

Towards the Embodiment of Sustainable Integrative oncology Canters

Prof. Dr. Emad Kamel Faheem*, Architect. Eman Gamal Shalaby **

*(Professor in Architecture, Faculty of Engineering, Helwan University
Email: emad.kamel@ark-eg.com)

** (Teaching Assistant of Architecture,
New Cairo Academy of Sciences and Arts,
Email :arch.emangamal@gmail.com)

Abstract:

It was the emergence of a new type of treatment for cancer patients, which was known as "environmental medicine" to take into account the psychological aspects of cancer patients and in support of achieving all elements of integral healing for cancer patients during their journey in treatment, or even after they were similar to the healing process. Applications of environmental medicine to all oncology users (professional care providers, patients, loved ones, and professional care providers), and this also indicates the need for new spaces developed for oncology centres and the materials needed to finish them in order to support the development in the medical aspect of cancer treatment, studies show that the sustainability of the physical environment of the internal spaces of oncology centres has a significant impact on the users of oncology centres. Therefore, the model of a sustainable integrated environment in oncology centres was the cornerstone of the original research component of this study.

Keywords —Environmental medicine, Immunotherapy capsules ,Typical counseling room, Injection room, Inspirational spaces.

I. INTRODUCTION

Environmental medicine is defined as "an integrated health perspective recognized the multiple nature of human health aspects through visualizing the body, mind and spirit as an inextricable force in action within each of us." Which in turn is formed from the built natural environment so that the comprehensive health model becomes possible and for the environment of tumor centres to successfully support this holistic health model, it must include a variety of healing methods that reinforce each other. Integrated medicine has emerged as an assistant to advocate an approach to integrated health care. This newly emerging field offers the best method of treatment that combines: Prevailing medical treatments. Environmental medicine treatments (such as acupuncture, meditation, and music therapy) are of high quality. According to Dr.

Andrew Weil, an expert in integrative medicine, integrative medicine is "medicine that takes into account the whole person (body, mind, and spirit), including All aspects of lifestyle which emphasizes the therapeutic relationship and makes the use of all appropriate treatments, both traditional and alternative, and an integrated approach supportive of individual empowerment to full recovery. Where the Cancer Canter imagines a place that encourages and supports you on your journey to wellness and the Integrated Canter for Cancer Treatment seeks to be an attractive environment that supports the shift in perception of cancer from being life-threatening to a health challenge that can be overcome and can be inspired by the power of healing nature as an example of the positive role that can Interior design and the interior environment can play this type of change. Therefore, it was necessary to study the effect of environmental medicine in oncology centers in order to reach

sustainable integrated oncology centres, as well as the spaces created in the design of sustainable integrated oncology centers.

II. THE EFFECT OF MODERN APPLICATIONS OF ENVIRONMENTAL MEDICINE ON ARCHITECTURAL SPACES:

Oncology centers should be designed as a living space for patients, which provide a stimulating environment, in order to create the optimum numbers for the healing process. It should not be designed only through its function, aimed at implementing the use of sensory design in the health care setting, in order to create the optimum numbers of healing that occurs by integrating the cancer center with treatment facilities by:

- Establishing a cancer center that provides a variety of treatments, including radiation and chemotherapy.
- In addition to providing alternative therapies and entertainment programs, other programs include psychological support and patient and community education.
- Design a building composed of outer space and the environment and create a therapeutic environment

It is divided into several applications, namely: Immunotherapy capsules, Typical counselling room, Needle Chamber, Inspirational spaces, The main stairs, Reception and waiting area.

1- IMMUNE THERAPY PODS.

Internal elevations appear and it is expected that setting the priorities of nature and providing abundance of natural light will reduce the pressure on staff and patients and the patient's uneasiness while receiving treatment and all these factors contribute to increasing patient satisfaction, in this area, the negative action to receive treatment is converted into an active time To engage with the surrounding landscape and communicate with people there is also a strong sense of control over the user in space (Figure 2).

People spend up to an hour and a half receiving intravenous immune system treatments. The design of the capsules aims to give priority to a feeling of control over the user and safety during these treatments while linking people with each other. It is envisioned that every pod wraps them with natural materials as shown in Fig. 1.



fig .1 Immune therapy pods -materials and finishes..

These packages provide a feeling of privacy and safety, a sufficient space and comfortable seats to accommodate two care partners during treatment, and the glassy interface provides views of the garden and also contains individual TV screens in each pod carrying people the option of watching a sports game or other display, how it can be transformed The capsules are from very special containers to an open shared space by sliding the resin panels into the wood enclosure and opening a privacy curtain in fig.2.



