

# Factors Influencing the Visit to the Courtyard Gardens in Public Hospitals in Malaysia

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## Abstract

Individuals' mental health and well-being are significantly influenced by being in a natural setting and viewing nature. Hospital courtyard gardens (HCG) is a common feature found in public hospitals in Malaysia. Nevertheless, the factors influencing the visitation and non-visitation to the HCG are less understood. This study attempts to investigate factors influencing the visit and non-visitation of patients, staff and visitors to the HCGs in three Malaysian public hospitals. The research findings are instrumental to the architects and landscape architects to make necessary improvements for future HCG design and the hospital managers to enhance and retrofit the existing HCG.

**Keywords:** Courtyard Gardens; Visitation; Non-visitation, Public hospital

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## 1.0 Introduction

The quality of living and working environments have a significant impact on individuals' health and well-being. Staff, patients, and visitors are subjected to stress when they spend long hours in a sterile hospital environment. In contrast, patients' recovery is positively impacted when in contact with nature, either by viewing or being in a garden. Several scholars have attributed the positive role of nature in reducing stress and enhancing relaxation in humans, leading to improved health and well-being (Ulrich et al., 2018; Amat, 2017; Gonzalez et al., 2011; Kim et al., 2009; Verderber and Reuman, 1987; Ulrich, 1984). Therefore, health outcomes and stress-coping capacities could be improved by having access to natural settings in hospital buildings (Ulrich et al., 2020; 2018; Cooper Marcus and Sachs, 2014). Furthermore, numerous interventional studies have reported a significant reduction in adult patients' stress levels following nature contacts and interaction, either in a natural setting or walking through nature (Kim et al., 2009; Gonzalez et al., 2011).

Besides providing comfort by improving the microclimatic conditions (Idris et al., 2019; Almhafdy et al., 2013b; 2014), courtyards have been integrated into the built form of hospital buildings to establish restorative environments that will facilitate patients' recovery, mental health and well-being (Idris et al., 2018; Cooper Marcus and Barnes, 1995; Naderi and Shin, 2008). There is data paucity regarding the factors influencing the visit and non-visitation to the HCG in Malaysian public hospitals. Understanding from the perspectives of the HCG users and non-users are fundamentals to determine the factors that entice and motivate them to visit the HCG and issues that refrain them from such activities. Hence, this study aims to identify the factors influencing the visitation and non-visitation of patients, staff, and visitors to the HCGs in three Malaysian public hospitals.

## 2.0 Literature Review

### 2.1 Theoretical foundations of restorative environments

A setting that permits and promotes recovery and restoration from the mental exhaustion of excessive demands and daily errands is a restorative environment (Hartig, 2004, p.273-274). A restorative environment results in positive outcomes such as renewal of cognitive function, better psychological well-being, reduced stress levels, and improved moods. Several original research and empirical studies have documented the benefits derived from nature contact and interaction in terms of stress levels and health outcomes in both urban (non-healthcare conditions) (Thompson et al., 2012; Honold et al., 2016) and healthcare settings (Kim et al., 2009; Gonzalez et al., 2011).

The 'Biophilia' concept is traditionally used to describe the theory of restorative environments. According to Wilson (1984), the idea posits that interaction with nature is a stimulating event that leads to health-related impacts and benefits outcomes in humans, implying that humans react positively to nature. This theory was further expanded by Ulrich (1984), suggesting that the restoration of psychological aspects based on reduced stress levels (Stress Reduction Theory – SRT) is a part of the positive response (Stress Reduction

Theory – SRT). The (Attention Restorative Theory - ART) was suggested by Kaplan and Kaplan (1989) as another fundamental aspect of a positive response from nature. It assists in the psychological restoration process by regaining direct attention. Both SRT and ART have been substantiated in several empirical research (Ulrich et al., 1991; Staats et al., 2003; Hartig and Staats, 2004; Berto, 2005).

### 2.1.1 Stress Reduction theory (SRT)

An individual's ability to manage stress and restore good psychological well-being is connected with the potential of natural environments to improve health outcomes (Ulrich, 1984, 1991). These events serve as the foundation of the SRT. The theory is also known as the 'theory of supportive gardens' (Ulrich, 1999), which posits that an outdoor garden in a healthcare setting could serve as a stress-relieving facility if it is designed to promote the following characteristics: (1) natural distraction access; (2) social support; (3) physical activity and exercise; (4) a sense of control (Reference). Additionally, the impacts of outdoor gardens on health outcomes in a healthcare setting are embedded in the theory of supportive gardens (Ulrich, 1999), which comprises four characteristics capable of reducing stress levels and improving health status by enhancing specific coping and restorative resources (See Figure 1).

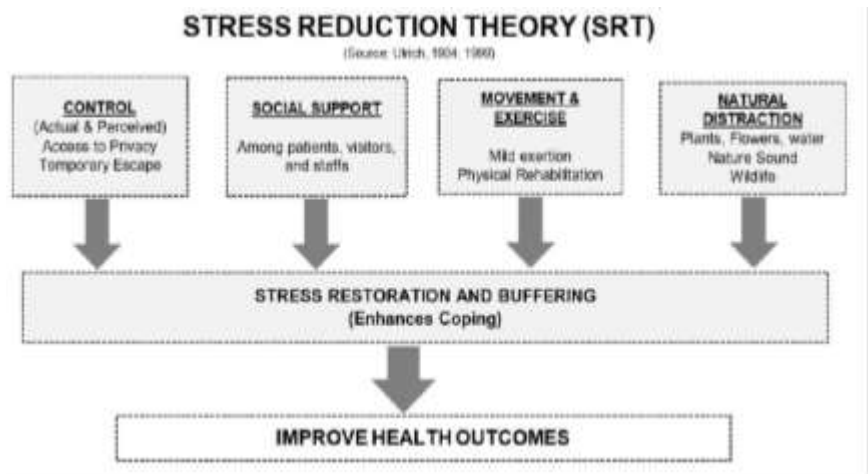


Figure 1: Conceptual model: Effect of the garden on Health outcomes  
Source: Ulrich (1999) and re-illustrated back by the author (2017).

