

Therapeutic Landscape as a Healthcare Facility in Egypt: Design and Evaluation Process

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Abstract: Outdoor natural environments are well proven to have psychological, physical, and social benefits, particularly those attached to healthcare facilities. Despite that, the Egyptian Codes devoid of data related to the design of such gardens, which hinders the design process and the inclusion of these spaces within health care facilities. Thus, this paper seeks to reach a set of considerations for the design of different types of therapeutic gardens by summarizing the findings and recommendations of some evidence-based design (EBD) research and post-occupancy evaluations (POEs). Post-occupancy evaluations lack to determining the percentage of achieving the design principles in the garden. Therefore, in addition to the behavioral and visual observations to evaluate Children's Cancer Hospital garden in Egypt (CCHE), an audit tool was integrated to combine the advantages of audit tools and POEs. With this merging, we can reach a steady form of post-occupancy evaluations of pediatric cancer hospital's gardens to be a guide for future researches and landscape architects.

Keywords: Healing environments, Healthcare facilities, Healing gardens, Post-occupancy evaluation, Therapeutic gardens.

1. Introduction

Man has believed in the healing benefits of nature for those suffering from psychological and physical problems for thousands of years. The beginning of this belief was from the ancient Egyptian civilization through the early Asian, Greek, and Romanian, and then to the monastic monasteries in the middle Ages. This interest continued to the beginning of the twentieth century, and then it began to diminish as a result of the preference for functional efficiency and priority of financial gain. Now it being re-discovered in the form of healing landscapes and therapeutic gardens [1]-[5]. When access to nature became well-documented as an element of healing by growing evidence [6]-[11], the research concentrated on studying the design and evaluation process of therapeutic gardens. The American Horticultural Therapy Association (AHTA) has divided the natural environments that aid in the healing process into several different types, according to user groups and garden design programs. In Egypt, some of the therapeutic garden designs, when investigating, you hardly discover whether it serves frail elderly, psychiatric,

Alzheimer's, or cancer patients. Therefore, it mostly does not meet all (psychological, physical, and social) needs of all users (patients, visitors, or staff).

Due to the varied types of therapeutic gardens and the different needs of users, it was necessary to identify design criteria that are in line with this difference to increase the effectiveness of these gardens. The various design guidelines were summarized from the results of experimental researches and surveys for gardens attached to different types of hospitals and health care facilities. These results defined decisions for designers to access the highest possible health outcomes and to obtain a base of design guidelines that assist in the evaluation processes.

2. Methodology

A. Theoretical Study

Although the terms (healing gardens, therapeutic gardens, and horticultural therapy gardens) intended to improve health outcomes through spending time in, the American Horticultural Therapy Association developed definitions that explain the difference between them Table 1 [12].

Table 1
Definitions of some different types of gardens according to AHTA

Gardens Types	Definitions according to (AHTA)
Healing gardens	"Healing gardens are natural environments associated with public hospitals and have positive effects on all users, regardless of the type of disability. It can also be classified into subcategories as horticultural or therapeutic gardens."
Therapeutic gardens (field of study)	"Therapeutic gardens serve specific users (patients with Alzheimer, cancer patients, frail elderly, etc.) and meet their needs. These gardens can be considered as a part of the healing gardens or an indoor rehabilitation area extension."
Horticultural therapy gardens	"Horticultural therapy gardens also are a subcategory of therapeutic gardens with unique characteristics, it designed specifically for the use of patients in the care and cultivation of plants as part of a treatment program, the thing that stimulates patients to move and strengthen their muscles."

B. Analytical Study

Whereas the therapeutic gardens are healing gardens but more specialized and interest in a certain category of patients, the design considerations were divided into general and specific.

1) General design considerations

According to Cooper Marcos [2], the general design guidelines are organized in three sections Table 2:

- **Planning process considerations:**

Considerations relating to the site and buildings in addition to the outdoor spaces, and it should be taken into account from the planning process of the project before the beginning of the outer space design.

- **Comprehensive design considerations:**

Applicable to all components of outdoor spaces in all facilities (whether health care facilities or others) for example, safety, security, and privacy.

- **Considerations of the physical elements of all healing gardens:**

These considerations apply to physical components within all outdoor spaces attached to health care facilities as paths,

seating, planting, and the like.

2) Specific design considerations

In addition to the general design considerations that must be fulfilled in all healing gardens, there are special considerations that distinguish a therapeutic garden from another or emphasize to achieve them in one garden without the other. In Table 3 some types of these gardens and their considerations, such as Alzheimer's [22], [2], [23], [24], the elderly [23], [2], [25], cancer [26], [27], mental [28], [22], [29], children [30], [31], [32].

