



Hospital Users' Perception on Therapeutic Green Spaces in the General Hospital Environment Abuja, Nigeria

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ABSTRACT

Generally, the hospital environment should provide therapeutic benefits for health and provide comfort to patients, staff, and visitors. However, in Nigeria, the non-integration of therapeutic spaces into the hospital environment has resulted in a serious setback in the quick recovery of patients. It has been observed that general hospitals in Nigeria lack therapeutic green spaces within the hospital environment. This study investigates the adequacy of the hospital environment to trigger therapeutic impact and aid the recovery of patients in Abuja, Nigeria. This study's objective is to evaluate hospital users' perceptions towards therapeutic spaces in the general hospital environment in Abuja with a view to aiding the recovery of patients. A descriptive research method was used, whereby a purposive sample strategy was adopted to choose the hospitals to get the required information on the impact of therapeutic green spaces on hospital users. The sampled participants received a total of 347 structured questionnaires, of which a total of 280 were retrieved. In addition, 10 staff members were interviewed about the maintenance and existence of green spaces. To ascertain the effect of therapeutic spaces on the patients' health and recovery, the data was analysed using a 5-point Likert scale. Findings reveal that most hospital users regard therapeutic spaces in the hospital environment as a result of their impact on health recovery. The research therefore recommends that landscape architects adopt proper design considerations to accommodate therapeutic green spaces in the design and planning of hospital environments. Adequate measures should be taken to ensure that therapeutic green spaces are present and maintained within the hospital setting.

1. Introduction

A therapeutic garden is typically seen in hospital green areas that seek to promote the residents' health (Kreitser, 2016). Patients can find solace and relief in these hospital gardens, which also promote healing. A suitable atmosphere can support healing, but gardens have a greater capacity for healing since people are connected to nature (Kreitser 2016). There is a connection between wellbeing and healing gardens, say health research and horticultural therapeutic programmes (Wells, 1996; Kellert et al., 2008; and Haller & Karmer, 2006). The quality of life is a sign of

one's health and happiness, and it can be used to gauge the sustainability of a community (Johnson, 1995; Dave, 2011). WHO (2021) defines health as a condition of physical abilities, psychological wellbeing, and social wellbeing, not just the elimination of illness.

As stated by Kellert *et al.* (2008), referenced in Barmelgy (2013), some studies have been done that demonstrate the relationship between nature, healing, and nature. Here are the results of the three studies. Studies were carried out in the recovery areas of patients recovering from gallbladder surgery. While some of the recuperation rooms had views

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of the outside world, others were hidden and had views of a solid brick wall. According to the study, patients who enjoy views of plants and greenery from their hospital rooms recover faster, go home sooner, have fewer pains, and need fewer treatments than those facing a wall devoid of any plants (Kellert et al., 2008).

Another study among the convicts at Michigan State Prison revealed that some had views of courtyards while others had views of fields. The results showed that 24% of the convicts facing the courtyard became sick (Kellert et al., 2008). Similar research was conducted in a German school where pupils were watched in both plant-filled and plant-free classrooms. The findings demonstrated that having plants in the classroom helped to lessen student concerns about their health. The study provided evidence in favour of the notion that plants benefit students' health and wellbeing (Vapaa, 2002).

Hospital structures were surrounded by lush, traditional gardens throughout the 14th and 15th centuries. The development of scientific medicine in the 17th and 18th centuries proved the healing power of nature on the body and soul of the patient, which led to the creation of huge city hospitals with courtyards lined with rows of trees (Dejana et al. 2010). In the 19th and early 20th centuries, the pavilion- and sanatoria-type became the predominate design, with large green spaces separating pavilion wards, whilst hospitals were regarded as public monuments. (Dejana et al. 2010)

Technology made significant strides in both building construction and medical science during the 20th century. The understanding of the restorative advantages of nature has begun to fade as the focus of hospital design has changed away from establishing a therapeutic environment and toward enhancing staff productivity. Hospitals built during the Modern Movement resemble high-rise commercial buildings, with big parking lots taking the place of traditional gardens.

Patients recover more quickly and require less treatment when they are exposed to the outside world through the windows of their separate wards as opposed to those who are surrounded by walls (Taylor et al., 2001). The presence of a natural environment significantly lessens the patients' extreme pain, lowers their level of tension, and also promotes relaxation and wellbeing (Wichrowski et al., 2005). The following goals served as a guide for this study: (i) to investigate the incorporation of therapeutic green spaces into the design of the hospital environment in order to facilitate patients' recovery; and (ii) to elicit information from the hospital users on the impact of therapeutic space on their recovery.

