

# INTEGRATION OF LANDSCAPES IN HEALTHCARE FACILITIES TO HEAL USERS' BODY-MIND HEALTH

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## ABSTRACT

*The inclusion of nature in healthcare facilities for its restorative healing benefits began earlier in ancient times but was gradually forgotten in the development of the modern hospital. In Malaysia, it is found that most of the public hospital only focused on the built environment while disregarding the green outdoor environment. There is also a dearth of studies on the implementation of healing environment through therapeutic landscape in Malaysia. This study aims to identify the healing landscapes or therapeutic landscapes in healthcare facilities that are able to heal users' body-mind health, and to investigate the design and construction guidelines of therapeutic gardens in Malaysian healthcare facilities. This study is conducted using the qualitative method through precedent studies and case studies on healthcare facilities integrated with landscape elements as well as the quantitative method by questionnaire survey. The study has proven that patients who spend time in the courtyard garden or therapeutic garden in healthcare facilities have shorter recovery period and experience a reduction in the level of stress and anxiety. In the future, it is also to be advised to have more studies conducted on local courtyard garden in healthcare facilities in order to fulfil the basic principle of healing garden or therapeutic garden that could heal human body-mind health.*

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**Keywords:** *Therapeutic landscape, Human body-mind health, Healthcare facilities, Courtyard garden, Healing garden*

## INTRODUCTION

Contemporary study on the link between health and well-being and environmental environments frequently use the term ‘landscapes’ (Ward Thompson, 2011). Figuratively, plants and indoor landscapes could benefit human health and are associated with healing (Garden Streets, 2020).

Healing landscapes are landscapes at healthcare institutions that absorb natural elements and promote users’ physical and mental well-being. Gardening in hospital settings is gaining popularity as a way to help people heal and feel better. Nature-oriented places that are meant to give therapeutic or rehabilitation possibilities are examples of healing landscapes (or therapeutic, restorative, or rehabilitative gardens) (Söderback et al., 2004; Cooper Marcus, 2007).

According to a 2010 survey performed by the National Recreation and Parks Association, green landscapes in healthcare institutions help reduce anxiety and tension. Another study found that when people are surrounded by vegetation, they feel more tranquil and unbothered. Trees function as natural dust filters and oxygen producers, which are critical for our everyday health (Michael C., 2020).

### Problem Statement

The concept that landscapes and gardens in healthcare environments are beneficial to patients dates back over a thousand years and is prevalent in both Asian and Western cultures (Ulrich and Parsons, 1992). Furthermore, to provide operationally efficient settings for modern medical technology that is today perceived as strikingly institutional, unacceptably unpleasant, and inappropriate to the emotional requirements of patients, their families, and even healthcare professionals. The majority of the people living indoor are stressed out and dealing with bad emotions, which leads to an unhealthy lifestyle. Biophilic design, which reconnects humans with natural elements in a constructed environment, has been shown in studies to improve human

well-being (Ming. H., 2019).

The importance of outdoor space is undeniable, and connection to nature is vital and beneficial. But in recent decades the environment of hospitals and medical centers has become merely physical and include indoor space far from the surrounding environment. Jungle hiking, sitting on park benches, gardening and watching colors and nature's movement from indoor space, are active and passive ways of communicating with the natural environment. But lack of medical facilities, with limitations in green environment, unconsidered need to privacy, and even weak needs preparation are some of the problems that designers face through the design of medical centers (Cooper Marcus & Sachs, 2014).

As a result, the integration of landscapes and garden as design elements in Malaysian healthcare facilities was largely lost during the late twentieth century. Nature's value in our lives must be recognised and incorporated into hospitals, nursing homes, clinics, and respite centres (Tristan S., 2020).

### **Research Question**

- (1) Can landscapes make a positive contribution to the healing of patients in healthcare facilities?
- (2) How is the landscape integrated as the architectural element in the healthcare facilities to heal users' body-mind health?
- (3) What are the design and construction guidelines of therapeutic gardens for healthcare facilities?

### **Research Objectives**

- (1) To identify through literature review, the history and healing landscapes types in healthcare facilities that are present in current design.
- (2) To examine the design which integrated landscapes and the role of landscape elements to heal users' body-mind health.
- (3) To investigate the design and construction guidelines of therapeutic gardens in Malaysia's healthcare facilities.