C. Applied Study

Post-occupancy evaluations (POEs) have proven to be very effective in assessing outdoor spaces, regardless if these gardens were therapeutic or not [33]. POEs also gives an overview of the shortcomings and successes in the garden, show who uses it and why, the number of garden visits, different activities, barriers to the visit, and user satisfaction with the garden. However, it lacks a list of elements and qualities that should ideally be incorporated into a therapeutic garden to assess the quality of design considerations implementation from the user perspective and whether it meets

Table 2
General design considerations

Planning process considerations [2]	Comprehensive considerations [10], [2], [13], [14] [15], [16], [17]	Considerations for the physical elements of all healing gardens [2], [18], [19], [20], [21], [13], [14], [15], [16]
<p><u>Geographical characteristics of the site.</u></p> <ul style="list-style-type: none"> • Quiet location. • Visibility and accessibility to the garden site. • The ratio of street width or open space to the building height. • The sun arrives in the garden at least six hours a day. <p><u>Designing according to an evidence-based design approach.</u></p> <p><u>Patient or resident population.</u></p> <ul style="list-style-type: none"> • Design for all users and patient types. <p><u>The organization's culture, composition and policy.</u></p> <p><u>Physical and functional requirements.</u></p> <ul style="list-style-type: none"> • Design that supports healthy outcomes, programs and targeted activities. <p><u>Budget and funding.</u></p> <p><u>The interdisciplinary design team (IDT).</u></p> <ul style="list-style-type: none"> • The IDT should include a landscape architecture (LA). • (LA) must have an experience in designing therapeutic gardens. • In addition to landscape architects, occupational, physical, and therapists must be incorporated to the team. <p><u>The environment of care (EOC).</u></p> <ul style="list-style-type: none"> • The whole healthcare environment (users, systems, concepts, physical environment, layout/operation, and implementation) must be Curing as a healing environment at the same time. 	<p><u>Facilitate exercise and movement.</u></p> <ul style="list-style-type: none"> • Provide pathways for patients and playground for children. • Involve horticultural therapy programs. <p><u>Privacy and sense of control.</u></p> <ul style="list-style-type: none"> • Provide private areas, different kinds of spaces, involve the users and stakeholders in the design. <p><u>Social support.</u></p> <ul style="list-style-type: none"> • Promote conversations by appropriately garden's design. <p><u>Constructive distractions.</u></p> <ul style="list-style-type: none"> • Plant materials should be dominant, natural sound, and presence of water. <p><u>Visibility.</u></p> <ul style="list-style-type: none"> • Garden should be visible from the main entrance and for (court garden, roof garden ...) people must know there is a garden there. <p><u>Universal design.</u></p> <p><u>Support all physical and emotional comfort facilitates</u></p> <p><u>Reduce intrusions.</u></p> <ul style="list-style-type: none"> • Reduce negative factors like urban noise, smoke, or artificial illumination. <p><u>Reduce ambiguity.</u></p> <p><u>Maintenance for the garden.</u></p> <p><u>Sustainability.</u></p>	<p><u>Gateways and entrances.</u></p> <ul style="list-style-type: none"> • Include the garden with more than one well visible entry. • The entries have to be broad for the movement of wheelchair users <p><u>Parking areas.</u></p> <ul style="list-style-type: none"> • Provide a sufficient number of parking spaces. Staff must be provided with parking at the rear of the hospital, while parking must be as near to entrance for patients, especially those with disabilities. <p><u>Paths.</u></p> <ul style="list-style-type: none"> • Paths need to be arranged within a simple hierarchical distribution in hospitals. • The width of one-way roads must be not less than 15 meters, while the width of two-way is not less than 21 meters, and the slope of the crossed slopes must not exceed 2%. • Provide frequent resting spots, distance markers, and raised edges along the pathway. • Control joints on paving units are no wider than 1/8 inch and to prevent wheels of IV poles from slipping. <p><u>Art.</u></p> <ul style="list-style-type: none"> • The message should be simple and positive for sculpture, artworks and other design components. <p><u>Furniture in the site.</u></p> <ul style="list-style-type: none"> • Seats should be movable, comfortable, and accessible where users want to use. It should be in front of a fascinating view. The material used should not keep heat or cold and rustproofing. • Signage and lighting should be present for all parts of the garden. <p><u>Planting design:</u></p> <ul style="list-style-type: none"> • Maximize the use of low-maintenance planting. • It blends harmonious textures, shapes, colors, and multi-high rising. <p><u>Water.</u></p> <ul style="list-style-type: none"> • Combine the seats close to the water feature. • Avoid placing sprinklers next to the paths to prevent slipping. • Sensory stimulation with the features of water must be by two sense at least (sight, touch, and sound).

minimum standards (audit tool). Therefore, we developed the POE for (CCHE) garden to include questionnaires in the form of an audit tool to be a combination of the advantages of POEs and audit tools. The European Landscape Convention described the landscape as “an area, perceived by people, whose character is the result of the action and interaction of natural and human

factors” [34]. Thus, the research method is based on four main criteria (site, users, operations, and evaluation of the garden). This research was based on (visual analysis, behavioral observation, and questionnaires) as tools for data collection, evaluation, and auditing Fig.1.