2. Literature Review

The concept of therapeutic green areas in medical facilities can be both old and new at the same time. Natural settings have been used as healing spaces ever since humans first settled there and formed communities (Brown *et al.*, 2010; Cooper-Marcus & Barnes, 1999). Western hospitals exclusively rely on plants and herbs for their therapeutic effects (Barmelgy, 2013). In hospitals, plants and gardens are helpful to the sick, and both prominent Asian and Western cultures have valued them for more than a thousand years (Ulrich & Parsons, 1992). According to historical accounts, designing areas with plants and other greenery was crucial to ensuring that patients felt at ease. Greece is where the idea of a therapeutic environment first emerged. Monks in Europe constructed magnificent gardens during the Middle Ages that gave patients beneficial, calming tools. (Gierlach-Spriggs et al., 1998). The monastery garden is primarily utilized as a therapy and healing space. The patient's room was planned to look out onto the hospital garden, giving them exposure to the sun and the surrounding surroundings.

There are hospitals that use the outdoors to promote therapeutic recovery, like the 1409-built Sarsossa hospital in Spain. The patients at Sarsossa Hospital were not confined to their rooms; instead, they treated their patients in the hospital garden, which allowed them to interact with everyone in full (Taylor et al., 2001). This study supports the Attention Restoration Theory (ART), which contends that exposure to or contemplation of nature might reduce mental tiredness and enhance focus. According to this theory, being among natural settings fosters more effortless brain activity, which enables the brain to replace and repair its focused attention capacity. According to the study's findings, for the natural environment to have this healing impact, it needs to possess four characteristics: extent, being remote, soft fascination, and compatibility.

The landscape of healing has included restorative or healing gardens for the sick since medieval times (Taylor et al., 2001). In the past, gardens were imagined and depicted as a place of heavenly healing (Barmelgy, 2013). According to research by Wheeler et al. (2015), there are several types and characteristics of natural habitats that may have an impact on health and wellbeing. According to the study, there are links between the density of green space and the prevalence of good health.

Landscape design was viewed as a green form of decoration in the twentieth century, which led to the loss of the concept of environment and healing. However, in the 1990s, the idea of therapeutic green space re-emerged and started to show up in studies (Vapaa, 2002, Emechebe, 2020). Due to the cruel and harsh environmental conditions humans must endure nowadays, therapeutic green places are resurfacing and gaining popularity.

Psychological benefits of therapeutic green spaces to health care

Green areas are widely used to provide structured therapeutic assistance to at-risk kids, adults with dementia or mental illness, probationers, and stressed-out workers (Barton & Rogerson, 2017). Study has shown that being around plants, gardening, and spending time in green spaces can all be good for one's physical and mental wellbeing (Vries et al., 2003). Plants help to purify the air, encourage physical activity, lower the risk of illness, and promote a healthy diet (Hillside, 2019). The advantages of green spaces and the ways they function are two distinct things. Physical advantages of green places include bettering air quality, lowering noise levels, preventing flooding, and enhancing thermal comfort. Inhaling and touching plants provides psychological benefits that aid in the recovery of some illnesses (Vapaa, 2002).

There is proof that therapeutic green spaces boost public health and that green spaces have both physical and psychological advantages (Morton, 2016). In addition to promoting healthy living, the physical and psychological advantages of green spaces also improve indoor environmental quality by lowering levels of carbon dioxide (CO₂), indoor ozone (O₃), volatile organic compounds (VOCs), and particulate matter, which lowers the incidence of infectious diseases.

In hospitals, plants and gardening in green spaces offer psychological benefits. Maintaining a sense of wellbeing requires interaction with nature and vegetation (Hillside Atlanta, 2019). Being in nature and around plants and gardens has many psychological advantages for people. In environments with lots of plants and nature, people typically feel happier and more optimistic. But gardening and being in a good mood significantly reduce stress levels more (Agnes & Maritte, 2011).

