



Research Article

EVIDENCE-BASED DESIGN AS AN ENTRY POINT FOR AN INTEGRATIVE CURATIVE ONCOLOGY CENTER

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ABSTRACT

The research study of a set of design elements for integrative oncology centers according to the theories of supportive design, where the research study reaches a set of determinants that can be applied to the research sample to come up with a set of recommendations that include raising the design efficiency of oncology centers and enhancing the optimal healing environment for groups of users and their behaviors.

Materials and Methods: The goal is to reach standards for the design of integrative oncology centers to facilitate the use of the center in promoting an integrated healing psychologically and physically, this is driven by its recognition of the value of patients suffering from cancer and the importance of integrative design for the complete recovery of patients.

Understanding the broad benefits of establishing contact with nature in tumor centers by studying the effect of environmental medicine on the design of tumor centers. It is hoped that the recognition of nature's role in healing and the adoption of design standards on a large scale in integrative tumor centers will help in reaching a complete cure. It also aims to conclude. Discussing the criteria for designing integrative oncology centers and the desire to reach a different, more comprehensive approach to cancer care called integrative oncology centers, where it examines how to design an integrated cancer treatment center to be more than a functional space, and seeks to become an active entity that helps in a complete physical and psychological recovery. For those suffering with cancer.

Results: 1- As a result of the emergence of medical developments, the impact of evidence-based design on tumor centers had to be studied, and the optimal healing environment had to be studied as an influential component in the design of oncology centers to meet modern functional needs in the medical field. 2- As a result of studying the psychological needs of cancer patients, the importance of the physical environment, and the factors affecting its design on the psyche of patients, new integrative principles had to emerge to be taken into account during the design of oncology centers and to consider them as a basic factor to help patients during the healing journey.

Conclusion: The aim of this research thesis is to know the extent to which the oncology centers in Egypt achieve the integrative approach where a more sustainable approach to cancer care can be established based on the guidelines for sustainability as it focuses on all users at all levels, and it also shows the role that architects can play in the integrated approach. While designing oncology centers based on the emerging field of evidence-based design and the optimal healing environment model that includes all types of treatment (physical and psychological), Where personal care is provided on the basis of the physical, psychological and spiritual needs of each patient. And this will be done through a comparison of the oncology centers in Egypt and the oncology centers in the world. A knowledge of the availability of the integrated approach in the Egyptian oncology centers will be the cornerstone of the original research component of this study.

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INTRODUCTION

Upscale environments can be created that use nature as a way to contribute to the cure of tumors. The design and expansion of an increasing number of oncology centers worldwide have been directed to attention in this aspect. Its importance comes back when the professor of architecture and behavioral scientist Dr. Roger Ulrich Roger Ulrich "to conduct research on the effects of health care facilities on medical outcomes and satisfactory safety.

The report has completed the findings of a comprehensive research on rigorous empirical studies linking hospital design" physical environments "with evidence-based design results, according to Ulrich:" It indicates that good design It plays an important role in making oncology centers safer and more healing for patients and better places for employees to work. It summarizes the relationship between specific design factors and evidence-based design results, creating a family area in patients' rooms, providing single patient rooms, accessing daylight and appropriate lighting, using finishes to reduce noise, and creating views of nature. And one of the biggest reasons for implementing evidence-based design is limiting

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negative results in oncology centers that are the leading cause of death in the world¹.

Evidence-Based Design (EBD)

The Essential Guide in the Design Process, the Main Evidence for Evidence (EBD). It is a term coined by the Health Design Center "where it emphasizes the application that can be evaluated for projects at all stages of design" and also known as "the decision-making process." The surrounding environment. –In 1990: Dr. Roger Ulrich conducted an analytical study of gallbladder patients and their conditions. After the operation, half of the patients looked from the window from the bed to the fallen trees, while the other half looked at a wall of built bricks, and the results of the study showed that patients who had windows overlooking the trees They spent less time in hospital, and took less medication, as these studies demonstrated that the built environment can have a significant impact on patient recovery, and staff production².

– 1993: The Health Design Center actively participated in promoting the use of EBD as a tool for designing "healing environments" in various settings and was known as "health care" settings.