	Subject	the use	Sustainability
walls	Closed aluminum panels	Where it absorbs the excess heat in the interior space of the building and store it until the degree falls again and return it to the vacuum.	External lighting , Thermal comfort
	Anti-reflective glass for holes	It is an anti-reflective glass, the thickness of the coating of nanomaterial is about 150 mm, and it works to reduce the reflection to less than 1%. Solar energy utilization to 15%	Shading , Landscape lighting , Thermal comfort
	ANZ Paints	You use three layers of these paints to obtain an insulating surface for heat, humidity, and salts in the least time, as it is transmitted for long periods on the walls.	Thermal comfort
Floors	Nano thermal insulation boards	It is used in flooring to prevent slipping and its ability to largely isolate heat and sound Vacuum insulation panels	Thermal comfort , Landscape lighting
bishop	Closed aluminum panels	It is installed in the ceilings where it absorbs the excess heat inside the vacuum and stores it until the temperature drops again and re-uses it to warm the vacuum.	Thermal comfort
Complementary material	Nano wood	The nanotechnology improves the structural performance of wood, as nano catalysts stimulate chemical reactions and make wood multi-functional as it makes wood repellent to oils and water, impermeability of water vapor, maintaining temperatures	Thermal comfort
	Windows absorbent energy	"Saflex-SG" is the trade name of the product manufactured from the material "PVB" absorbing the solar energy. It uses solar energy absorption technology and visible light in order to improve the performance of the solar heat acquisition compared to the chips and transparent glass.	Landscape lighting , External views , Environmental openings
Construction and Building Materials	Carbon nanotubes	They are empty nanometer-sized cylinders and consist of a huge group of hexagonal structures that in turn consist of carbon atoms, they are used in the building's structure Where it works on: increase the ability of concrete to resist frost, improve concrete strength by 30%, magnetic radiation scattering	Thermal comfort , External dynamic design

fig .2The public immunotherapy pods

- **Finishing IMMUNE THERAPY PODS:**

Table .1 It shows the finishing of the immunotherapy capsules.

2- Typical Consultation ROOM.

Access to natural light is one of the most important basics of this room, fresh air and favorable views through the operable windows where the interior of the consultation room has been furnished with unstable parts and seats are provided for guests to take care of the guests during the consultations, and there is an LCD screen behind the doctor's chair that allows the patient and care partner To display medical information on the computer in fig.3.



fig .3 It shows Interior perspective of the consultation room.

this provides an opportunity for all parties to play an informed role in decisions related to treatment, as lighting plays an important role in this room.

The use of four light boxes for the comfort of patients and to create good emotional effects or a dynamic white light environment during the consultations These lights are turned on and mixed in the ceiling, which allows the natural non-disabled scene to be projected. The scene is chosen by the patient, and further enhancing their sense of control as the nature scene works Positive (Figure).

Finishing consulting room typical:

Table .2Demonstrates the finishing of the model consulting room.

	Subject	the use	Sustainability
walls	Bioplastic	Bioplastic is manufactured from PLA as the production of refractory and water-repellent thermoplastics is expensive. Therefore, it is preferred to use cellulose-based bioplastic as it is a natural and organic material and is considered to be a material with high light transmittance by 90%.	Natural local materials , Landscape lighting , Environmental openings
Floors	Rigid	It is a material used for thermal insulation from polystyrene in the	Thermal

	polyurethane foam	form of solid foam with a high density added to wood and is considered a material that is impervious to moisture, high temperature and pressure resistance, so it is used in isolating floors.	comfort , Natural local materials
bishop	Lemera (Aerogel)	It is a unique material that is lighter and better insulating material from silica and is a hairline of glass lines with very small pores. The material consists of 5% of solid material and 95% of the air improves the spread of light inside the vacuum and also provides a high quality of light and limits Voice transmission, as it transmits light at a rate of 91% per cm ² and reduces the solar heat gain.	Thermal comfort , Natural looks , External views
Complementary material	Photocatalyst Foliium paint	Helps paint interior and exterior walls by concentrating formaldehyde and carbon dioxide emissions in the atmosphere. When exposed to ultraviolet sunlight, carbon dioxide emissions are reduced until emissions are zero.	Thermal comfort , Natural local materials
Construction and Building Materials	Vacuum insulation boards	As a result of the increasing demand for the use of insulating materials in buildings, it was directed to find solutions with better specifications where the traditional insulation reached 5-30 cm, making it impractical, as the thermal conductivity of these panels is ten times less than the traditional materials and is used when you need a few place For insulation	Thermal comfort