Therapeutic garden and plants

A therapeutic garden is defined as "a plant-dominated area intentionally created to foster interaction with the healing components of nature." Patients and users can find shelter in these gardens, which can aid in recovery. In a study using a velveteen piece, a natural pothos leaf (Epipremnum aureum), and an imitation pothos leaf made of resin, it was shown that certain plants can help with a speedy psychological recovery. Involuntary relaxing of the cerebral blood flow is revealed by touching the samples (Koga & Iwasaki, 2013). Some therapeutic plants have essential aromas that are used in aromatherapy, but sometimes just having a walk through the hospital garden and inhaling all of the fresh scents from the garden is good therapy. Table 1 describes some samples of plants sourced from literature for hospital green spaces.

Table 1: Therapeutic plants and their functions

S/N	Plants	Botanical Name	Family	Functions and Applications	source
1	Devils Ivy	Epipremnum aureum	Araceae	A focused change in cerebral blood flow (CBF) as a measure of central nervous system activity is demonstrated by touching.	(Koga, R & Iwasaki, Y, 2013)
2	Strawberry Alpine	Fragaria vesca	Strawberries	Aromatic red strawberries that are packed with vitamin C.	Briscoe white (2019)
3	Peppermint Plants	Mentha piperita	Mint	Peppermint plants are known to have a scent that is one of the strongest triggers of memory. The scent of Peppermint has been used for ages to help cure headaches.	Briscoe white (2019)
4	Lemon Balm Plants	Melissa officinalis	Melissa	Existence of Lemon balm naturally drive biting insects and mosquitos and the scent help to cure nausea, colic and anxiety.	Briscoe white (2019)
5	Lemongrass Plants	Cymbopogon citratus	Grasses	The aroma strengthens the immune system, increases blood flow, lowers blood pressure, eases headaches, and may even help prevent some cancers, including colon cancer. This citrus fragrance works wonders to deter mosquitos and other biting insects.	Briscoe white (2019)
6	Munstead Lavender Plants	Lavandula angustifolia	Lavender	The relaxing scent of the oil calms the mind as the plant's collagen-regenerating ingredients rejuvenate your skin. Its aromatherapy uses range from treating headaches to sunburns.	(Harada, et al., 2018), (Butler, 2018).
7	Hidcote Lavender Plants	Lavandula angustifolia	Lavender	Wakens the senses and can increase the oxygen level in the blood just by being inhaled. These oils not only smell wonderful, but they actually heal at the cellular level.	(Harada, et al., 2018), (Lehrner, 2005)
8	Lemon Catnip Plants	Nepetactaria spp. citriodora 'Lemony'	Lamiaceae	Catnip when inhaled helps to assist trouble sleeping (insomnia), anxiety, migraine and other headaches. In addition to mice, rats, and weevils, catnip is an effective natural insect repellent for mosquitoes, ants, cockroaches, termites, fleas, and Japanese beetles. The commercial chemical DEET, which is present in the majority of name-brand insect repellents, was discovered by the American Chemical Society to be 10 times less effective at keeping mosquitoes away than catnip.	Briscoe white (2019)
9	Feverfew Plants	Tanacetum parthenium	Asteraceae	A fragrant plant called feverfew can lower fevers and, surprise, help with headaches when inhaled. Additionally said to aid in body relaxation and arthritic relief.	Briscoe white (2019)
10	White Sage Plants	Salvia apiana		White Sage is an aromatic plant which helps to purify areas, objects negative energy.	Briscoe white (2019)
	Echinacea			Stimulation of the immune system and also use for preventing and treatment of common colds.	Briscoe white (2019)

Table 1 describes the plants that have psychologically impacted recovery. Studies done by Harda et al. (2018) show that the scent of lavender is really good for aromatherapy to treat anything from headaches to sunburns. Its calming aroma calms the mind. The study also suggests that lavender's naturally occurring alcohol, linalool, may help reduce anxiety when inhaled rather than applied topically or consumed. Through olfactory neurons, linalool stimulates certain neurotransmitter receptors in the brain. This implies that plants have good psychological effects on recovery.

Therapeutic green spaces aid in health recovery, wellbeing, and the promotion of indoor air quality in the hospital environment (Taylor et al., 2001; Emechebe et al., 2020), but are unable to craft good implementation for the actual delivery of sustainable health and wellbeing in the study location. The gap in the study is the lack of consistent knowledge and the requirement for green spaces in hospital environments. This is understood by understanding how users perceive the impact and benefits of the green spaces on their ability to recover from illness.