#### i) Control

The first component of SRT is a sense of control. Individuals who feel a sense of control refer to people who can determine their actions and decisions in certain situations and determine what others do to them (Gatchel et al., 1989, cited in Ulrich, 1999). Research has shown that providing a sense of control can reduce stress levels and improve the ability to cope with

stress in an individual (Evans and Cohen, 1987). People who feel a sense of control are healthier compared to those who experience a lack of control (Evans and Cohen, 1987). SRT theory suggests that being in the garden or viewing nature through a window can provide a sense of control for patients, staff and visitors by having a temporary escape or being away from a stressful environment and situation. As such, it helps them to relieve their stress (Ulrich, 1999).

### **ii) Social support**

The second component of SRT is social support, which refers to care, empathy and emotional, physical and material support that someone has received from other people (Ulrich, 1999). Ulrich (1999, p. 42) highlighted that people who received a higher level of social support experienced less stress compared to those who are often isolated and received low support from others. In addition, Cooper Marcus and Sachs (2014) described social support as also including expressing feelings to the people that they care about such as providing them with a sense of belonging to a group.

### **iii) Physical movement and Exercise**

The third component of SRT is providing opportunity for physical movement and exercise. Ulrich (1999) emphasised that physical movement and exercise including mild movement can contribute to positive stress-reducing effects for the garden's users in the healthcare setting. There is an abundance of studies highlighting that physical movement and exercise provide both physical and emotional benefits for the perceivers (Norris et al., 1992; Blumenthal et al., 1999; Nabkasorn et al., 2006). For instance, a study conducted with impaired older adults (e.g., patients with chronic lung diseases) reported a positive effect on reducing their stress level and a positive outcome in terms of their psychological change (Blumenthal et al., 1999). Further research conducted by Nabkasorn et al. (2006) also revealed that adolescent females with depressive symptoms who practised jogging exercise reported less stress and lower levels of depression and stress hormones.

### **iv) Natural distraction**

The fourth component of SRT is a natural distraction (Ulrich, 1999). SRT theory suggests that a natural distraction such as viewing the trees, water, flowers, being in nature and listening to the sounds of nature can promote a positive emotional state in the perceiver (Ulrich, 1999). There is mounting evidence that viewing a natural scene (Ulrich 1984; Verderber and Reuman, 1987) and being in nature (Kim et al. 2009; Gonzalez et al. 2011) can promote restoration from stress for patients in a healthcare setting. In addition, several experimental control studies revealed that viewing nature can positively contribute to a stress-reducing effect in non-patient groups compared to viewing urban scenery (Ulrich, 1981; Ulrich et al., 1991). Moreover, further recent interventional studies have revealed that being in nature and viewing nature contributed to a lower level of stress hormone among the perceivers in a neighbourhood area (Thompson et al., 2012; Honold et al., 2016). Further studies also found

that the sound of nature also promotes the restoration effect to its perceivers (Zhang et al., 2017; Payne, 2013; Jahncke et al., 2011; Alvarsson et al., 2010).

### 2.1.2 Attention Restorative Theory (ART)

In addition to the emphasis on stress reduction in the healthcare setting as proposed by Ulrich's theory, other ART scholars posited that human-nature interaction could positively boost recovery from the depleted directed attention capacity (Kaplan and Kaplan, 1989; Kaplan, 1995). These researchers further reinstated that ART focus on how human's brain function is influenced by two forms of attentions: 'Direct Attention' and 'Indirect Attention' (Cooper Marcus and Sachs, 2014, p.28-29). A persistent attentiveness to execute a stressful or demanding task, which affects the sensory stimuli indirectly and induces mental fatigue, is known as 'Direct Attention'.

On the other hand, 'Indirect Attention' could aid in the recovery process following prolonged mental fatigue. Indirect Attention was described as a state of mind in which mental fatigue is alleviated without pre-conditioned efforts (Kaplan and Kaplan, 1989; Kaplan, 1995). This phenomenon was further elaborated using the term 'soft fascination' that facilitated mental restoration and coping with stress and anxiety. Kaplan and Kaplan (1989) affirmed that interaction with nature, either directly or indirectly (i.e., by viewing or walking in a garden), could contribute positively to mental health and well-being (Cooper Marcus and Sachs, 2014, p.28-29). Four fundamental characteristics of restorative settings identified by ART include being away, fascination, extent, and Compatibility (See Figure 2).