Table 3
Specific design considerations

	Design considerations	Alzheimer	Older	Cancer	Mental	Children	Pediatric
Accessibility	Emphasize on variation of access from buildings to the garden (cognitive and physical access).	•	•	•		•	•
	Emphasize visual access from rooms to allow people who have no access outside (because of their weak immune or mental disorder as violence) to contact with nature.			•	•		•
	Keep the garden without obstacles to seeing the entrances clearly and keeping the shortest distance to the building from any point in the garden because it gives the patients a sense of safety.				•		
	The play areas are preferred to be connected by access to the garden through the playroom.					•	•
Orientation and safety	Design the paths as a returning path system called a loop, e.g. a figure of 8.	•					
	Make the garden safe by fences, which should not describe as a wall (masked by planting or decorative wall).	•			•	•	•
	Monitoring the garden from inside for patients using the garden without physician or escort.	•			•	•	•
	Provide tracks with handrails (for those who find it difficult to walk), make it bright, and easy to identify.	•	•				
	Protect against obvious dangers as overhanging branches, irregular steps, and fallen leaves that cause slippage.	•	•				
	Avoid objects that patients can use in any form of damage, either for themselves or others (e.g. Light chairs that they can use to attack each other).				•		
	The layout of the garden preferably to be an open-plan, allowing children to freely choose their play areas and equipment without a regular sequence of the play system.					•	•
Design paths in a manner that is impressive and includes attractive and fun elements.					•	•	
Socialization	Emphasize providing plenty of places to sit through the paths and be at regular intervals and repeated every 15 feet.	•	•				
	The seating design is pleasantly attractive and has a small scale.					•	•
	It is preferable to fixing chairs and furniture in the ground.				•		
Emphasize providing private and semi-private spaces to create opportunities for individuality and consider the psychological state			•				
Stimulation	Incorporate colorful traditional plants as mint and basil, as well as merging usual activities, bird feeders.	•	•		•		
	Stimulate the senses and by fragrant flowers and aromatic plants such as jasmine, cork, and roses.	•	•		•	•	
	Emphasize avoiding things that stimulate the noxious thoughts and negative feelings of the patients who use or watch the garden as dead plants or fallen leaves that tell death is near.		•	•			•
	Incorporate familiar elements and away from the disturbing or annoying things in the garden which lead to increased pressure on patients	•	•		•		
	Avoid frequent stimuli in the same place.	•					
Planting	Avoid trees with deep and dense shadows on the tracks.	•					
	Incorporate plants with saturated colors (red, orange, and yellow) because people with cataracts receive cold colors (blue) as gray.	•	•				
	Use plants with aromatic oils which evoke memories, promote sleep and relieve pain, blood pressure.	•	•		•	•	
	Use edible plants like fruit trees (lemon-orange), herbs (parsley -basil), and vegetable patch (tomato -lettuce -carrots).	•					
	Use mature trees because it give a symbolic feeling of longevity and can be used later as a play structure.		•			•	•
	Incorporate diverse plants with a little odor, safe in texture, without risk of chemicals, wounds, or infections.			•			•
	Integrate flowers that attract wildlife, insects, birds, honey bees, bumblebees, and butterflies.	•	•			•	
Use trees without low limbs.				•			
Activiti	Provide a variety of play areas that allow children to choose freely and include interactive activities.					•	•
	The landscape should promote cardiovascular and muscle health efficiently and safely.	•	•				
	Various activities programs should be integrated and provide wide areas for walking to release aggressive behavior.				•		
General	Avoid sudden changes in paving materials (consider as steps) or reflective substances (consider as water).	•	•				
	Avoid frequent light reflections or dark (pergola structures), which cause deep shadows. Avoid dark inspection rooms that may be considered by the patient as ground holes.	•	•				
	Small-scale design changes are important for people who walk slowly to feel visual diversity.	•	•				
	Maintenance that creates dust and pollen should be at times other than when the patients in the garden.			•			•
	Provide positive elements not ambiguous and give the symbolism of life and re-growth.			•			•
Emphasis on providing separate spaces for staff in the garden because they have a cumbersome job.				•			

1) Evaluation criteria

• Site:

The site was examined through (geographical and physical analysis). The geographical analysis was conducted by visual analysis to studying the location, climate orientation, visibility and accessibility, the ratio of street width or open space to the building height, and entrances to the garden. The physical examination includes all hard elements in the garden as plants and structures that make up the garden and its various distinct areas Fig.2.

• User and participants:

Random samples participated in the research, whether from patients (inpatient, outpatient, surgical, or intensive care) or staff (doctors, nurses, physicians, and administrators).

• Operations (uses and activities):

The user's interaction with the garden happens through a group of activities (walking, eating, and passing through) that we monitored in the behavior matrix table 4. The uses of the garden were determined by observation and drawing behavioral maps that used to track the circulations of user groups while using the garden.

• Evaluation of the garden:

The evaluation was at three points (1) Achieving general design considerations. (2) Achieving specific design considerations. (3) The degree of user satisfaction.

2) Evaluation tools:

• Visual analysis:

It provides an understanding of the physical, geographical conditions, and spatial proportions of the environment. It was conducted during the period from November 2018 until August 2019.