### **Significance of the Study**

Landscapes have become crucial in healthcare facilities. Moreover, the landscape acts as an element that is able to heal patient's body-mind health.

Therefore, the study aims to identify the healing landscapes or therapeutic landscapes in healthcare facilities that are able to heal users' body-mind health. Moreover, the study is to investigate the role of landscapes in architecture and to examine the design and construction guidelines of therapeutic gardens or healing gardens in local healthcare facilities.

## **LITERATURE REVIEW**

### **Therapeutic Landscape and Healing Garden**

The concept of a healing garden is both old and new. Throughout history, people have relied on nature as a strong source of healing and a resource for rehabilitation (Cooper, 1999). Wilbert Gesler, a cultural geographer, first proposed the notion of healing landscapes in 1992, and it has since been intensively researched in the fields of environment, health, and care (e.g. Butterfield and Martin, 2016; Williams, 2007). If planned properly, a therapeutic garden can aid and promote the healing process (Yun, 2010; and Wells, 2014). Treatment is the consequence of a user's direct interaction with nature (Marsh et al., 2017; Oh et al., 2018; and Paiva, 2018). The presence of medical personnel is not required for the therapeutic effect of this sort of rehabilitation; simply being in the garden is enough.

### **Sensory Garden**

Within healthcare facilities, sensory gardens are accessible, species-rich habitats. Adults and children's social, emotional, cognitive, spiritual, and physical health needs are addressed in these programmes (Souter-Brown, 2015). The usage of a sensory garden may be divided into two categories: passive and active. The term 'passive use' refers to merely being in the sensory garden and taking in many forms of sensory stimulation such as fresh air, scents, sights, sounds, sunshine, and warmth. 'Active usage' in the garden refers to more focused gardening activities (Hernandez, 2007).

While the paediatric hospital garden may be characterised as a platform for children to use five different types of playing and learning methods, including deductive, inductive, visual and auditory, impulsive, and reflective (Thomson et al., 1994). The gardens also provide space for children to run

and roll about on the lawns. These are energetic games that require a lot of movement that may both tire and satisfy youngsters.

## **Horticulture Therapy**

Horticultural therapy is a therapeutic practice that encourages active participation in plant-based activities. To get the most out of this exercise, it must be monitored and facilitated by a skilled therapist. (Ismail et al., 2017). Horticulture is derived from the Latin word *hortus*, which means "garden," while culture is defined as "the growth, improvement, or change of the mind, feelings, interests, behaviours, tastes, ideas, customs, skills, art, and other cultural traits." (Perveen, 2013; Tse et al. 2012).

Horticulture therapy is one of the most successful treatments for people of various ages, backgrounds, and skills, according to some experts. The terms "horticultural therapy" and "therapeutic horticulture" refer to the process of interacting with plants or gardens by persons. Horticulture therapy is a method for people to continue to recuperate by employing plants, and it can be done either actively or passively (Perveen, 2013). Horticultural therapy is a client-centered treatment method that uses horticulture activities to help patients achieve specific therapeutic or rehabilitative goals. The goal is to improve overall health and wellness by maximising social, cognitive, physical, and psychological functioning (Haller, 2006; Haller, 2018).

## **Design Principle of Therapeutic Landscape/ Healing Landscape**

The individuals who will utilise the landscape should be the focus of attention when developing a therapeutic landscape; on the other hand, theories should be used as a guide. There should be a mix between physical activities and just being in the garden passively, depending on user groups (Stigsdotter, 2003).

The therapeutic landscape should make you feel comfortable and secure. They might bargain psychological calm and room for rest by being contained and secure (Tenngart, 2011). Gardening, by displaying life with vibrant components such as trees, flowers, and shrubs, may offer visitors a sense of security and optimism (Stigsdotter, 2002). For user groups that are more vulnerable, they are more likely to perceive depressed or dangerous

messages from their surroundings. The architecture of the facility should convey a sense of security. The surroundings must be unmistakably positive in order to enhance the healing process in therapeutic environments; this means that the area should encourage the healing process. (Cooper & Barnes, 1999).

## **Landscape Therapeutic Effect to Users**

There is evidence that modern humans' alienation from nature is linked to deteriorating well-being and rising incidence of depression and other mental diseases. As a result, when physical and constructed surroundings, social conditions, and human perspectives come together, landscapes become restorative. The visible landscape is thought to have a variety of effects on humans (Fakhar, 2016). It promotes aesthetic appreciation as well as human health and overall well-being.