Study Area

The study was conducted in Nigeria's capital city, the Federal Capital Territory (FCT). Six area councils now make up the group: Abaji, Abuja Municipal Area Council (AMAC), Bwari, Gwagwalada, Kuje, and Kwali. Multiple general hospitals are located within these local councils. From each of the FCT area councils, the hospitals to be researched were selected. This study will only concentrate on the hospital environment and, more specifically, how patients perceive the effects of therapeutic green areas on their healing and general wellness. As Abuja is the capital of Nigeria and a fast-developing state that also houses some major hospitals and has inadequate therapeutic spaces, this formed the basis for the choice of location for the research.

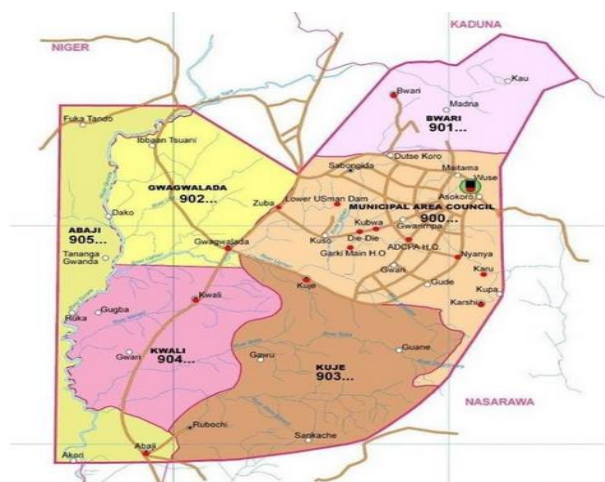


Figure 1 showing Map of F.C.T Showing the area councils

3. Methodology

The application of the survey research design, which entails the distribution of questionnaires to the target population, was made in order to collect the data required for this study. Primary information was gathered by distributing questionnaires to patients at the chosen hospitals to learn how they felt about the therapeutic green spaces there. The study was carried out in six hospitals in the FCT's area councils of Asokoro, Bwari, Kuje, Kwali, Abaji, and Gwagwalada because of their significant populations. The research areas' hospital facilities were randomly chosen using the purposive sampling method. Using a random sampling procedure, the respondents completed the surveys on their own. A secondary data collection strategy was also used, and this comprised a thorough assessment of the literature from journal articles, books, and online sources. The impacts and advantages of therapeutic green spaces on patients' wellness and recovery have been thoroughly studied, and secondary sources have been properly cited and recognised.

In order to determine the nature of the planning of green areas in the hospital setting, surveys of professionals were also conducted. The information gathered by way of a structured questionnaire was examined using a descriptive statistical method. A table was used to display the analysed data. The scale of measurement used was a 5-point Likert scale, with the cut-off points for the mean value being 1-1.75 for strongly disagree, 1.76-2.50 for disagree, 2.51-3.25 for neutral, 3.26-4.00 for agree, and 4.01-4.75 for strongly agree. Using a purposive sampling technique, the six hospitals for the study were obtained. The research population comprised three categories of people (visitors, patients, and staff). The respondents were based on morning and evening visits. The population size of the study is 1500 hospital users, comprising 675 patients, 250 staff, and 575 visitors. (See Table 2).

Table 2: Categories of the hospital users and the gender characteristics of respondents

Hospital Users	Frequency	Gender		% of the frequency
		Male	Female	
Patients	675	293	382	45%
Staff	250	107	143	16.7%
Visitors	575	259	316	38.3%
Total	1500	655	845	100%

The Krejci and Morgan (1970) formula was used to get the sample size value of the respondents for the entire population of 1500. Using the equation developed by Krejci and Morgan (1970), which is illustrated below:

$$Sample\ size = \frac{X^2 \times NP(1 - P)}{d^2 (N - 1) + X^2 P(1 - P)}$$

Where, S= required sample size; X= Z value (e.g. 1.96 to 95% confidence level); N = Population Size; P = Population proportion; and d = Degree of accuracy 5%, expressed as proportion (.05); It is the margin of error.

Data Presentation, Analysis and Results

At a 95% confidence level and a 5% margin of error, the sample size obtained for the study shows that a minimum of 306 respondents is required. The sample size (i.e., the number of respondents) in each hospital in the study area was chosen using stratified random sampling (See Table 3).