• Behavioral observation:

In the behavior observation data collected through on-site observation by the researcher for a week to know the user groups in the garden and drawing behavior mapping through which we can determine general use distribution and most distinct places in the garden for patients, visitors, and staff.

obstacles that prevent them from the visit. In the second and third set, respondents were asked about the garden's achievement of general and specific design considerations. The degree of satisfaction was calculated by a scale of ten degrees, to assess the user satisfaction with the garden features.

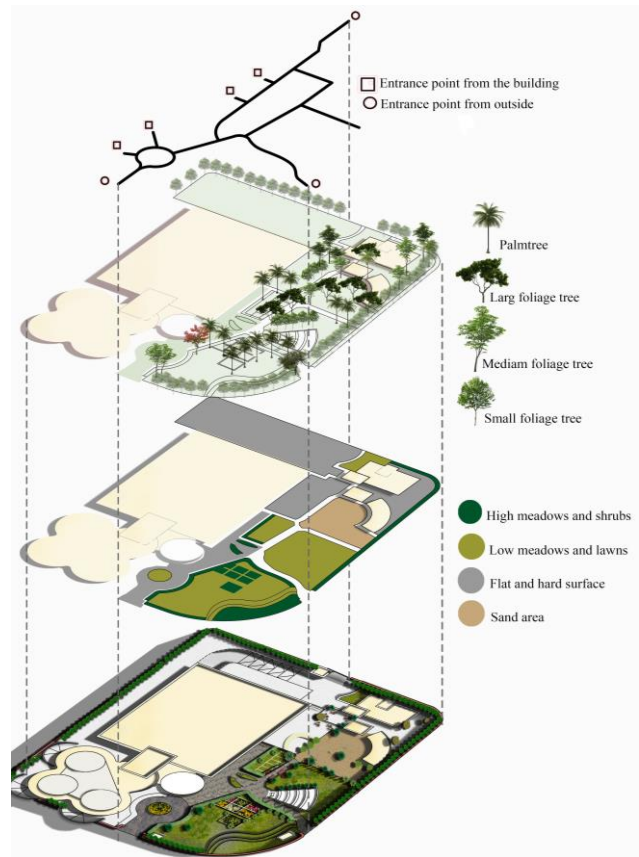


Fig. 2. Physical analysis for (CCHE) hospital's garden by researcher

3. Results and Discussion

A. Site Analysis

The hospital is located in the area of Qasr Al-Aini, Cairo. The site has a quiet location as it has no sources of noise. The site is easy to access as it can be reached through four main streets and linked to three points of road intersection (nodes) make it easier to access. Furthermore, the hospital has a distinctive design form that makes it visible from nearby and surrounding places. The ratio of outdoor building heights to the street width is approximately 1:2, which consider as an appropriate ratio to create an opportunity for privacy within the garden.

B. User and Participants

1) User groups in the garden

Table 4 shows the data of behavior observations in the form of a matrix to illustrate the information collected within a typical week period by watching the garden every day for ten minutes (from 11 to 11:10 AM), where 643 occupancy instances were monitored during the research period (families, visitors, children, staff and patients with therapist) Fig. 3.

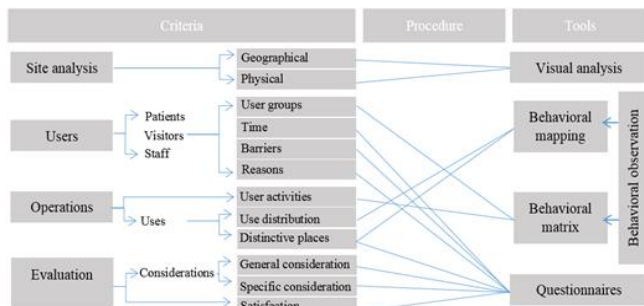


Fig. 1. Research methodology to evaluating therapeutic gardens by researcher

• Survey (Questionnaires):

The questionnaire was divided into four sets of questions. In the first group, the respondents were asked about number of visits, duration of visitation, reasons for visiting the garden, and

2) Time that user spent in the garden

There are many observations about the time of using the garden, whether the frequency of the garden, the length of visitation, or the time of the day users prefer to visit the garden. This information was collected through the questionnaires, which included 51 responses 16 of the staff and 35 were non-staff (visitors and patients) Fig. 4, Fig. 5, and Fig. 6.