Short-term relief from stress or mental exhaustion, faster physical recovery from sickness, and long-term overall improvement in patient health and well-being are the most significant benefits of landscape on health (Mackenzie, 2000; Jarrot, 2002). Patients who get a view of trees or the natural environment through a window during their routine therapy take less medicine and recover faster than those who have a view of a wall (Taylor et al, 2001; Taylor and Kuo, 2009). It dramatically decreases pain, increases comfort, enjoyment, and well-being, and reduces tension. Self-esteem and self-confidence improve as a result of psychological development. Working with real plants instills a sense of responsibility in patients (Wichrouski et al., 2005).

## **Effect of Therapeutic Landscape in Healthcare Facilities toward Users' Body-Mind Health**

Understanding physical environmental stimuli in healthcare facilities will enable us to design conditions that promote patient recovery and well-being. Anxiety, blood pressure, surgical recovery, the usage of pain medicine, and the duration of stay are all said to be improved by healing settings (Ulrich, 1995).

Families, patients, and hospital personnel that use well-designed

gardens report less stress and improved mental well-being (Cordoza., et al., 2018; Ulrich, 2005). Although a glimpse of nature from a window can help to reduce stress, while direct access to a garden appears to be more helpful in promoting healing (Lottrup, 2013). Gardens also offer a relaxing environment for family, patients, and employees to seek privacy or relieve stress through social interaction (Ulrich, 1999).

Landscape design helps to decrease sick absence by increasing employee wellness while also boosting happiness and attention levels (Raanaas et al. 2011; Browning et al. 2012; Ikei., et al., 2014). Stigsdotter conducted another research on healing landscape and concluded that it had beneficial therapeutic benefits on patients, including feelings of self-confidence, self-respect, self-reliance, and personality and self-development (Stigsdotter, 2002). Moreover, healing gardens create healthy living conditions for older people by renewing their memories, improving motivation, and encouraging physical activity (Bulut, 2006; Elings, 2006).

**Table 1. Summary of Evidence of Health Effect of View towards Natural Landscape**

No	Authors	Healing Effect	Measurements	Landscape Design Elements
1.	Ulrich, 1984	Shorter post-operative hospital stays	Number of days in hospital after surgery	Natural scene toward trees
2.	Heerwagen, 1990	Restorative benefits for heart rate data and emotional states	Heart rate; self-reports of emotional state	Painting of natural scene; distant mountains, clustered trees and open grassy areas
3.	Leather et al., 1998	Less job stress and intention to quit; reduced stress level of both patients and staffs	Self-report of emotional state	Percentage of the view from window with rural elements
4.	Kuo et al., 1998	Lower mental fatigue	Attention-tests; neighborhood social ties-test	Varying levels of nature (trees and grass) surrounding public housing (scale 0–4)
5.	Van den Berg et.al., 2007	Higher levels of happiness but lower levels of stress, anger, depression and tension	Attention-tests; emotion-test	Park-like-forest area with creek

6.	Jiang, 2015	Reduced stress and improved occupants' well-being	Survey Study and Questionnaires	Transparent landscape space with blurred boundaries between interiors and exteriors
7.	Shanahan et al., 2016	Reduced 7% depression; 9% high blood pressure	Doctor's test report	Natural Parks in Brisbane, Australia

Source: Author

## RESEARCH METHODOLOGY

This paper is focused on mix method literature reviews of existing healing gardens for healthcare facilities or primarily hospitals. The search terms were ‘therapeutic landscape’, ‘healing garden’, and ‘healing landscape’. Literature review will be done before the research regarding the understanding toward therapeutic landscape and healing landscape in healthcare facilities; the theories of incorporating landscapes as architecture elements in healthcare facilities; and the role of landscapes in healthcare facilities to heal users’ body-mind health.