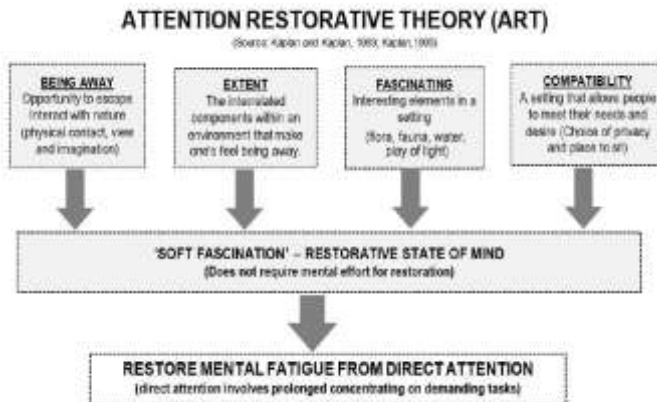


Figure 2: Conceptual model diagram: component of a restorative environment (Source: Kaplan and Kaplan, 1989; Kaplan 1995. A diagram is illustrated by Author (2017)).

#### i) Being away

Being away refers to escaping from a stressful environment or situation or any source of mental fatigue. Apart from having physical contact with nature, such as walking in a forest or

garden, it also includes changes in visual terms, such as viewing nature or images of nature or imagining nature in one's mind.

### ii) Extent

Extent refers to the interrelated components within an environment that have all the elements related to one another to facilitate one's mind to feel that they are away. It engages their mind to foster restoration.

### iii) Fascination

Fascination refers to the capability of a pleasant and aesthetical setting to hold one's mind without any mental effort. People not only tend to fascinate with the exciting things in a setting, including the flora, fauna, water and the play of light, but also through a process of thinking and imagining nature (Cooper Marcus and Sachs, 2014, p.28-29).

### iv) Compatibility

Compatibility refers to the characteristics of the environment that have the capability to meet one's needs and inclinations. For instance, the setting allows one to have privacy and fulfil their desire to be alone in that environment. Cooper Marcus and Sachs (2014) also described that incompatibility often happens when one's needs or desires to go outside and interact with nature are not met due to bad weather, inaccessible entrances, and policy matters.

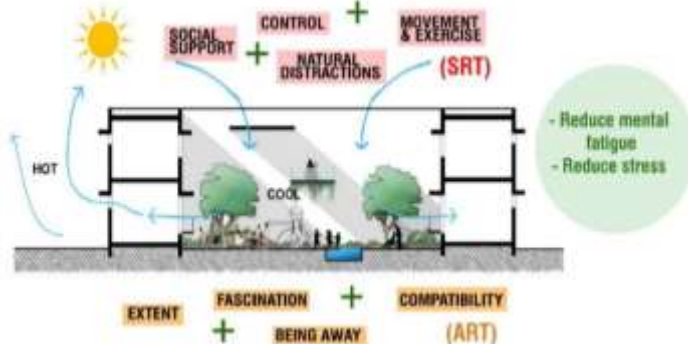


Figure 3: Illustration indicates the criteria for a restorative environment for the outdoor garden in the hospital.

(Source: Idris (2020))

Ulrich (1999) suggested several components of the restorative environment in a healthcare setting that improved the ability to cope with stress and the emotional state of the perceiver. Additionally, Kaplan and Kaplan (1989) also highlighted several factors of restorative environments which resulted in the positive emotional responses and satisfaction of the perceivers. Both SRT and ART theories are the central point of this research because they emphasise the interaction of humans with nature and the role of the natural environment

in promoting stress recovery, reducing mental fatigue and contributing to positive feelings through fascination and reflection (see Figure 3).

### 3.0 Methodology

#### 3.1. Case studies

Three representative samples of three different HCGs were selected from three Malaysian public hospitals (H1-hospital, H2-hospital, and H3-hospital) located in Johor Bharu, Selangor, and Kedah. The selected case study hospitals represent all types of closed courtyard garden configurations. The research was limited to Peninsular Malaysia and State Government hospitals with bed capacities ranging from 500 to 700 beds because of time and budget constraints and the feasibility of the case study sites (See Figure 4).



Figure 4:

The following criteria were considered for the selection of the case study hospitals:

- (i) design configuration of the courtyard;
- (ii) year of operation;
- (iii) location and size of the courtyard within the building;
- (iv) height of the wall surrounding the courtyard;
- (v) the role of the spaces clustered around the courtyard.

After that, the study sites were visited, and a field investigation was carried out in all the 13 HCGs. These procedures were carried out to ensure that representative samples were selected for the three case study HCGs, and the following six criteria were employed:

- (i) types of users;
- (ii) accessibility;
- (iii) occupancy levels;
- (iv) sites characteristics based on the presence of hardscape and softscape
- (v) feasibility for the subjective assessment study; and

(vi) space function and location.

Figure 5 and Table 1 show the site plan and the layout of the selected case study HCGs: H1-C1, H2-C3 and H3-C2.