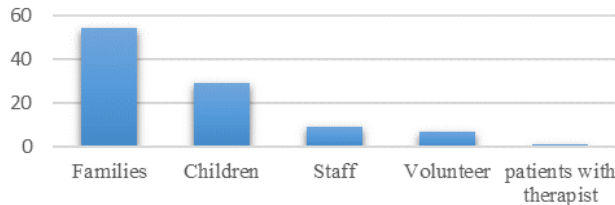


Fig. 3. User groups in the garden

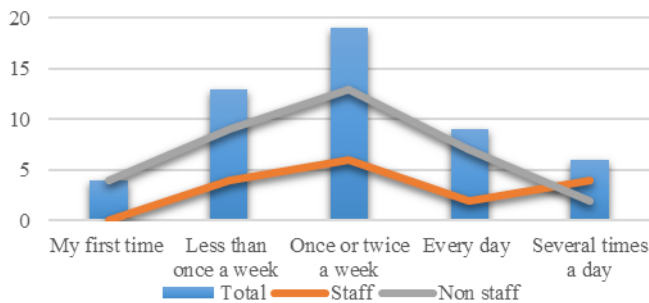


Fig. 4. Frequency of the garden

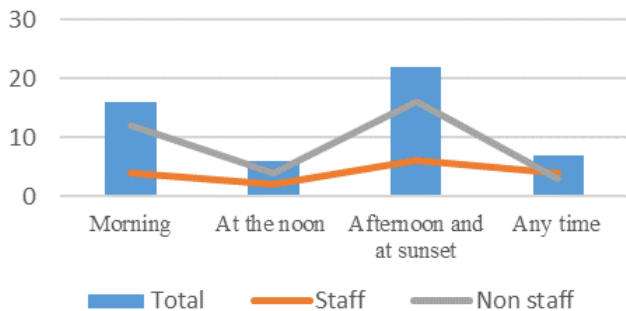


Fig. 5. Time of the day users prefer to visit the garden

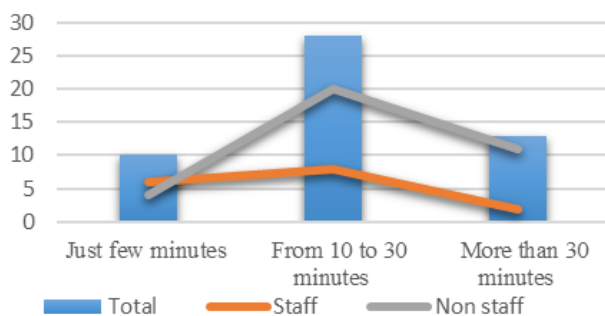


Fig. 6. Length of visitation

Among the questions that were asked to the respondents were: What is the obstacles and reasons for garden visitation? Fig. 7, and Fig. 8.



Fig. 7. Reasons for garden visitation

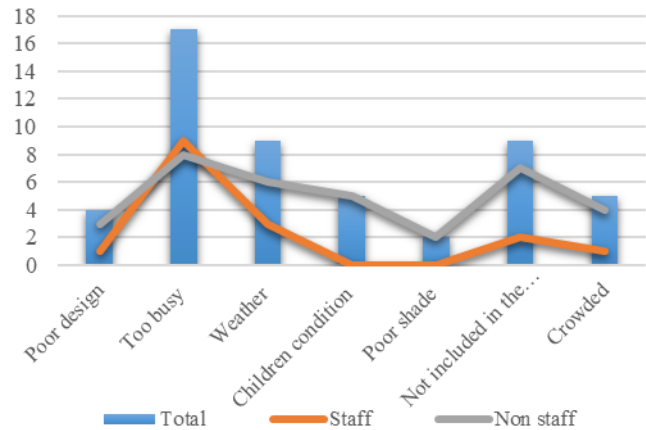


Fig. 8. Obstacles for garden visitation

C. Operations

1) Activities

From the behavior matrix, it is possible to determine what users do in the garden from a group of activities were counted within a week of field observation Table 4; Fig. 9.

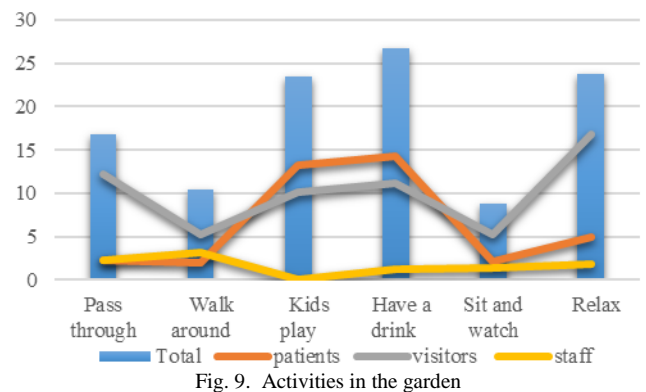


Fig. 9. Activities in the garden

2) Uses

• Use distribution:

Fig. 10, Fig. 11, and Fig. 12 illustrate graphics usage patterns that explain the shape of the garden use. The garden is monitored from a point in its middle so as to allow the observer to detect all the garden and monitor the users from the beginning of their entry to the garden until they exit. By comparing the motion path for both visitors and patients, both are almost identical where patients or visitors leave the hospital

heading to the play area or sitting area near it. This tour may interrupt by heading to the cafeteria and then returning to the play or sitting area again. The path of the staff is different where the workers using the garden either to pass through or to reach the cafeteria.