Moreover, qualitative content analysis is carried out to analyse the selected healthcare facilities that integrate landscapes elements to support the research findings. Precedent studies also include several therapeutic landscapes or healing garden in tropical climate. The 2 selected precedent studies are as follows:

- 1.Lady Cilento’s Children Hospital, Brisbane, Australia
- 2.Khoo Teck Puat Hospital, Singapore

The 4 selected local healthcare facilities case studies are as follows:

- 1.Serdang Hospital, Selangor, Kuala Lumpur
- 2.Therapeutic Gardens at Batu Pahat Hospital, Kuala Lumpur
- 3.Hospital Seberang Jaya, Pulau Pinang
- 4.Hospital Kepala Batas, Pulau Pinang (Seberang Perai Utara)

Next, quantitative method based on questionnaire survey, using the Likert Scale to justify their preference for certain considerations where respondents should specify their level of preference in the five-level Likert Scale.



**Table 3. Five-Level Score of Likert Scale**

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	2	3	4	5

Source: Preedy, (2010)

**Table 4. Scale Range of Five-Level Likert Scale**



Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.00-1.80	1.81-2.60	2.61-3.40	3.41-4.20	4.21-5.00

Source: Preedy, (2010)

## RESULT AND DISCUSSIONS

Two precedent studies are selected as healthcare facilities that have integrated landscape element as one of the relief and escape for seriously ill and infirm patients and have demonstrative benefits in sustainability and building efficiency.

**Table 5. Comparison of the elements in the gardens of the Two Precedent Studies particularly between Lady Cilento’s Children Hospital & Khoo Teck Puat Hospital**

Precedent Study	Location	Findings Regarding Characteristic of Healing Garden / Therapeutic Garden
Lady Cilento’s Children Hospital  Sources: Conrad Gargett, (2016)	Brisbane, Australia	<ul style="list-style-type: none"> <li>- The structure incorporates landscape, maximises natural day lighting and vistas, and facilitates wayfinding to create a positive, rich and exciting architectural experience.</li> <li>- Green walls and roofs, as well as lushes, verdant vistas from hospital beds, become wonderlands</li> <li>- People use the garden for passive and active recreations, as well as part of rehabilitation programmes.</li> <li>- Garden offers a variety of play and rehabilitation activities</li> <li>- Various themed garden for different users</li> </ul>
Khoo Teck Puat Hospital  Sources: Peridian Asia (2012)	Singapore	<ul style="list-style-type: none"> <li>- Greenery extends from the centre courtyard through the higher levels of the buildings and down into the open-to-sky basement.</li> <li>- Water elements with aquatic species, as well as plants that attract birds and butterflies, were added to make it feel more like a forest. Blue-green spaces account for 18 per cent of total floor area.</li> <li>- Balconies with aromatic plants extend the experience to the patient’s bedside.</li> <li>- Rooftop farm as educational opportunities and rehab activities.</li> </ul>

Source: Author

**Table 6. Comparison of the elements in the gardens of Four Case Studies in Malaysia through Roger Ulrich's Theory of Supportive Garden Design**

Element of Gardens from Roger Ulrich's Theory of Supportive Garden Design (Ulrich 1999)	Serdang Hospital	Segamat Hospital	Hospital Seberang Jaya	Hospital Kepala Batas
To provide opportunities for movement and exercise	*	*	*	*
To provide opportunities to make choices, seek privacy			*	*
To encourage people to gather together and experience social support	*	*		
To encourage positive distractions with nature	*	*	*	*
Visibility	*	*		*
Accessibility	*	*	*	
Familiarity			*	*
Quiet				*
Comfort	*	*		*
Unambiguously positive art	*	*	*	*

Source: Ulrich, (1999)

### Questionnaire Survey

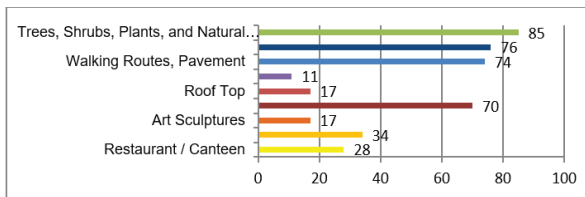
The questionnaire are given out online in Google Form format to public and emails are sent to 2 healthcare facilities in Penang which are Hospital Seberang Jaya and Hospital Kepala Batas. However, due to the current pandemic situation, there are limitations in finding the respondents (patients, staff in hospital). A total number of 104 respondents participated which included students, health and medicine workers, business, management and administration and others. The questionnaire is divided into three sections, the first of which contains demographic information, the second of which contains user reactions and experiences with landscape design in local healthcare facilities, and the third of which contains user recommendations for improving courtyard garden design in current Malaysian healthcare facilities.