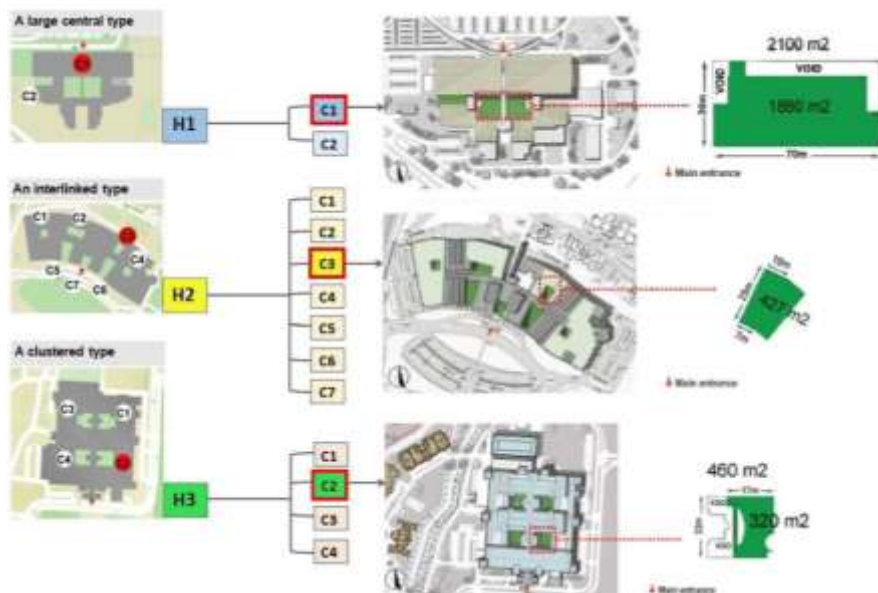





Figure 5: The representative case study HCGs selection: H1-C1, H2-C3 and H3-C2.

Source: Author (2021)

Table 1: The layout of the case study HCGs: H1-C1, H2-C3 and H3-C2.

H1-Hospital (H1-C1)	H2-Hospital (H2-C3)	H3-Hospital (H3-C2)
		

Source: Author (2021)

### 3.2. Research methods

The study methodology was a survey interview with a group of users and non-users. The user's group includes those who visit and spend time in the HCG, whereas the non-users comprise those sitting in the hospital waiting areas or in the lobby. Survey research is



essential for this study because it facilitates the use of a representative sample of the population to understand people's trends, attitudes, and opinions. Besides, it also yields the quantitative data needed as an aspect and evidence of the case study (Creswell, 2015). The participation of non-users is required in this research to prevent any data collection bias and subsequent reporting of the results. In each case study HCG, representative samples for the HCG users and non-users were selected using a simple (H1-C1, H2-C3 and H3-C2), implying that an equal chance of selection during the sampling was allocated to each member of the population.

**3.3 A Demographic data of the user's group and non-users group in the selected HCGs**

At all three sites, a survey interview was conducted among 120 users (H1-C1 [N = 46]; H2-C3 [N = 36]; and H3-C2 [N = 38]) to determine the factors that influenced their visit to the HCG. The visitor's group contributed the highest number of HCG visitors, followed by staff members and patients (See Table 2). Those willing to participate in the study were interviewed, whereas individuals who were simply passers-by or under stress were not included. The respondents who were spending time in the HCG from 9 a.m. to 5 p.m. were interviewed at random during the fieldwork. Additionally, 45 respondents each from the three case study hospitals (H1, H2, and H3) participated in the survey interviews, thus amounting to 135 respondents. A research assistant conducted the survey interviews among the non-users group while the researcher concurrently interviewed the HCG users group. Similarly, visitors represent the highest number of respondents visiting the HCG, followed by staff and patients (See Table 3).

Table 2: Demographic data of the user's group in each representative HCG



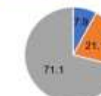

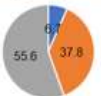
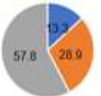
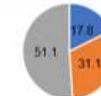
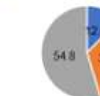
	H1-C1 N=46 (38%)	H2-C3 N=36 (30%)	H3-C2 N=38 (32%)	TOTAL N=120 (100%)								
<b>TYPES OF USERS</b>												
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <span style="color: blue;">■</span> Patient  <span style="color: orange;">■</span> Staff  <span style="color: gray;">■</span> Visitor                 </div> <div style="width: 80%;"> <table border="0"> <tr> <td>13.0% (n=6)</td> <td>19.4% (n=7)</td> <td>7.9% (n=3)</td> <td>13.3% (n=16)</td> </tr> <tr> <td>10.9% (n=5)</td> <td>19.4% (n=7)</td> <td>21.1% (n=8)</td> <td>16.7% (n=20)</td> </tr> <tr> <td>76.1% (n=35)</td> <td>61.1% (n=22)</td> <td>71.1% (n=27)</td> <td>70.0% (n=84)</td> </tr> </table> </div> </div>	13.0% (n=6)	19.4% (n=7)	7.9% (n=3)	13.3% (n=16)	10.9% (n=5)	19.4% (n=7)	21.1% (n=8)	16.7% (n=20)	76.1% (n=35)	61.1% (n=22)	71.1% (n=27)	70.0% (n=84)
13.0% (n=6)	19.4% (n=7)	7.9% (n=3)	13.3% (n=16)									
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76.1% (n=35)	61.1% (n=22)	71.1% (n=27)	70.0% (n=84)									