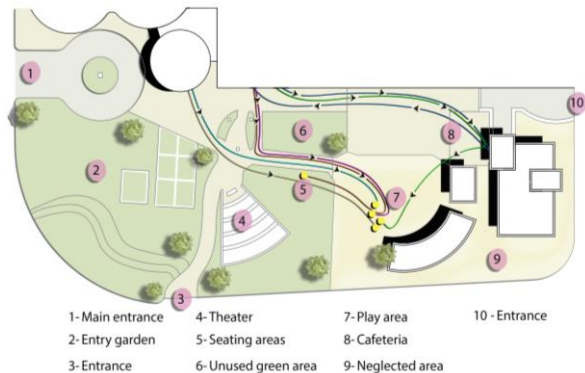


Fig. 10. Usage patterns for patients by researcher

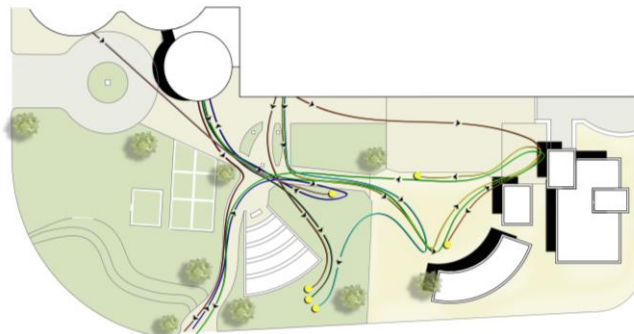


Fig. 11. Usage patterns for visitors by researcher

The behavioral mapping matrix

Location: The Children's Cancer Hospital Egypt (CCHE 57357)

Date from 29-6-2019 to 5-7-2019
 Duration of observation every day: 10 minutes.

Table 4
 Behavior matrix

Category	Visitors												Patient								
	Family						Volunteer						Kids /Teen								
Day	Pass through	Walk around	Kids play	Have a drink	Sit and watch	Relax	Total	Pass through	Walk around	Kids play	Have a drink	Sit and watch	Relax	Total	Pass through	Walk around	Kids play	Have a drink	Sit and watch	Relax	Total
29-6-2019	6	3	7	9	4	16	45	2	0	0	1	1	0	4	2	3	10	4	1	3	23
30-6-2019	10	6	9	8	5	18	56	4	0	0	3	1	0	8	3	1	13	3	3	5	28
1-7-2019	8	3	6	1	4	15	47	3	0	0	2	0	0	5	4	4	9	5	0	4	26
2-7-2019	5	3	8	7	6	11	40	3	0	0	0	0	0	3	1	2	15	4	2	5	29
3-7-2019	9	3	7	11	3	13	46	2	0	2	0	1	0	5	2	1	11	4	1	6	25
4-7-2019	11	6	8	9	2	16	52	5	0	0	1	0	0	6	2	0	10	3	3	5	23
5-7-2019	7	10	12	8	6	18	61	3	0	6	2	1	1	13	1	2	16	6	4	4	33
Total	347						44						187								
Percentage	54.1 %						6.9 %						29.1 %								

Category	Staff														total
	Staff							Staff with kids							
Day	Pass through	Walk around	Kids play	Have a drink	Sit and watch	Relax	Total	Pass through	Walk around	Kids play	Have a drink	Sit and watch	Relax	Total	
29-6-2019	1	2	0	1	2	3	9	1	0	0	0	0	0	1	82
30-6-2019	3	4	0	1	1	2	11	0	0	0	0	0	0	0	103
1-7-2019	1	3	0	3	2	1	10	1	1	0	0	0	0	2	90
2-7-2019	0	4	0	0	2	0	6	0	0	0	0	0	0	0	78
3-7-2019	2	1	0	1	1	3	8	0	0	0	0	0	0	0	84
4-7-2019	4	2	0	2	1	1	10	1	0	0	0	0	0	1	92
5-7-2019	0	2	0	0	0	2	4	1	11	0	0	0	0	2	113
Total	58							6							642
Percentage	9.03 %							.94 %							

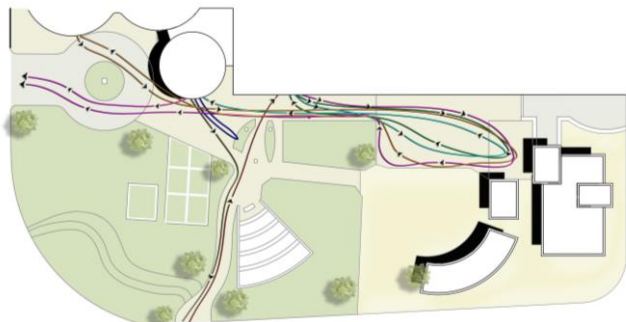


Fig. 12. Usage patterns for staff by researcher

A. Evaluation of the Garden (Audit Tool)

1) Achieving general design considerations

Table 5

A questionnaire of the planning process considerations. This questionnaire is for the designers participating in the design of the garden under study

Planning process considerations	Yes	No
Is the garden designed based on the evidence-based design approach?	0	4
The design respects all garden users (patients, visitors, and staff).	2	2
The organizational structure of the institution, the cultures, and the policies used were considered in the design.	3	1
All stakeholders were involved in the design process.	1	3
Functional, physical, and programmatic requirements formed the basis for how to garden was designed.	4	0
There is a major source of funding, from the design process to periodic maintenance.	4	0
The garden was designed by an interdisciplinary design team (IDT) including landscape designers.	4	0
If the garden was planned by a team of landscape designers, were they trained to design therapeutic gardens?	3	1
As a garden for a pediatric cancer hospital, does the design team include the appropriate professionals to design this type of garden as (occupational, physical, other professional therapists)?	0	4
Components of the overall environment of care EOC (concepts, people, systems, layout, operations, and implementation) are generally considered a healthy environment.	3	1

Table 6

A questionnaire of the comprehensive design considerations. This questionnaire is for groups of users from patients, visitors, and staff.