Table 3: Sample Size distribution and Results from the Administered Questionnaires

Hospital	Total Population	PTP	Sample Size	NOQA	NOQR	PQR
Asokoro	290	19	38	65	51	18.21
Bwari	270	18	55	61	54	19.29
Kuje	240	16	49	55	47	16.79
Kwali	220	13	46	52	45	16.07
Abaji	240	16	49	57	39	13.93
Gwagwalada	240	16	49	59	44	15.71
Total	1500	100	306	347	280	100

Key notes: PTP = % of Total Population, NOQA= No of questionnaire administered, NOQR= No of questionnaire Returned, PQR= % of questionnaire returned.

The distribution of sample sizes and the questionnaire's outcomes are shown in Table 3. The various hospitals sampled for the study received a total of 347 questionnaires, and a total of 280 questionnaires were retrieved. The larger sample size is being used to account for research flaws. This indicates an 80.69% response rate. Table 4 below shows the effects of therapeutic spaces on hospital users based on the structured 5-point Likert scale.

Table 4: Assessment of the effects of therapeutic spaces to hospital users by the respondents

Survey's Statement	Respondents Ranking					Sum	Mean Score	RII	Rank	Consensus	Opinion
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree						
Green landscapes that are therapeutic are necessary in hospitals.	1	2	3	4	5	984	3.51	0.702	7th	Agree	
Green spaces in hospitals' environments improve, soothe, and reenergize patients.	9	4	28	84	122	1108	3.95	0.791	4th	Agree	
Therapeutic green spaces relieves symptoms of sickness	24	5	5	102	96	1038	3.68	0.737	5th	Agree	
Therapeutic green spaces aid in stress reduction.	13	1	21	105	123	1147	4.09	0.819	3rd	Strongly Agree	
Like to see green spaces in the hospital environment.	0	0	36	109	135	1219	4.55	0.870	2nd	Strongly Agree	
Therapeutic green spaces psychologically aids in fast recovery.	10	8	5	70	157	1256	4.48	0.897	1st	Strongly Agree	
Therapeutic spaces improve my overall sense of well-being.	34	2	58	82	89	1010	3.60	0.721	6th	Agree	
Aromatherapy has good restorative effects on patients.	28	3	94	82	44	922	3.29	0.658	9th	Agree	
I desire satisfaction in interaction with therapeutic garden in the outdoor space area of the hospital.	31	4	51	75	81	973	3.47	0.695	8th	Agree	

Mean Values: Strongly Disagree: 1-1.75; Disagree: 1.76-2.50; Neutral: 3.26-4.00; Agree: 4.01-4.75

The following observations and deductions were made from Table 4: (i) The respondents strongly agreed with the survey statement that "therapeutic green spaces psychologically aid in fast recovery" ranked 1st and have a relative importance index of 0.879; (ii) they like to see green spaces in the hospital environment (2nd) with a relative importance index of 0.897; (iii) therapeutic green spaces aid in stress reduction (3rd) with a relative importance index of 0.819. The result shows the top three positive effects of therapeutic spaces on hospital users as determined by the respondents. This shows that hospital users require and value the impact of therapeutic green spaces in the hospital surroundings. The level of integration of green spaces in the study location (hospital environment) was analysed by using the following survey statement: i) Existence of green spaces and therapeutic plants. Professionals (architects and urban planners) piloted the survey. Table 5 shows the level of existence of green spaces among the respondents.

Table 5 shows the submission of the hospital staff on the level of green space in each of the hospitals. Four alternatives were provided to the respondents (completely inadequate, inadequate, adequate, and very adequate) to ascertain the level of existence of green spaces in the

hospital. The top two hospitals with a high level of green space presence are Gwagwalada (ranked first) with a mean value of 3.50 and Asokoro (ranked second) with a mean value of 2.70. Others have little to no green space in their respective hospital settings. In view of the data presented by Haigh et al. (2014) that demonstrates a connection between the presence of plants and stress reduction, the significance of green space in treatment areas was stressed.