-However, healthcare designers quickly realized that design is an equal mix of art and science, and have led the way in adopting EBD concepts. Since EBD began in the healthcare sector, healthcare designers have used to apply current evidence from research (physical and psychological). Both and considered an important factor influencing design decisions, and the aspiration to improve patient care with a safer environment

-EBD seeks to initiate and support desired behaviors and outcomes using the physical environment. For example, a simple design solution such as angled pelvis to the patient in patient rooms encourages professional caregivers to wash their hands upon arrival, while still being able to speak with the patient. Important, because hand washing reduces the spread of infection. Given the importance of healing processes and their role in the healthcare of oncology centers, one of the major areas of study for (EBD) is "Optimal Healing Environments (OHE)"³.

1-2- Optimum healing environments

-History of ideal healing environments: 2002: The American Institute of Health Care coined the term "**ideal healing environment**" to describe a health care environment "in which the" social, physical, spiritual, and behavioral "components of health care support support that stimulate the body's innate ability to heal itself.

- Ideal healing environments are defined in oncology centers as:

"The process of recovery, repair and return to wellness; this is in contrast to treatment, which is defined as the elimination of disease"⁴.

According to Dr. Keith Block, Medical Director of the Block Center for Integrative Cancer Therapy, curing cancer involves more than just tolerating the treatment, or survival. On the other hand, a feeling of rejuvenation can occur that enhances flexibility and perfection. On the other hand, while cancer treatment may cure disease for many patients, it may leave them psychologically or emotionally afflicted. The healthcare environment facilitates healing and treatment both physically and psychologically.

The goal of the OHE model is

It is the use of the physical, psychological, social, spiritual, and behavioral components of health care to support and facilitate healing.

This model seeks to improve the quality of life for all patients, and contributes to improving disease tolerance and treatment (medical treatments), and improving the overall patient outcome. These goals are most important for patients suffering from a deadly disease such as cancer.

-The Seven Domains of the Model of Optimal Healing Environments (OHE):

To achieve the objectives of the OHE model, the Samuel Institute developed the Domains of Optimal Healing Environments into seven domains⁵ (Fig1).

These areas include



Healing intention

Defining it: It is the conscious design to improve one's health and support hope or expectation of recovery and well-being. It is important to develop the intention of treatment because studies show that "stress, anxiety, depression and loss of control are harmful to health, while optimism, self-efficacy, cohesion, a sense of control and good health are associated." The healing intent is also referred to as the "healing belief" and the Samuel Institute defines the healing belief as "the conscious and rational determination to improve health". When designing a healing space, steep and terrifying healthcare facilities with fuzzy signs and long winding

¹ Anderson, Diana. 2017. "Humanizing the hospital: Design lessons from a Finnish sanatorium." CMAJ 160 (11). Accessed August 5, 2017. <http://www.cmaj.ca/content/182/11/E535.short>.

² AIA. 2019. Ng Teng Fong General Hospital & Jurong Community Hospital. Accessed October 12, 2017. <https://www.aia.org/showcases/768-ng-teng-fong-general-hospital-jurong-commun>

³ Building Enclosure. 2016 St. Charles Cancer Center Wins Several Awards. March 1. Accessed October 11, 2017. <https://www.buildingenclosureonline.com/articles/857-st-charles-cancer-center-wins-several-architectural-awards>

⁴ n.d. The Architecture and Design of Maggie's Dundee. Accessed October 4, 2017. <https://www.maggiescentres.org/our-centres/maggies-dundee/architecture-and-design/>.

⁵ Levin, Debra. 2018. Evidence-based Design Origins. May 20. Accessed August 5, 2017. <https://www.healthcaredesignmagazine.com/trends/architecture/evidence-based-design-origins/>.

corridors can cause anxiety and stress in users. However, facilities designed with adequate directions, using signage, artwork, landmarks, and visual evidence The other, it will give users freedom and help them move around in the hospital without getting lost or forced to depend on others, the guideline signs also help increase the productivity of professional caregivers, as it saves time in giving directions constantly and to give patients a sense of control over their environment as it helps reduce the level of Stress them and thus aid in their recovery(Fig2)also by:

⊖ Avoid the arcade maze.



⊖ Ensure easy finding of the way - use minimal signs and more landmarks⁶.



Experiencing personal wholeness

Defining it: According to Wayne Jonas "CEO of the Samuel Institute"

Personal perfection: is the experience that occurs when the body and mind are at peace and work in harmony. "Health care" is an important component of the experience of personal perfection according to the (OHE) paradigm. While therapies are necessary and certainly implemented, methods that facilitate natural healing and self-recovery are it is the primary means of health care.