3- injection chamber, ACUPUNCTURE ROOM.

acupuncture sessions lights are turned on and mixed in the ceiling and the scene is chosen by the patient, and further enhance their sense of control in space as the landscape scene works as a positive distraction based on evidence, and divert people's attention from the potential discomfort of acupuncture in fig.4.



fig. 4 It shows the finishing of acupuncture.

Needle Chamber Finishes:

Table (3) shows the finishing and furnishing of the needle room.

	Subject	the use	Sustainability
walls	Polycarbonate	This material is used as a transparent insulation material, which allows light penetration of 88% and its thickness reaches 3 mm	Landscape lighting , Environmental openings
Floors	Extruded earth surfaces	These surfaces, which depend on their formation on nanotechnology, use a variety of coatings to protect against infrared and ultraviolet radiation at	Shading , Natural lighting , The external views of the

		99% mm.	building
bishop	PMMA Article	It is a material with high optical performance compared to the rest of the materials. It is similar to glass. It is light in weight and contributes to the passage of light inside the vacuum to 92% and can be used as a transparent thermal insulation.	Natural Looks , Landscape lighting
Complementary material	Non-toxic paints	These types of paints depend on being not harmful or toxic, as they can be manufactured from the surrounding environment, such as natural oils, water, vegetable dyes, and minerals. They do not contain volatile organic compounds and can be made from linseed where they decompose, which allows the walls to breathe and thus prevent moisture.	Natural local materials , Thermal comfort
Construction and Building Materials	M Wood	It is a mixture of industrial wood, various types of plastic and polyvinyl chloride tubes, thus it is 55% lighter.	Natural local materials

4- Spiritual SPACE:

Its definition: It is a quiet area of meditation and restoration in the centers of tumors whose focus is to create a connection with the outside world, as Stephen Kellert (2008) explained, that accelerated water and majestic light have the ability to connect people with a greater sense of themselves, and transmit spiritual messages, spiritual space is considered, Surrounded by a water wall on three sides and surrounded by moving light, a multi-sensory area creates a strong sense of contact outside and privacy while maintaining the impression of openness. The floor consists of treated oak, creating a sense of accompaniment along the void and the void surrounded by a water wall, visitors wander around the wall, confirming that this is a place far from the rest of the center and has its own character Fig.5.



fig .5 It shows Interior perspective of the spiritual space.

Within space, a person has the feeling that under the canopy of a protective tree with a glow of natural light that casts its shadow everywhere the

effect was created using elaborate lights concealed behind the laser-cut panels that simulate the shape of an aspen tree tremble, although the spiritual space does not enjoy With access to natural light, this lighting effect conveys the impression that it is being outdoors in nature, invites interaction and provides options for sitting alone or with a companion that provides the opportunity to calm haptic interactions between family and friends The primary element in space is the water surrounding it. The water is a restorative element that has spiritual significance. It transmits natural sounds and scents in a clear and wonderful way by dissolving the hardness of the walls of the spiritual space with water. Falling water also calls to touch it (Figure 5).

Finishes in the Inspirational Space:

Table (4) shows the room's finishing.

	Subject	the use	Sustainability
walls	Lemera (Aerogel)	It is a unique material that is lighter and better insulating material from silica and is a hairline of glass lines with very small pores. The material consists of 5% of solid and 95% of air improves the spread of light inside the vacuum and also provides a high quality of light and limits Sound transmission	Thermal comfort , Natural local materials
Floors	Nano wood	The nanotechnology technology improves the structural performance of wood and multifunctional as it makes wood oil and water repellent, impermeable to water vapor, and maintains temperatures.	Thermal comfort
bishop	PMMA Article	It is a material with high optical performance compared to the rest of the materials. It is similar to glass. It is light in weight and contributes to the passage of light inside the vacuum to 92% and can be used as a transparent thermal insulation.	Landscape lighting , Thermal comfort , Environmental openings
Complementary material	Windows absorbent energy	"Saflex-SG" is the trade name of the product manufactured from the material "PVB", which absorbs the solar energy. It uses solar energy absorption technology and visible light in order to improve the performance of the acquisition of solar heat compared to the chips and transparent glass.	Thermal comfort , Landscape lighting , Natural local materials
Construction and Building Materials	Environmental cement	This type of cement depends on re-providing local waste instead of relying on primary wood in its composition so that this waste is burned and used to reduce carbon dioxide emissions by 50%.	Natural local materials , Renewed energy

5- MAIN STAIRCASE main tray

The main staircase is the focal point and carries a large vital presence felt on each floor. The staircase is designed by building a green wall extending the length of the stairs on the north side, at the base of the stairway there is a small waterfall garden to become a group of aesthetic experiences and these multiple sensory elements combine to create a strong sense of connection to the world.