Table 3: Demographic data of the non-users group in each representative HCG

	H1-HOSPITAL N=45 (33.3%)	H2-HOSPITAL N=45 (33.3%)	H3-HOSPITAL N=45 (33.3%)	TOTAL N=135 (100%)								
<b>TYPES OF NON-USER</b>												
<div style="display: flex; justify-content: space-between;"> <div style="width: 20%;"> <span style="color: blue;">■</span> Patient  <span style="color: orange;">■</span> Staff  <span style="color: gray;">■</span> Visitor                 </div> <div style="width: 80%;"> <table border="0"> <tr> <td>6.7% (n=3)</td> <td>13.3% (n=6)</td> <td>17.8% (n=8)</td> <td>12.6% (n=17)</td> </tr> <tr> <td>37.8% (n=17)</td> <td>28.9% (n=13)</td> <td>31.1% (n=14)</td> <td>32.6% (n=44)</td> </tr> <tr> <td>55.6% (n=25)</td> <td>57.8% (n=26)</td> <td>51.1% (n=23)</td> <td>54.8% (n=74)</td> </tr> </table> </div> </div>	6.7% (n=3)	13.3% (n=6)	17.8% (n=8)	12.6% (n=17)	37.8% (n=17)	28.9% (n=13)	31.1% (n=14)	32.6% (n=44)	55.6% (n=25)	57.8% (n=26)	51.1% (n=23)	54.8% (n=74)
6.7% (n=3)	13.3% (n=6)	17.8% (n=8)	12.6% (n=17)									
37.8% (n=17)	28.9% (n=13)	31.1% (n=14)	32.6% (n=44)									
55.6% (n=25)	57.8% (n=26)	51.1% (n=23)	54.8% (n=74)									

## 4.0 Results

### 4.0 Findings

#### 4.1. Factors influencing the visitation to the HCG

For this study, multiple-choice survey questions were used to interview the HCG user group to identify the factors that encourage their visitation to the HCG. Of the total interviewed respondents (N = 120), more than half of them affirmed that they wanted to refresh their minds, enjoy the view of the courtyard garden, and relax and rest (See Figure 6). This is consistent with the findings from a previous study, where the respondents mentioned that the availability of relaxation and resting venue and a likeness for the greenery and pleasant views were their main reasons for visiting the HCG (Idris, 2020).

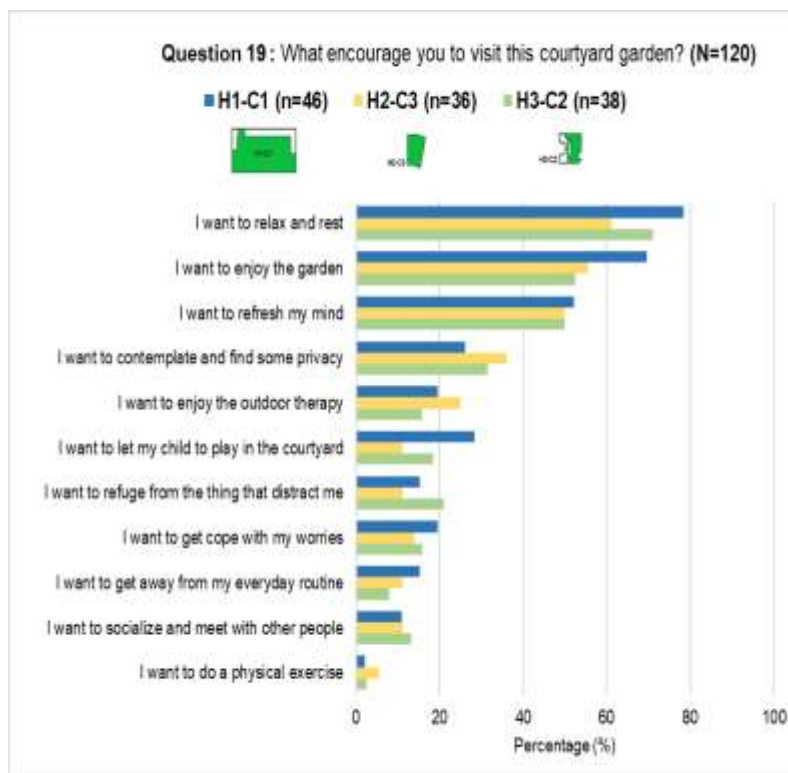


Figure 6: Factors affecting visitation to the HCG

Furthermore, contemplating and finding some privacy were the reasons over 20% of the respondents had visited the HCG. Finding a playing ground for children, a distracting

refuge, enjoying the outdoor therapy, getting away from daily life activities, socialising and meeting other persons, coping with worries, and performing physical exercise were the other factors that encouraged the respondents to visit the HCG.

#### 4.2. Factors influencing the non-visitation to the HCG

The non-user group were also assessed for factors that prevented them from visiting the HCG. A total of 135 respondents participated in this survey, and the factors that discouraged HCG visits included physical design, life routine, accessibility, microclimate and safety (See Figure 7).