→ One of the means of health care is to provide activities such as yoga, meditation, massage therapy, etc. To provide these services, it should be: -

"The design of the medical facility includes spaces to accommodate these activities."

→ The other key element of personal perfection is spirituality. Thus, spaces are needed that would encourage and refresh the spirit for many patients "Sickness represents not only a physical and emotional crisis, but a spiritual one as well."

→ Although health care facilities face a challenge in catering to the diverse spiritual needs of people, they can offer several

options to meet people's spiritual needs and are places of rest or meditation (Fig 3), as a quiet haven for patients and their families. Stained glass and symbols of faith support spiritual healing as well, as nature is the universal image of spirituality; Nature is also an innovative and useful way to depict birth, death and regeneration by way of:

⊖ Create places for rest and contemplation.

⊖ Create an opportunity for quiet sessions.

⊖ Create places and opportunity for spiritual healing.



⊖ Make use of nature in design⁷.

Cultivating healing relationships

Defining it: Healing relationships are social interactions that provide a sense of belonging and promote well-being and healing, and qualities such as sympathy, compassion, care, love, reassurance, comfort, trust, honesty and respect form the basis of therapeutic relationships.

→ Developing these traits requires listening and communication skills According to Wayne Jonas, "Indulging in healing relationships is one of the most powerful ways to stimulate, support, and maintain health and healing."

→ Another source agreed, stating that both family and professional support for caregivers contribute to reducing anxiety and promoting healing in patients. In the OHE model, there are two ways to facilitate therapeutic relationships:

Therapeutic Alliance: These are social and psychological interactions between professional caregivers and patients who facilitate recovery.

Social supportive interactions: These are non-clinical interactions between patients and their families and friends, support groups and the community.

Design can influence the relationships between professional caregivers and their patients, for example, one source indicates that glass partitions and centrally located nursing stations may increase interaction between professional caregivers and patients and small, decentralized nursing stations are spread throughout the space, making Allows patients to have more professional support for caregivers Since these smaller "nursing huts" are located just outside patient rooms, and not in the middle of the space, patients and their families will not have to walk far to reach a nurse. Decentralized nursing centers provide services from

⁶ ZGF Architects. N.d. St. Charles Medical Center, Bend Outpatient Cancer Center and Radiation / Oncology Remodel. Accessed October 11, 2017. <https://www.zgf.com/project/st-charles-bend/>.

⁷ Zuniga-Teran, A.A., B.J. Orr, R.H. Gimblett, N.V. Chalfoun, D.P. Guertin, and S.E. Marsh. 2017. "Neighborhood design· physical activity· and wellbeing: Applying the walkability model." International Journal of Environmental Research and Public Health.

professional caregivers to patients and are therefore seen as more supportive of patients' needs.

→ Decentralized nursing stations not only provide more patient interaction with professional caregivers, but also new places to communicate with professional caregivers, which encourage and enhance teamwork and improve patient outcomes can support design or detract from patient interactions with their families.

→ Unfortunately, oncology centers have a long history of separating patients from their families despite the extensive knowledge available that demonstrates the importance of social support. Poorly designed spaces are usually insufficient for visitors and contribute to the lack of privacy and confidentiality. The design of the interaction between the patient and the family takes into account many (Fig4) Things by:

⊖ Create seating arrangements that enhance conversation.

⊖ Select soft materials and comfortable seating options.

⊖ Fix carpeting in rooms against hard floors (where applicable)⁸.

Practicing healthy lifestyles

Defining it: Focusing on promoting healthy behavior, healthy behaviors such as diet options, exercise, relaxation and leisure can support wellness, facilitate healing, and prevent disease.

In order for OHE to promote healthy lifestyles, they must provide services that encourage and help maintain healthy lifestyles.

Programs aimed at achieving a healthy life should be provided

1. Managing negative addictions and promoting positive habits.
 2. Healthy eating.
(3) Exercise appropriate physical exercise.
 3. Managing and creating a balance between work, leisure and family activities.
 4. Detecting preventable diseases.
- ✓ Add indoor and outdoor walking paths.
 - ✓ Add community meeting spaces Includes vending machines that provide healthy options.
 - ✓ Design cafeterias to look like a restaurant.
 - ✓ Create community spaces for yoga, tai chi, art, music, and pet therapies.