As a transitional space, the stairs have a unique ability to connect people to the sensory side of themselves while they rotate through the building In most cases, the stairs indicate health as the act of climbing or descending is a form of exercise that engages the body in movement in tumor centers, the main stair depends on This post seeks to be a place for joy. Encouraging people to use it and an invitation to interact with the architecture. The staircase itself is preferably made of steel and maple-coated, to enjoy the strong industrial



structure and refers to trees in the landscape outside the glass façade The outer guardrail is built and coated with solid maple wood to suggest that the staircase is safe to climb On the contrary, the inner handrail is transparent to provide an unobstructed view of the chandelier Behind it in fig .6.

fig .6 It shows the custom chandelier and waterfall at night.

Thuraya: It is a custom fixation of the lighting lamp designed by Omer Arbel and randomly cut crystals as shown in the details Fig.7.

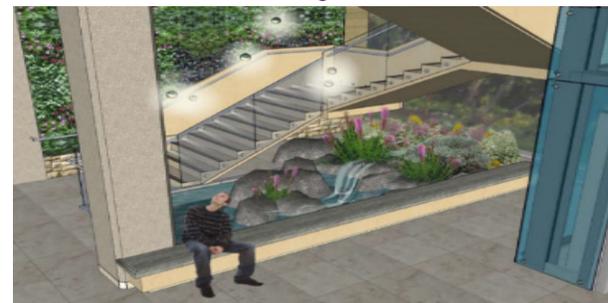


fig .7 It shows thuraya.

infiltrate through the space in the stairs to spark a picture of precipitation and its renewal during the day, the lights are turned off and illuminated Abundance of natural light from the glass facade on the stairs, this natural light is refracted by the crystals and cast rays of colored light on the stairs and floorboards and this charming light illuminates

the qualities of awe and bio-cheerfulness . "The" waterfall garden "can be tried at the base of the stairs, as shown, near the sitting area or at a moderate distance from the waiting area, this feature is expected to break the boredom and stress resulting from the waiting experience by providing a view Positive multi-sensory that engages Visual and auditory systems, and when natural elements are included as positive dispersal factors that contribute to reducing patient and employee stress and increasing patient satisfaction. These positive effects increase when visual features are combined with the involvement of other sensory methods.

6- Reception Spaces EXTERIOR APPROACH

Upon entering the building, the first impression is made among people about the interior of the center in the reception area. The first impression of the center is crucial to delivering a comprehensive healing message in oncology centers.

As the space fills with light, plants and natural materials that speak to the wilds and revitalize the area, immediately, the visitor can feel confident about the place they go to and is tempting to explore space. After check-in, people make their way to the parking area behind the reception desk where they can directly reach the elevator and the main stairs when it's time to climb to the top floor



in fig. 8.

fig .8 It shows the finishing of reception.

As shown in the submitted floor plan, the open area progresses from most public areas in the front to the most private in the back clarifying the contribution of the ceiling level and the concept of lighting in

the experience of these areas although the floor is open, the variation in the flooring materials and the level of the ceiling and the furniture helps in Create connected but distinct experiences in place when moving from one area to another as shown, a farmer keeps the original prairie herbs between the waiting area and the reception identifies these two areas and the stove distinguishes the quiet library and fireplace hall next to the rest of the public area. In the waiting area, therapeutic landscapes outside the structural glass wall, the delicate scent of the green wall extending along the stairs and seating options in this area are provided for people of all ages and abilities .

shows the waiting area surrounded by acoustic mesh ceiling and wooden slats traveling below the western wall intended for the ceiling is to reduce noise while providing a sense of safety and the ceiling also touches the decorative shades lying on



the floors and walls of the outer ceiling in essence in fig.9.

fig .9 It shows the seats in reception.