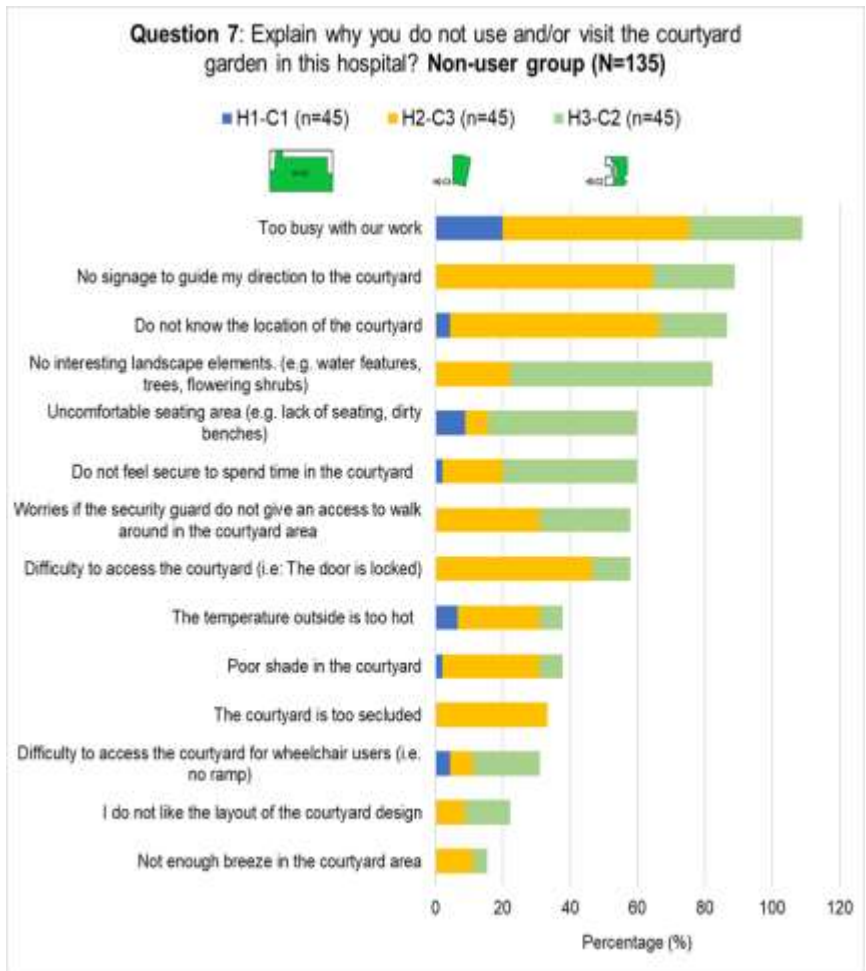




Figure 7: Factors resulted in the non-visitation to the HCG

The main barrier to HCG visitation was busy life routines, with 42.9% (N = 21), 40.8% (N = 20), and 16.3% (N = 8) of staff, visitors, and patients, respectively asserting to be busy with their daily activities. Visitors to the hospital spend only a few minutes visiting family members in the wards. Patients stated that they visited the hospital for their clinic appointment and did not intend to visit the HCG. Staff also reported being busy treating patients in the ward and managing work in the office.



Regarding the physical design, a higher proportion of respondents (64.4%) in H2-C3 and H3-C2 (24.4%) stated that there was no signage directing them to the HCG. Surprisingly, no respondents in the H1-C1 mentioned this issue because this hospital allocated proper signage to the HCG, which was closer to the main lobby (See Table 4).

Table 4: The signages provided in the HCG

HCG	DIRECTIONAL SIGNAGE	MAP SIGNAGE	LOCATION SIGNAGE
H1-C1	The signage indicates the HCG mounted on the wall at the staircase area. However, the font is too small and less visible to other impaired and mobility users 	X	Signage provided to indicate the name of the HCG: 'Taman Harmoni' (Peace garden). However, the signage is located on the slope area, making it less visible to hospital users. 
H2-C3	X	X	X
H3-C2	X	X	X
X	: No HCG signage provided		
Directional signage	: Signage indicates the direction to go to the HCG		
Map signage	: Signage indicates the floor plan and location of the HCG		
Location signage	: Signage which shows the name of the HCG		







Moreover, most respondents in the H2-C3 stated that they were unaware of the HCG location compared to the other HCGs because the former was too secluded from the main hospital lobby. Issues related to the uncomfortable, lack of seating, and uninteresting landscape elements were highlighted the most by the respondents in the H3-C2 compared to other HCGs (See Table 5).

Table 5: Different types of vegetation in the HCG

Description	H1-C1	H2-C3	H3-C2
Size	 2,100m <sup>2</sup>	 320m <sup>2</sup>	 427m <sup>2</sup>
Canopies	Have a variety of canopy trees	No canopy trees	Shady palm trees
Variety of planting	 - Have a variety of trees and shrubs	 - Less variety of trees and shrubs. - Potted plants	 - Have the least variety in type of trees and shrubs

Another barrier that deterred them from visiting the HCG was the lack of accessibility, such as locked doors in H2-C3 and H3-C2 (See Table 6). Difficult access for wheelchair users was also one factor contributing to the non-visitation to the HCG. More respondents in both H2-C3 (40%) and H3-C2 (17.8%) were concerned about their safety and if permitted to visit the HCG. Only 2.2% of respondents felt insecure to visit the H1-C1.

Table 6: Accessibility in the HCGs

Description	H1-C1	H2-C3	H3-C2
Accessibility	 +ve	 -ve	 -ve
	90%	30%	50%
Number of entrances	3 main entrances to access the HCG	Only one door opens to the public	Two entrances to the HCG
			

In terms of the microclimate, some respondents complained about the weather outside, was too hot and uncomfortable for them to stay in the HCG: H2-C3 (24.4%), H1-C1 (6.7%), and H3-C2 (6.7%). Some respondents also complained regarding the lack of shade and breeze in the HCGs.

## 5.0 Discussion

### 5.1 Perceived restorative score in relation to the SRT and ART theory

In order to determine which HCG was perceived to have the highest restorative score, the users' perceived restorative scores in the three different sites were analysed. As shown in Table 3, the survey findings in terms of the factors encouraging the users to visit the HCG were arranged based on the corresponding components of the two vital theories of the restorative environment: Stress Reduction Theory (SRT) (Kaplan and Kaplan, 1989) and Attention Restorative Theory (ART) (Ulrich, 1999) (See Table 3).