Living a healthy lifestyle is especially important for cancer patients. Studies have shown that a diet containing a large amount of vegetables and fruits can work to control and possibly prevent cancer. Exercise and physical therapy are proven to have significant positive effects on cancer patients.

→ The routine of practicing healthy lifestyles begins first on the part of professional caregivers, as it is considered that the most important component of the healing environment is a "professional caregiver", in order to provide appropriate care and there is a concern that professional caregivers who have healthy stereotyped behaviors will be less prone to diseases.

⁸ (Stevenson and Humphris 2007)

After analyzing the most recent data from the Nurses' Health Study, he expresses concern that nurses who smoke may be less willing to support tobacco control programs or encourage their patients to quit. Likewise, another study looking at nurses' obesity found that the majority of nurses who were overweight were the plus does not follow up with patients even if they consider them obese. However, it is of utmost importance for leaders to create a healthy culture within their organizations and to apply the same system to themselves as well.

→ Healthcare facilities can also use design to support disease awareness and promote healthy living for example,

1- The site coordination will encourage employees and patients to practice more sports, as is the case in the indoor and outdoor walking paths, which encourage exercise.

2- Providing meeting spaces to hold comprehensive healthy lifestyle training programs (Fig 5).

3- Restaurants can offer healthy options to encourage community use so that consumers have access to a nutritionist and other health care educators.



The facility can also provide family kitchens so that families can prepare special meals for their loved ones whenever they want⁹.

Applying Environmental medicine

Defining it: Another area of the (OHE) paradigm, also referred to as the application of integrated healthcare in an integrated healthcare setting is a combination of traditional medicine and environmental medicine (complementary or alternative), with reference also to a team of professional caregivers who work together to provide optimal care, Where environmental healthcare is patient-centered, and therefore works with a specific set of basic values and goals including treating the

⁹ Waxman, H.M., E.A. Carner, and G. Berkenstock. 1984. "Job Turnover and Job Satisfaction among Nursing Home Aides." *The Gerontologist*, 503 -509.

whole person (physically - psychologically - spiritually), Aiding in the natural healing process, promoting health and wellness all within a personal patient care system. Indeed, one of the greatest advantages of collaborative medicine is its holistic personal care approach; because it depends on patients' individual preferences and needs, it helps to ensure the best clinical outcomes and enhances patient satisfaction.

→ Also known as "a new collaborative effort for cancer patients and integrated cancer care, it is a new comprehensive approach that integrates insights from research in the fields of nutrition, biochemistry, exercise, psycho-oncology, complementary and alternative medicine with traditional medical practices".

→ As a consequence of the insignificance of integrative medicine there is a need to change healthcare design as healthcare settings should now provide rooms for massage, acupuncture, and stress reduction, as well as yoga rooms, and music (Figure 6), where the architecture itself is seen on It is an "approach to integrative healing. In fact, because of their validation, the positive effects of the physical environment on patients, researchers and designers are already starting to consider architecture as an essential tool in the therapeutic process."¹⁰



Creating healing organizations

Defining it: The sixth area is the creation of treatment organizations for the first time, although there are no right or wrong values. SAMI considers that the Al-Shifa organization is "an organization that values and endorses attitudes and behaviors that facilitate recovery, reform and perfection." With daily tasks, building trust and respect in others through teamwork and commitment Design can facilitate the creation of therapeutic organizations by supporting recovery, repair and wellness Any design decisions based on promoting user healing, health, recovery, and perfection has the power to help maintain organized values Healing as it describes the many features that physical environment designers can use to facilitate healing and perfection (Fig7).



Building healing spaces

¹⁰ The Dove Clinic for Integrated Medicine. (n.d.j). Ozone therapy. Retrieved October 3, 2019 from http://www.doveclinic.com/site/treatments/treatments/t_ozone.htm

Defining it: The final area of the OHE framework is the construction of healing spaces the research is based on the premise that "the physical environment is not just a background for healthcare services, but an important part of the healthcare experience." Treatment environments should allow all users to have a positive experience. This field contains many components that It can promote or support wellness (Fig8) by: -

∞ Include spaces for the daily journal and organize the creation of therapy organizations.



∞ Make design decisions based on promoting user well-being, health, freshness and perfection¹¹.