**Table 7. Questionnaire Section 1: Demographic Data**

Gender		Age Group		Job Occupation	
Male	32.7 % (34)	15-20 years old	-	Student	39.4%
		21-25 years old	55.8%	Architect / Landscape Architect	5.8%
Female	67.3% (70)	26-30 years old	31.7%	Engineer	3.8%
		31-35 years old	7.7%	Art, and Culture	2.9%
		36-40 years old	1%	Business, Management and Administration	12.5%
		41-45 years old	3.8%	Health and Medicine	22.1%
				Others	13.5%

Source: Author

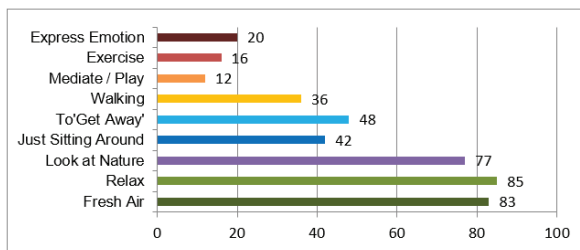
The majority of the respondents preferred the natural character of the complex like trees, shrubs and plants, with a total of 85 respondents which made up 81.7% of the responses as shown in Figure 3 below.



**Figure 3. Respondents' Preference towards Features in Complex/ Healthcare Facility**

Source: Author

Based on Figure 4, three main reasons the respondents visit the garden are to relax, inhale fresh air, and to look at the nature which have 85 votes, 83 votes and 77 votes respectively.



**Figure 4. Respondents' Preference towards Features in Complex/ Healthcare Facility**

Source: Author

Based on the bar chart shown in Figure 5, it shows most of the respondents perceive the natural environment as a peaceful place to stay with 86 respondents (82.7%). Second and third choices of the respondents perceive the natural environment as refreshing and motivating which have 81 votes (77.9%) and 41 votes (39.4%) respectively. Besides, only some of them perceive the natural environment as courage which is 12.5% or 13 respondents. However, there are respondents that perceive natural environment creating anxiety and nervousness of the environment which are 7 respondents (6.7%) and 3 respondents (2.9%) respectively. There is 1 respondent that perceives the natural environment of the area as anger.

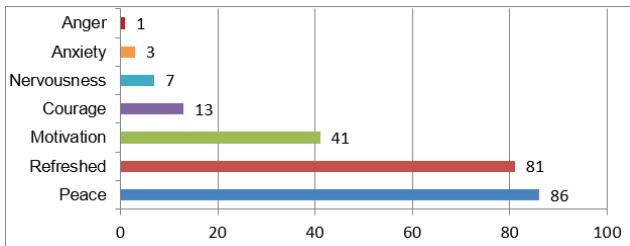


Figure 5. Respondents' Perception of the Natural Environment

Source: Author

The majority of the respondents with a total number of 71 respondents (68%) agree that passive design that integrated landscape elements could improve indoor air quality (IAQ) in healthcare facilities effectively (Figure 6). However, there are 15% or 15 respondents who do not agree that landscape integrated passive cooling design could improve indoor air quality (IAQ) in healthcare facilities. Meanwhile, there are 17% or 18 respondents show uncertainty toward passive design integrated with landscape elements could improve IAQ in healthcare facilities effectively.

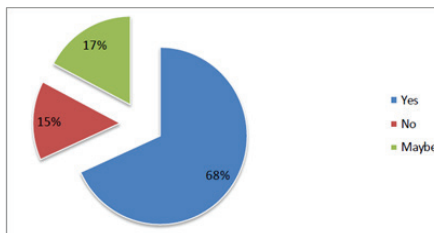
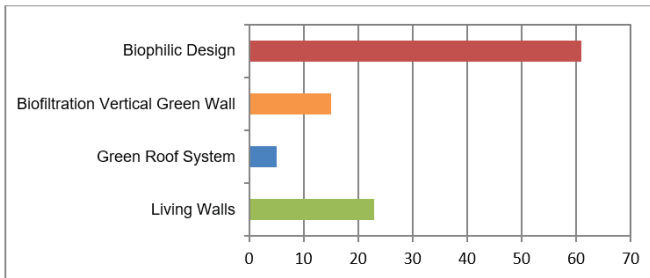


Figure 6. Respondents' Opinion towards Passive Design Integrated with Landscape Elements could Improve IAQ in Healthcare Facilities Effectively.