III. CLASSIFICATION OF THE VOIDS OF EMERGING ENVIRONMENTAL MEDICINE.

THE FOLLOWING AREAS INCLUDE: -

- External spaces.
- Interior spaces.
- Workers' spaces.

1- External communication spaces:-

A-Design spaces for communication with other.

Studies have shown that patients need:

- Communication with people.
- Communication with professional caregivers.
- Contact with the family.

- Communication with other patients

According to a study conducted by the Picker Institute, patients have made clear that they want health care treatments to facilitate communication with professional workers and caregivers because professional caregivers play a critical role in providing the psychological support that patients need and one of the ways the environment can be facilitated Built to enhance communication with staff by placing the nursing center close to the beds of patients and it is important that nurses see chemotherapy patients, and that patients have contact with the nurses station if they need help or want something as nurses stated that patients find this arrangement comfortable.

Family support is also important for patients, as one source states, "Cancer is a family disease. Examination rooms and conference rooms must be large enough to accommodate the family." Additionally, families need several options for places to go to the cancer center, reading halls, gym, Coffee shop, garden, etc.

The spaces that welcome visitors will encourage them to stay with the patient, and social contact with other patients is another important factor in the healing experience for many cancer patients, social isolation is a very familiar fact associated with their disease

The design of the built environment can change this scenario by creating a collective or private "chemotherapy bays", these different options will give patients control of their environment and will support the opportunity to form a friendship between them, as one of the cancer patients observed: "With your friends with cancer, you can talk about all Issues that you can't talk about with another person, because they all suffer the same kind of thing whether it's your gut or not you are sleeping or, you know, all that kind of problem "When a cancer facility design enhances community building, cancer patients can participate in sharing Information, and emotional support from fellow patients These interactions have shown that they significantly reduce feelings of anxiety, depression, isolation, and pain.

Spaces for communicating with others. "Relationships with others lie at the heart of

recovery." Studies have shown that patients need and want to contact people - contact with professional caregivers, communicate with family, and communicate with other patients. According to a study by the Picker Institute, this is because professional caregivers play a crucial role in providing the psychological support they need.

B-Spaces for Counselling

Another important aspect is counselling, especially for cancer patients and their families, the built environment needs to be supported by several types of advice, including private and group counselling, group spaces are necessary for support sessions, exercise lessons, and even organized and unstructured opportunities for mutual participation and promotion between patients and loved ones.

These spaces should have a comfortable setting that is conducive to conversations and can be designed by designers

"The social interaction has increased significantly between patients and counselors by identifying comfortable and movable furniture that can be arranged in small, flexible groups." in fig .10.



fig .10 It shows counselling area .

C - Knowledge Space Design.

In the face of illness or the challenge of life, one faces a series of important questions and the urgent need to obtain answers, this instinctive campaign for survival, many individuals who seek information about what to do next by making an intellectual effort to know their disease, where Cancer patients add a sense of empowerment and control in their lives, and for this reason, another important area within the healthcare facility is the "Centres for Diseases Resource" Especially within cancer centers, studies indicate that many health care facilities do not seize opportunities to educate patients and their families,

however, health care facilities can turn into educational resources if they provide resources for access to knowledgeable staff, books, pamphlets, and Internet access , And other health care media so that patients and their families can educate themselves about their illness and resource centers should be located on each floor, or near an accessible public space such as the hallway, formal classrooms should also be included in the design to accommodate community health care courses And professional caregivers in fig .11.



fig . 11 It shows knowledge area.

2- Workers' blanks:

A-Design of patient care areas.

The professional care provider has observed that although the size of the examination rooms is sufficient size for up to 3 people, it is not sufficient for patients with many loved ones. The professional care provider suggested that a small number of examination rooms should be large enough to accommodate Up to 5 people This will not only give patients more sitting space, but also give professional caregivers more space to work in fig.12.



fig . 12 It shows patient care area .

B- Design of professional caregiver work spaces.

→ Where professional caregivers expressed their feeling that their work space is not suitable and does not provide them with sufficient storage space However, some professional caregivers expressed

that they do not have sufficient office space also this was mainly in the medical oncology clinic where some office areas are only 24 inches wide (Figure 10).

→ Therefore must take into account the varying heights of the work surfaces in medical oncology clinics put the nurses stations integrated in the height of the office and the height of the stand, where the heights of the permanent work surfaces and used mostly by doctors who stopped to write quick notes is not sufficient, this gave them space to work without distracting the nurses Or take up their workspace.