Through the study of areas of optimal healing, it becomes clear that the most comprehensive of all elements is "building healing spaces". Therefore, it was necessary to pay attention to this, whether financially or psychologically. Therefore, the importance of studying health care approaches and concluding some new integrative principles that should be taken into account when designing oncology centers appeared.

Curricula for health buildings

Healthy buildings are the most resource-intensive, and so there has been a recent push to design them more sustainably.

→ Certification (LBC), (WELL):

- They build certification programs that focus on the sustainability and wellness of health buildings, both of which are promoted by the Future International Living Institute.
- As the (WELL) approach: It is the first building standard that focuses on the health and wellness of the occupants of the building, the design can be more holistic, creating a better healing environment, when sustainability is considered at the beginning of the design process.
- (Living Building Challenge) curriculum: one of the most difficult sustainability certification programs in the world for healthcare buildings.
- (LBC) and (WELL) begin to address deficiencies by integrating strategies that focus on health, happiness, fairness, beauty and a sense of place with design standards for health buildings.
- Post-operational assessments of spaces designed based on the Health Building Assessment Curriculum have shown that more than 90% of patients see new indoor spaces as improving their health and well-being; Over 80% believed that the

¹¹ Ananth, S. (2018 c). Cultivating Healing Relationships. EXPLORE The Journal of Science and Healing, 5(4). 250-251. doi: 10.2016 /j.explore.2019.05.

outdoor space made them more productive and increased cognitive performance¹².

Goal: Awareness of the changes that can be made in the design of sanitary buildings in order to simultaneously improve the welfare of their occupants and reduce the environmental impact of the building. We must therefore design healthcare buildings to incorporate sustainable principles that make the building less environmentally harmful by incorporating design guidelines that support ideas of wellness and healing. To achieve this goal,

The following process will be carried out

1. (Living Building Challenge and WELL) will be used to generate a list of criteria for evaluating case studies.
2. Similarities and relationships will be found, and a set of overall sustainability strategies will be created, which will be used to formulate health building design principles.
3. Strategies created from the case studies will be evaluated based on their sustainability and wellness characteristics. The overall sustainability strategies that are most important to the overall design, supported by evidence-based design, will be used in the final building design¹³.

Well (Well Building Standard)

→ The Well Building (WELL) standard, also produced and managed by the International Living Future Institute, is the first standard of its kind that focuses on the health and safety of building occupants.

→ There are 7 concepts in the standard (Fig 9), namely¹⁴:



Lbc (Living Building Challenge)

→ The LBC curriculum was published in 2006 by Jason McClain in an effort to create a more sustainable design standard, and McLane joined Eden Brockman to further develop the standards.

→ Where he started with the LBC 2.0 curriculum and eventually reached the LBC 3.1 curriculum, which is the version that is used today and the organization that currently

oversees this challenge is the International Living Future Institute, and the institute provides global solutions for lasting sustainability.

→ (LBC) is one of the most difficult programs to obtain the sustainability certificate available with the aim of creating a renewable building, and the result should be a beautiful, self-sufficient building that returns to the environment more than it consumes.

→ The syllabus uses the flower with 7 petals (classes of achievement), which are:

- ✓ Place
- ✓ Water
- ✓ Energy
- ✓ Health +happiness
- ✓ Materials
- ✓ Equity
- ✓ Beauty

When an integration occurs between the WELL curriculum standards and the LBC curriculum, resulting in a new set of complementary standards (Fig 10), which are as follows¹⁵:

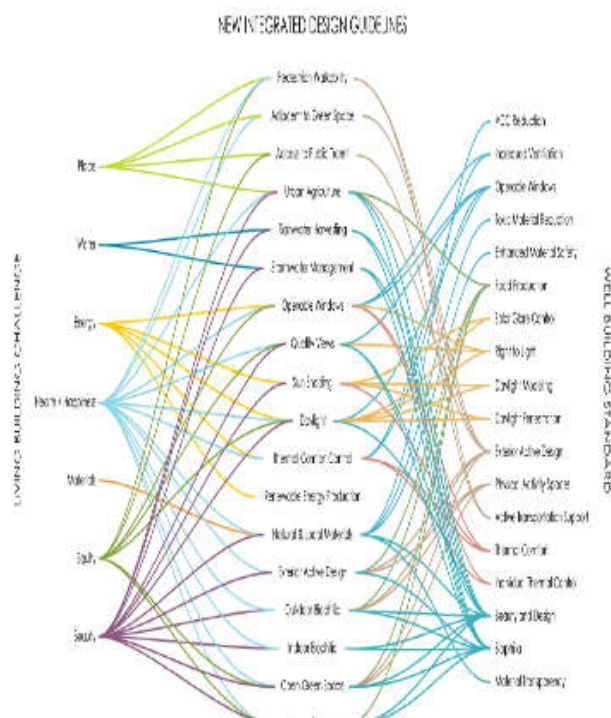


Table1

principles	Describe	Contact with WELL	Contact with LBC
Pedestrian Walkability	By placing the building in an area that can be accessed on foot, in order to reduce car use, thus reducing carbon emissions, and promoting a more environmentally friendly approach, this also creates a sense of community within the area that promotes social interaction, daily activity, and the environment can also be designed. Built in a way that integrates physical activities into daily life, helping to reduce the	Active exterior design, dynamic transportation	Place, health, happiness, and material value

¹² Barnes, J. (2011). Evidence-Based Design: An Interior Designer's Opportunity. In C. Martin & D. Guerin (Eds.), *The State of the Interior Design Profession* (pp.129-135). Location: Fairchild Books.

¹³ Ananth, S. (2019). Implementing OHEs. *EXPLORE The Journal of Science and Healing*, 6(1), 52-53. doi: 10.2019/j.explore.2019.11.005

¹⁴ (Atkinson, Chartier and Pessoa-Silva 2019).

¹⁵ Bégat, I., Ellefsen, B., Severinsson, E. (2005). Nurses' Satisfaction with Their Work Environment and the Outcomes of Clinical Nursing Supervision on Nurses' Experiences of Well-being – a Norwegian Study. *Journal of Nursing Management*. 13(3), 221 -230.