Table 7: Perceived restorative based on Attention Restorative Theory (ART) and Stress Reduction Theory (SRT)

THEORY OF RESTORATIVE ENVIRONMENT	SURVEY QUESTION
ART – Attention restorative theory SRT – Stress reduction theory	<b>Question 19:</b> Factors that encourage you to visit the HCG?
Fascinating (ART) and Natural distraction (SRT)	I want to enjoy the garden I want to cope with my worries I want to refresh my mind I want to relax and rest
Being away (ART)	I want refuge from the things that distract me I want to get away from my everyday routine
Compatibility (ART) and Control (SRT)	I want to contemplate and find some privacy I want to let my child play in the courtyard
Movement and exercise (SRT)	I want to do physical exercise I want to enjoy the outdoor therapy
Social support (SRT)	I want to socialise and meet with other people

The results revealed that the main factors that encouraged users to visit the HCG were associated with the components of fascination (ART) and natural distraction (SRT). Specifically, the users intended to enjoy the garden, refresh their minds, cope with their worries, and relax and rest in the HCGs (See Figure 8).

The SRT theory posits 'natural distraction' as one of the essential components for a restorative environment, which includes providing access to nature such as flowers, plants, water and natural sounds. Based on ART theory, 'fascinating' relates to having the access to interesting elements in the setting such as flora, fauna, water, play and light. Hence, users in the hospital context showed a strong desire to interact with nature and to find relaxing and resting sites, where they can cope with their worries, refresh their minds and enjoy the outdoor garden. However, users' levels of comfort and experiences with the HCG might be affected by the HCG design, which lacks variety in terms of shade, amount of greenery and seating facilities.

This study revealed that more people might be encouraged to visit and spend more time in the HCG if better seating choices are provided, as well as comfortable microclimate and interesting landscape elements, such as water and vegetations features. Numerous previous studies have reported the positive effects of vegetations in reducing HCG temperature

(Ghaffarianhoseini et al., 2019; Taleghani, 2018; Morakinyo et al., 2016; Shashua-Bar et al., 2011). A previous study recommended that the vegetation and hardscape of an outdoor garden should be in a ratio of 70:30 (Cooper Marcus and Sachs, 2014). Other researchers found that the outdoor garden has a high amount of greenery, making it more appealing and restorative to users (Jiang et al., 2018; Reeve et al., 2017; Shukor et al., 2012). Additionally, this study highlights that accessibility and visits to the HCG could be improved by simply providing multiple entrances or entries to the facility. Such a provision will prevent disorientation and confusion and shorten the walking distance to the outdoor garden exit point. The findings corroborate the results of Said et al. (2007), who advocated for multiple doors to improve access to outdoor gardens.

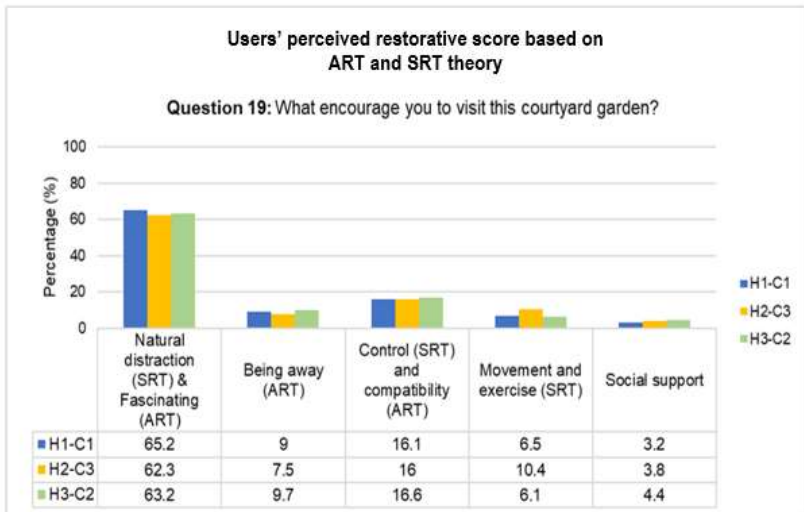


Figure 8: Percentage of perceived restorative score of each case study site

The importance of providing directional signage and visual access to the HCG was also demonstrated in this study. This practice will facilitate wayfinding and guide users to the facility and enhance usage. Several researchers reported that wayfinding and spatial navigation promoted individuals' experiences and made them feel connected between the spaces in the hospital (Sivaji et al., 2015; Jiang and Verderber, 2017; Shamsuddin et al., 2016; Alvaro et al., 2018). Users' orientation and spatial navigation improved while in the hospital, which was attributed to the landmark features provided by courtyard gardens and atriums (Peavey, 2015; Adams et al., 2010).

Based on the overall findings regarding the factors influencing HCG visitation and non-visitation, H1-C1 showed a better restorative environment than the other case study sites. This emphasises the significance of careful planning and ongoing maintenance of the HCGs'

existing facilities and landscape elements to provide a better and more comfortable environment for the intended users.

## 6.0 Conclusion

This study identified the factors affecting the staff, patients and visitors to visit the HCG, which included their desire to relax and rest in a natural environment, temporarily stay away from the hospital's indoor areas, and refresh their minds. Five critical findings were found to discourage people from visiting the HCG: i) busy life routines; ii. improper hardscape and softscape design; iii. accessibility issues for both normal and disabled people; iv. concern on safety issues; and v. unshaded and less breezy microclimate. This study contributes to the existing body of knowledge regarding the environmental and behavioural factors related to the utilisation of outdoor spaces. On a broader note, these findings are relevant to any related field focusing on restorative environments in other building typologies of a tropical climate. Finally, the research findings are instrumental in formulating the framework for an effective courtyard design for a future healthcare facility, which will be useful to the researchers, architects and landscape architects, facility managers, and policymakers.