Comprehensive design considerations	Excellent	Good	Fair	Poor	Mean	Level
Support physical movement and activities through design.	12	23	11	5	2.82	Good
Giving the opportunity to choose between different areas in the garden.	9	18	21	3	2.65	Good
Promoting the idea of privacy in the garden by providing isolated places.	2	8	7	34	1.57	Poor
Encouraging social support and communication between users and provide features that stimulate it.	23	16	8	4	3.14	Good
Access to nature and positive distraction.	17	26	4	4	3.09	Good
Visibility of the garden (visual access) from all parts of the hospital.	11	14	21	5	2.61	Good
Access to the garden (physical access) from all parts of the hospital, especially for people with disabilities and wheelchair users.	9	29	10	3	2.86	Good
The dominance of plants and green matter in the garden.	24	17	8	2	3.24	Good
Garden environment is an aesthetic environment and help to relax.	15	30	6	0	3.18	Good
The design supports the physical and emotional comfort of users (the availability of shaded areas, or comfortable furniture).	20	19	7	5	3.06	Good
The garden is quiet and minimizes negative factors and external interventions as urban noise.	26	19	5	1	3.37	Excellent
The simplicity of the garden design idea and avoiding ambiguous symbols in its elements.	35	13	3	0	3.63	Excellent
Maintenance of the garden and all its components and away from the damaged and broken elements and dead plants that lead to a sense of lack of interest.	16	27	4	4	3.08	Good
Total					2.95	Good

2) Achieving specific design considerations

Table 7

A questionnaire of the considerations for the physical elements of all healing gardens. This questionnaire is for groups of users from patients, visitors, and staff

Considerations for the physical elements of all healing gardens.		Excellent	Good	Fair	Poor	Mean	Level
Gateways and entrances	The number of entrances to the garden is sufficient.	28	19	4	0	3.47	Excellent
	The entrances are wide enough to accommodate people with special transportation requirements.	22	16	12	1	3.16	Good
	Seeing the garden from inside the building (e.g. glass doors).	12	16	20	3	2.73	Good
	The possibility of monitoring the garden from the inside by staff and therapists.	9	13	23	6	2.49	Fair
	The doors are easy in use (automatic or light), and visible.	25	20	4	2	3.33	Excellent
Total					3.04	Good	
Parking areas	Distance between parking spaces and hospital entrances.	25	14	9	3	3.20	Good
	Availability of parking lots and accommodating existing vehicles.	9	17	17	8	2.53	Good
	Clarity of the location of the parking and accessibility especially by patients and visitors.	24	16	11	0	3.26	Excellent
	Vehicles (ambulance and cars for people with special needs) access to the closest point to the entrance and emergency.	34	12	5	0	3.57	Excellent
	Total					3.14	Good
Paths	Ease of navigation on tracks for pedestrians, people with disabilities, and wheelchair users (Paving materials).	14	26	8	3	3.00	Good
	Organize paths (master paths, sub paths, and service paths) and do not conflict with each other.	9	14	20	8	2.47	Fair
	The absence of obstacles that lead to slipping and stumbling motion or cause obstruction to crutches and wheels.	13	27	9	2	3.00	Good
	Width of tracks allows walking in groups.	7	14	25	5	2.45	Fair
	Provides frequent comfort points along the track with raised edges for seating.	16	18	11	6	2.86	Good
Total					2.75	Good	
Seats, signage, and lighting	Seats are available in places where the user wants to use it.	15	21	13	2	2.96	Good
	Seats in the garden help in physical comfort and help stand and sit.	6	14	21	10	2.32	Fair
	Chairs are made of suitable material (don't retain heat or blur with the sun).	17	20	12	2	3.02	Good
	Seats and chairs meet attractive views.	4	13	15	19	2.04	Fair
	Availability of seating options (alone or in groups) through the distribution.	3	11	17	20	1.94	Fair
	Provide signs indicating the direction and parking places, entrances and exits etc.	8	16	20	7	2.49	Fair
Provides industrial lighting in the garden and distributed in different areas to support the sense of safety and give a beautiful view of the place.	22	16	13	0	3.18	Good	
Total					2.57	Good	
Plants	The plants enhance feeling of the place, arouse emotion and provide a positive distraction to the user.	25	17	9	0	3.32	Excellent
	Access to plant and touch by people using wheelchairs.	14	20	14	3	2.88	Good
	The types of plants used in the garden require frequent maintenance.	11	15	20	5	2.63	Good
	Total					2.94	Good