	lack of physical activity, which is a global health problem, which has been linked to various serious health problems later in life.												
Adjacent to Green Space	Placing the building close to a green space can enhance well-being because 'people actively seek interactions with nature for leisure and enjoyment' and can improve one's quality of life through 'positive effects on physical health, psychological well-being, cognitive ability and social cohesion', green space can To create a sense of place.	Active exterior design	Place, health		Daylight	Exposure to daylight has been linked to patient health and employee satisfaction, and new research indicates that lighting can improve the sleep patterns of elderly patients, reduce medical errors, and even reduce the need for medications, as providing natural daylight in spaces can reduce the need for artificial lighting. And providing solar heat during the winter months reduces the building's heating needs.	Smart windows, radiation reduction, natural lighting, beauty and design	Energy, health happiness, fairness, and beauty					
Access to Public Transit	Public transportation reduces car use, which reduces the amount of pollution caused by greenhouse gases, and this also encourages people to walk to nearby transit stations and interact with people from the community.	Vital means of transportation	the place		Thermal Comfort Control	Thermal comfort can affect performance and productivity and providing areas with adjustable temperature and shading can ensure that the level is chosen that best suits their comfort.	Natural ventilation, smart windows, and thermal comfort	Energy, health					
Urban Agriculture	Agriculture plays a vital role in creating a self-sustainable building or community, it creates natural foods made locally, supports the surrounding area, and studies show that gardening can lead to better eating habits and more positive perceptions of general health, and it was associated with a body mass index, as well as a lower Possibilities for overweight and obesity.	Diet, Active Exterior Design, Beauty and Design	Place, happiness, and beauty		Renewable Energy Production	Renewable energy can replace the need for electricity provided by power plants, reducing carbon emissions and this has been linked to air and water pollution causing a variety of health issues ranging from cancer to heart attacks.	There is no	energy					
Rainwater Harvesting	Rainwater can be collected and reused for drinking in what is known as gray water, which reduces the amount of water requirements for the building. Studies have shown that views of natural elements, such as water, have helped patients heal and recover faster, because humans have an affinity towards the natural world.	Beauty, design, and dynamic design	Water, beauty		Natural & Local Materials	Using renewable materials that come from reliable sources can ensure that they have little impact on human health and the ecosystem, and materials from local sources can reduce carbon emissions. Resulting from the transport of natural materials and materials such as wood, which studies have proven has a psychological effect on cancer patients, as it reduces depression, blood pressure and stress.	Reducing noise, rationalizing building materials, beauty and design	Health happiness, materials, and beauty					
Storm water Management	By managing rainwater runoff, the amount of erosion can be reduced in proximity to the site, and it also reduces the amount of polluted water that causes it to return to waterways and our drinking water supply. Original plants can be added to reduce runoff and create a beautiful natural environment. Studies have shown that irrigation Or interacting with a garden can reduce stress and anxiety.	Beauty and design, dynamic design	Water and beauty		Exterior Active Design	Studies have shown that patients were less depressed, as access to nature enhances physical exercise. Research has indicated that exercise leads to a recovery process for breast cancer patients, and can be used to manage the negative side effects of treatments, to increase treatment completion rates, to improve physical and psychological outcomes, and to Enhancing the quality of general life ... Recent studies also indicate that exercise after breast cancer diagnosis can significantly reduce the chance of contracting the disease again.	Diet, Active Exterior Design, Physical Activity Spaces, and Bio Design	Health happiness, beauty					
Operable Windows	Achieving natural ventilation through opening windows and doors can provide a positive experience, open windows can provide a supply of fresh air and reduce carbon dioxide levels, without compromising indoor air quality, operable windows can provide air circulation when temperatures are up. In addition, lower ventilation rates are associated with increased rates of infection or outbreaks of airborne diseases, and higher ventilation rates can reduce the risk of infection and this can be achieved despite natural ventilation when the air quality is high.	Natural ventilation, smart windows, natural lighting, and thermal comfort	Energy, Happy Health, and Beauty		Outdoor Biophilia	Human beings have an innate tendency to have connections with nature and other life forms and as a result they can reduce stress, improve cognitive functions and creativity, improve their well-being and speed up healing.	Food production, energetic exterior design, outdoor activity spaces, aesthetics and design	Health happiness, beauty					
Quality Views	Views of nature have shown to reduce stress, and decrease hospital stay.	Smart windows, natural lighting, beauty and design, dynamic design	Happiness, health, fairness, and beauty		Indoor Biophilia	To achieve this not only through physical contact with nature, but also patterns and materials that symbolize nature. These strategies for implementing and representing nature's forms can reduce stress, improve focus, and make the environment more comfortable.	Beauty, design, and dynamic design	Health happiness, beauty					
Sun Shading	Sun shading can reduce the solar heat gain of the building, and reduce the need for additional cooling. Excessive sunlight can cause thermal discomfort and unwanted glare, and it is desirable to provide shading options to allow individual patient comfort. Many cancer patients feel they have no control over their bodies and want to have some control over the environment around them.	Reducing radiation, solar energy, natural ventilation, and thermal comfort	Energy, beauty		Open Green Space	Existing open landscaped areas can enhance physical activity and community participation and it is important to leave part of the site uninhabited to support indigenous plants and ecosystems, thus reducing the overall environmental impact on the area. Nature can improve quality of life through positive effects on physical and psychological health, well-being and cognitive ability. And social cohesion	Diet, Active Exterior Design, Outdoor Activity Spaces, Beauty and Design	Health happiness, fairness, and beauty					

Place of Respite	Places of rest are a quality-of-life issue that has proven its economic viability for its users, including shortening patients' survival times, reducing employee turnover, and nature can be used to create a place of rest where patients and families can move away and get rid of stress, and health care workers can benefit from these areas. Also, comfort zones can be therapeutic, providing visual relief, and stimulating the senses.	Diet, beauty, design, and dynamic design	Health happiness, fairness, and beauty
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A new set of complementary standards encompasses the physical principles for designing an Integrated Oncology Center.

Summary

In order for us to be able to make optimal use of oncology centers, the research recommends that the design of internal spaces for oncology centers be based on several requirements, which are: 1- The design of internal spaces for oncology centers should be based on the psychological considerations of cancer patients and attention to evidence-based design and to achieving elements of an optimal healing environment in oncology centers. 2- Taking into account the environmental and physical aspects in finishing the oncology centers and the effect of this on the therapeutic aspects of the patient during the treatment period or after treatment. The research also recommends the necessity of continuing the architectural studies with all the medical and psychological influences, especially for patients with oncology, to reach an evidence-based complementary healing in all respects, taking into account all aspects of the patient, whether psychological or physical.

Focusing on sustainability, wellness and evidence-based design through the integration of all, the intended result will be the development of a design process that integrates all requirements in making healthy building environments more supportive to the patient and staff, more environmentally responsive, and more conducive to health and healing in oncology centers.

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