Source: Author

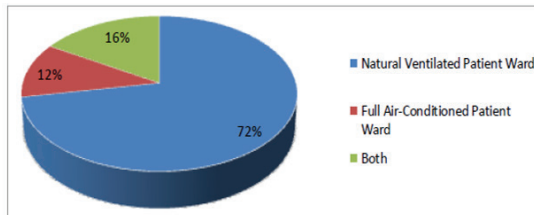
According to Figure 7 as shown below, the majority of the respondents with a total number of 61 respondents (58.7%) prefer bio-philic design to be integrated in Malaysian healthcare facilities. The second preference from respondents is living walls with 22.1% or 23 votes from respondents. This is followed by 14.4% or 15 respondents who preferred bio-filtration vertical green wall while 4.8% or 5 respondents voted for green roof system to be integrated into Malaysia's healthcare facilities.



**Figure 7. Respondents' Preference on Landscape Passive Cooling Design to be Integrated in Healthcare Facilities**

Source: Author

According to Figure 8 as shown below, 72% voted for natural ventilated patient ward. However, only 12% voted for full air-conditioned patient ward in Malaysian healthcare facilities. Yet, there are 16% of the respondents who preferred to have both in Malaysian healthcare facilities.



**Figure 8. Respondents' Preference on Ventilation System Integrated in Patient Ward**

Source: Author

**Table 8. Respondents’ Opinions towards intergrations of Landscape in Healthcare Facilities**

No.	Question	Average Index	Scale Response
1.	Landscapes act as an Element that able to Heal Patients’ Body-mind Health	4.50	Strongly Agree
2.	Communication with Nature Reduces the size of Physiological Respond to Stress and Tension	4.32	Strongly Agree
3.	Landscapes could Benefit Human Health and Associated with Healing	4.38	Strongly Agree
4.	Courtyard with Plenty of Plants Helps to Accelerate Healing of Patients	4.33	Strongly Agree

Source: Author

**Table 9. Respondents’ Recommendations in Improvement of the Courtyard Garden Design in Local Healthcare Facilities**

No.	Recommendations from Respondents	Total Respondents
1.	Green Natural Features	28
2.	Maintenance of the Courtyard Garden	14
3.	Pest, Insects, and Bugs Control	8
4.	Climate-Resilient Design Courtyard Garden	8
5.	Integrated animal in Courtyard Garden Design	8
6.	Universal Design Landscape / Courtyard Garden	6
7.	Water Features (Ponds, Moving Water, Water Fountain)	6
8.	Others	26

Source: Author

## CONCLUSION

Through appropriate planning and management of the garden or courtyard garden as well as the patient, a garden or green open space may be a useful environmental intervention in Malaysian hospitals. The year-round pleasant weather allows patients to benefit psychologically from watching and physically interacting in the garden. These preliminary findings on the effectiveness of the nature to foster the healing process of patient have been proven and shown that with the use of landscape in healthcare facilities may make a good contribution to the healing of patients. These findings results in shorter post-operative hospital stays, restorative benefits for heart rate

data and emotional states, reduced stress level for both patients and staffs in healthcare facilities, improved occupants' well-being and reduced 7% depression and 9% high blood pressure from doctor's test report.

Furthermore, both precedent studies offer social support in garden, but in somewhat different ways: Lady Cilento's Children Hospital offers various themed gardens for different users while Khoo Teck Puat uses green roof as a rooftop farm for patients, staff and neighbours to reintegrate and to socialise. All the chosen healthcare facilities with courtyard garden in Malaysia provide opportunities for movement and exercise, and encourage positive distractions with nature. From the findings, what is lack in courtyard garden of Malaysia healthcare facilities are the freedom to make choices, lack of privacy in garden, the garden might be filled with noises, and most of the patients are not familiar with the garden located in healthcare facilities.

There are various design principles of healing gardens or therapeutic gardens to use and refer to in order to promote the healing process in patients. Following that, numerous critical factors, design and construction guidelines must be addressed in order to have a well-designed garden in healthcare institutions. Providing various types of trees, shrubs, flowers in different height to stimulate the senses of the patients; water elements; offering a range of garden beds at different heights for ease of access and including socialization activities in the healing garden will promote the healing process of the users' body-mind health.

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## **CONFLICT OF INTEREST**

The authors declare no conflict of interest.

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