations and has written objectives to reduce the amount of hazardous or non-hazardous wastes and produces no wastewater and nuclear medicine waste. The hospital largely meets the criteria for environmental management and has a guideline with environmental protection. It has clearly defined responsibilities related to environmental protection, of which the staff is informed. It has, however, shortcomings regarding water management. It has double-flush toilets and performs regular inspections to prevent plumbing leaks. It is insulated and seeks ways to reduce energy consumption. It meets the criteria for hazardous substances management and does not use mercury. It takes recycling and reuse into account in material selection. It has a sufficient number of windows, recreation areas, transportation options and parking areas, and therefore, meets the criteria for sustainable facility.

All four hospitals have shortcomings. Although Medical Park is the newest hospital, it also fails to meet certain criteria. These criteria, which should be taken into account before building a hospital, are critical for both the environment and people. In conclusion, there are few green hospitals, and therefore, new buildings should be designed based on sustainable criteria, which should also be taken into account in the renovation of historic buildings.

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