C- Design of professional caregiver respite spaces.

→ While many of the professional caregivers interviewed mentioned that they come to work to focus on patients and do not expect relaxation, the aforementioned studies confirm the importance of the comfort of professional care caregivers as one of the professional caregivers stated, "We feel nervous every day we come and we work hard not to come Usually our household items are here but sometimes this bothers us, we are here for the sake of the sick, but we need space for us. " -minute lunch break is the only time to relieve the stress and relaxation they get during the day. However, it is extremely important that professional caregivers make the most of their rest time by allowing them to relieve stress and relax quickly after talking with professional caregivers. The study can conclude that privacy and rest time are very important to them.

As most professional caregivers mentioned that the cancer center needs special places away from patients to relax during lunch, many areas are provided for professional caregivers who represent "employee-only" spaces including lounge rooms and an outdoor dining area, according to the caregivers Professionals, the view from the window towards the wooded area surrounding the building in Fig. 13.



fig .13 It shows Design of professional caregiver work spaces.

where the interviewed professional caregivers confirmed that they enjoyed the window in the lounge and those who spent time in the restroom without windows expressed their preference for the windows.

In terms of efficiency, the breakout rooms of the Cancer Centre are efficient in storing and heating food if necessary, but they are very small for the number of people taking breaks at lunchtime.

→ As the break room 24 x 13 m is very crowded with 8 people in the room where you will end up standing in the room is very narrow and it was difficult to move around.

The majority of concerns for professional caregivers related to the length of the corridors, the proximity of the plans to the nurse stations at the medical oncology clinic, and that the professional care providers need a more comfortable relaxation place.

The care provider's comfort space is designed to be more than a restroom designed to provide enough space for those who need them during lunch hours when there is usually a greater influx of professional caregivers. The design of this space was also implemented as a direct result of the original research findings. The original research showed that professional caregivers will comfortably accommodate a lounge room for at least ten professional care caregivers, but also provide a place to relax during their breaks. The room is not only large, but it provides a lot of seats and different types of seats, A banquet in addition to a standard four-seat seating table, seats on the island in the kitchen area, and lounge chairs in the lounge (Fig. 12) are served artwork in the lounge, as shown, depicting a relaxing natural scene.

3- spaces of internal communication :-

A- Rehabilitation space

Where you must provide the spaces of different treatments, close to each other for the ease of contact with the residence spaces and provide flexibility in design. These spaces include the following:

B - Physiotherapy spaces

The main space is among the spaces to rehabilitate, and it must accommodate the set of equipment needed to provide treatment services as shown in the form and the space for the space must be sufficient for the safe use of all equipment, and that the ceiling height allow for general activities and installation of equipment on the ceiling, also buttons must be provided for emergency calls in Suitable places, as well as good monitoring by the treating team.

C-Speech Spaces Where in palliative care units this type of treatment is particularly concerned with communications (including the use of devices and devices) and treatment of those who suffer from swallowing difficulties, and there is a need for office space that can be used to conduct consultations between patients and caregivers, which requires providing a storage place Security for expensive equipment. Because there are large differences between patients 'cases, there will be a need in some cases for the treatment interventions that must be made in the patient's bed, something that requires a small room for physical therapy in each nursing unit.

IV. CONCLUSIONS

1- As a result of the emergence of medical developments, it was necessary to study the impact of modern applications of environmental medicine on tumour canters, and new internal spaces had to be designed to meet modern functional needs in the medical field.

2- As a result of studying the psychological needs of cancer patients and the importance of their communication, whether with others, their families or professional caregivers, it was necessary to provide new spaces that meet these needs and consider them as a key factor in helping patients during the recovery journey.

ACKNOWLEDGMENT

In order for us to be able to make optimal use of the internal spaces of the oncology centers, it is recommended that the design of the internal spaces of the oncology centers be based on several requirements, namely:

1- The design of the internal spaces of the oncology centers should be based on the psychological considerations of cancer patients, the development of medicine and the emergence of environmental medicine.

2- Taking into account the environmental aspects in finishing modern spaces in oncology centers and the effect of this on the therapeutic aspects of the patient during the treatment period or after treatment.

2- Taking into account the psychological needs, especially for cancer patients, as they are a special case of patients. The research also recommends the necessity of continuing the architectural studies with all the medical and psychological influences, especially for patients with tumors to reach an integral healing that takes into account all aspects of the patient, whether psychological or physical.

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