Table 5: Level of existence of green spaces and therapeutic plants in each hospital environment by the respondents

Hospitals	Survey statement	Completely Inadequate	Inadequate	Adequate	Very Adequate	Total	Sum	Mean Score	Rank
		1	2	3	4				
Asokoro	Existence of green areas	1	4	2	5	10	27	2.7	2nd
Bwari	Existence of green areas	2	5	3	0	10	21	2.1	6th
Kuje	Existence of green areas	1	4	3	0	10	24	2.4	4th
Kwali	Existence of green areas	3	3	3	1	10	22	2.2	5th
Abaji	Existence of green areas	0	5	3	0	10	25	2.5	3rd
Gwagwalada	Existence of green areas	1	2	2	6	10	35	3.5	1st

Table 6: Level of Preservation of available green spaces in each hospital environment by the respondents

Hospitals	Survey statement	Very Poor	Poor	Good	Very Good	Total	Sum	Mean Score	Rank
		1	2	3	4				
		Asokoro	Preservation of green spaces	0	2				
Bwari	Preservation of green spaces	5	1	4	0	10	17	1.70	5th
Kuje	Preservation of green spaces	2	4	3	1	10	33	2.50	3rd
Kwali	Preservation of green spaces	0	4	5	1	10	27	2.70	4th
Abaji	Preservation of green spaces	3	3	4	0	10	21	2.10	6th
Gwagwalada	Preservation of green spaces	0	2	2	6	10	34	3.40	1st

According to the analysis, the level of maintenance of the green spaces is low. The four options (very low, poor, good, and very good) presented to the respondents show that there are only two hospitals that have a high level of maintenance of green spaces in their environments (see Table 6). Shipra and Rajeev's (2020) research seeks to comprehend the fundamentals of green hospitals, their functions, and the importance of implementing these concepts in hospitals to make them more patient- and environmentally-friendly. They also demand that the elements that influence how well a hospital is designed be identified and used to guide future hospital designs. According to the study, there is a strong correlation between better indoor air quality and a reduced risk of developing illnesses like asthma, the flu, sick building syndrome, respiratory issues, and headaches.

Table 7: Survey on the professionals to know the nature of planning of green spaces in hospital environment

Hospitals	Survey statement	Completely Inadequate	Inadequate	Adequate	Very Adequate	Total	Sum	Mean Score	Rank
		1	2	3	4				
Asokoro	Nature of planning of green spaces	2	3	6	9	20	62	3.10	1st
Bwari	Nature of planning of green spaces	8	6	5	1	20	39	1.95	5th
Kuje	Nature of planning of green spaces	6	9	6	3	20	44	2.20	3rd
Kwali	Nature of planning of green spaces	9	6	5	0	20	36	1.80	6th
Abaji	Nature of planning of green spaces	8	4	8	0	20	40	2.00	4th
Gwagwalada	Nature of planning of green spaces	2	3	8	7	20	60	3.00	2nd

The results of the survey of 20 professionals to determine the type of green space design in the hospital setting are shown in the table above. With the exception of Asokoro Hospital, which came in highest with a mean value of 3.00, the survey revealed inadequate planning in the majority of hospitals. According to Elizelle (2015), the design of green spaces can have a significant impact on how a place feels and the quality of the environment, with broad implications for the social, economic, and environmental advantages in the places where they are most needed. This argues that in order to improve both the quality of life and the environment, rural areas and developing countries should be included in green-planning initiatives and should value green spaces more generally.

4. Conclusion

Based on the study, it is concluded that therapeutic green spaces in hospital landscapes have a significant impact on patients' and users' health and wellbeing through various physical, psychological, and social benefits. Furthermore, the results of this study and the number of respondents show that maintenance is low. According to the study's list of plants that promote speedy recovery and survey results from respondents, gardens and other natural elements increase patients' satisfaction with good healthcare provider performance and the overall quality of treatment. In addition to offering therapeutic benefits and enjoyable views of nature, well-designed therapeutic hospital gardens can help lower stress and enhance clinical results.

5. Suggestions and Recommendation

Considering the results of this investigation, the authors recommend the following actions for effective integration of green spaces into hospital environments: (1) The hospital environment should be well planned by a landscape architect, taking into consideration a well-designed outdoor garden to benefit the users. (2) Integration of some therapeutic plants that can psychologically aid in recovery (4). Introduction of a percentage of green areas in any hospital design, which will be regulated by the government authorities. (5) Increase the number of employees with training in hospital green area management and upkeep. The study also implies that exposure to gardens and other natural settings can improve patient and family satisfaction with the healthcare practitioner and the standard of care as a whole. Adherence to these recommendations could result in improved adequacy and maintenance of hospital green spaces, which would facilitate the users' performance in the environment and, consequently, lead to healthy deliveries.

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