Table 8

A questionnaire of the specific design considerations for Children's cancer hospitals gardens. This questionnaire is for groups of users from patients, visitors, and staff

		Considerations				Excellent	Good	Fair	Poor	Mean	Level
Accessability	The distance between the rooms and the garden (motivate parents to bring their children to the garden).	14	11	19	7	2.63	Good				
	Visual communication for people with weak immunity.	7	18	23	3	2.57	Good				
	The connection between the indoor play areas and the garden.	2	8	22	19	1.86	Fair				
Total									2.35	Fair	
Socialization	Design and shape of chairs suitable (fun and attractive) for children to sit on and enjoy with parents.	6	12	16	17	2.14	Fair				
	Variety of play areas to choose between working/playing in groups or individually.	12	17	21	1	2.79	Good				
	Provide some seats suitable for the scale of children in addition to others suitable for adults.	3	11	11	26	1.82	Fair				
	Stimulate exploration and investigation for children through the design of private and semi-private spaces.	5	11	13	22	1.98	Fair				
The presence of isolated places inside the garden for those who prefer isolation and shelters.	3	11	15	22	1.90	Fair					
Total									2.13	Fair	
Orientation (safety and Paths)	Fences form (artistically) suitable for children's environment.	4	10	13	24	1.88	Fair				
	Enhance security by closing the garden and playing area.	16	20	13	2	2.98	Good				
	Tracks design (materials used, artistic shapes and graphics) motivate children to move and run.	10	17	21	3	2.67	Good				
	Continuity and length of tracks helps children move and run.	2	11	18	20	1.90	Fair				
	The presence and availability of places protected from the sun.	24	14	10	3	3.17	Good				
Total									2.52	Good	
Meaningful activities	The diversity of interactive activity and play areas motivate users to motion and movement.	16	20	13	2	2.49	Fair				
	Diversity in the forms of play equipment and colorful features attract attention and concentration.	9	17	17	8	2.51	Good				
Total									2.50	Fair	
Sensory stimulation	Stimulate children's sense of learning with the five senses through colors and shapes in the garden.	14	22	10	5	2.88	Good				
	The artistic elements in the garden include a cognitive meaning for children.	9	18	21	3	2.65	Good				
Total									2.77	Good	
Plants	The garden is free from fragrant plants (which cause nausea and dizziness for cancer patients) or pollen (which cause significant damage to the weakened immune).	19	22	10	0	3.18	Good				
	The size of the grass area monitored by parents and therapists.	11	19	16	5	2.71	Good				
	The garden is free from poisonous plants or thorns where it is dangerous for children.	23	16	12	0	3.22	Good				
Total									3.04	Good	
General	Integrate and introduce the garden into health care programs by therapists.	0	4	10	37	1.35	Poor				
	Design furniture fun and exciting for children to distract them from thinking about pain.	2	9	10	30	1.67	Poor				
	Maintenance of the garden at different times than when the patients are present, Where this maintenance results in dust cause a great risk to patients, especially those with weak immune.	7	19	17	8	2.49	Fair				
Total									1.84	Fair	

3) Degree of user satisfaction about features in the garden

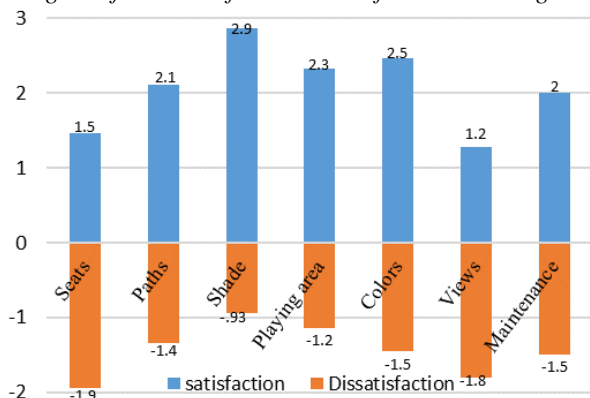


Fig. 13. User satisfaction about features

Respondents rated the garden's features by a 10-degrees scale. Fig. 13. represents the percentage of satisfaction and discontent for each feature separately in the garden.

4. Conclusion

The research aims to study the design of the different types of therapeutic gardens in Egypt and propose, (1) developing the Egyptian code to include the designing of outdoor environments as health care facilities. (2) The designer must take these gardens into account from the first stages of planning the project to reach the best possible results. (3) The necessity to differentiate between the types of these gardens. And raise the efficiency of the design elements depending on the needs of the user groups. (4) Incorporate the evaluation of these gardens

into design approaches to increase design recommendations, thus assist in future research. (5) Developing the assessment to include general and specific design considerations in the form of an audit tool to combine how the garden is used and the extent to which design considerations are met. (6) Attempting to arrive at a consistent form for a comprehensive evaluation to be a reference for later designers. Finally, the evaluation can be used later as a starting point in the issuance of licensing certificates for such kind of gardens in Egypt to stop launching the concept of therapeutic gardens in any green area.

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