The limitations in this study are well acknowledged. Only a small sample of the HCG users from all the study sites participated in the survey interview. It is important to note that the number and variation of sample size were based on the general population of the HCG users and non-users who were on-site during the fieldwork. Nevertheless, if there were no time and budget constraints, recruiting an equal sample of visitors, staff, and patients as the representative sample in each study site would be more fruitful. This will ensure more diverse feedback from different groups and the generalisation of the results. Looking at the current issue of indoor air quality and mental health during the Pandemic COVID-19, future studies could focus on how to redesign the HCG that not only meet the intended environmental and restorative roles but also able to respond to the physical distancing measures in controlling the spread of COVID-19 in public outdoor spaces.

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## References

Almhafdy, A., Ibrahim, N., Ahmad, S. S., & Yahya, J. (2013). Courtyard Design Variants and Microclimate Performance. In *Procedia - Social and Behavioral Sciences* (Vol. 101, pp. 170–180). Elsevier. <https://doi.org/10.1016/j.sbspro.2013.07.190>



- Almhafdy, A., Ibrahim, N., Ahmad, S. S., & Wan Salleh, W. M. N. (2014). Courtyard as microclimatic modifier: Experimental study on actual site. *Applied Mechanics and Materials*, 567, 14–19.
- Amat, N. S. A. (2017). *Preference for green outdoor environment over indoor spaces by cardiac survivors with walking as a rehabilitative activity*. Unpublished Master Thesis, Universiti Putra Malaysia.
- Berto, R. (2005). Exposure to restorative environments helps restore attentional capacity. *Journal of Environmental Psychology*, 25(3), 249–259. <https://doi.org/10.1016/j.jenvp.2005.07.001>
- Cooper Marcus, C., & Barnes, M. (1995). *Gardens in healthcare facilities: Uses, therapeutic benefits, and design recommendations*. Concord, CA: Center for Health Design.
- Cooper Marcus, C., & Sachs, N. A. (2014). *Therapeutic Landscapes: An Evidence-Based Approach to Designing Healing Gardens and Restorative Outdoor*. New Jersey, Canada: John Wiley and Sons.
- Creswell, J. W. (2015). *A concise introduction to mixed methods research* (Eds). SAGE Publication Ltd. Retrieved from [https://books.google.com.au/books/about/A\\_Concise\\_Introduction\\_to\\_Mixed\\_Methods.html?id=KeyRAwAAQBAJ&pgis=1](https://books.google.com.au/books/about/A_Concise_Introduction_to_Mixed_Methods.html?id=KeyRAwAAQBAJ&pgis=1)
- Ghaffarianhoseini, A., Berardi, U., Ghaffarianhoseini, A., & Al-Obaidi, K. (2019). Analysing the thermal comfort conditions of outdoor spaces in a university campus in Kuala Lumpur, Malaysia. *Science of the Total Environment*, 666, 1327–1345. <https://doi.org/10.1016/j.scitotenv.2019.01.284>
- Gonzalez, M. T., Hartig, T., Patil, G. G., Martinsen, E. W., & Kirkevold, M. (2011). A prospective study of group cohesiveness in therapeutic horticulture for clinical depression. *International journal of mental health nursing*, 20(2), 119-129.
- Hartig, T. & Staat, H. (2004). 'Restorative environments', *Encyclopedia of Applied Psychology*, 3, pp. 273–279.
- Honold, J. et al. (2016) 'Restoration in Urban Spaces: Nature Views From Home, Greenways, and Public Parks', *Environment and Behavior*, 48(6), pp. 796–825. doi: 10.1177/0013916514568556.
- Idris, M. M., Sibley, M. and Hadjri, K. (2018) 'Investigating Space Use Patterns in a Malaysian Hospital Courtyard Garden: Lessons from real-time observation of patients, staff and visitors', *Environment-Behaviour Proceedings Journal*, 3(8), p. 32. doi: 10.21834/e-bpj.v3i8.1413.
- Idris, M. M., & Sibley, M. (2019). What are users' perceptions of the hospital courtyard garden and how satisfied are they with it?. *Asian Journal of Environment-Behavior Studies*, 4, 60-75.
- Idris, M. M. (2020). *Holistic Multi-Methods Approach in the Investigation of Environmental and Restorative Functions of Courtyard Gardens in Malaysian Public Hospitals* (Doctoral dissertation, University of Sheffield).
- Jiang, S., Staloch, K., & Kaljevic, S. (2018). Opportunities and barriers to using hospital gardens: Comparative post occupancy evaluations of healthcare landscape environments. *Journal of Therapeutic Horticulture*, 28(2), 23-56.
- Kaplan, S. (1995) 'The restorative benefits of nature: Toward an integrative framework', *Journal of Environmental Psychology*, 15(3), pp. 169–182. doi: 10.1016/0272-4944(95)90001-2.
- Kaplan, R. & Kaplan, S. (1989). *The Experience of Nature: A Psychological Perspective*. Cambridge: Cambridge University Press. doi: 10.1037/030621.

Kim, W., Lim, S. K., Chung, E. J., & Woo, J. M. (2009). The effect of cognitive behavior therapy-based psychotherapy applied in a forest environment on physiological changes and remission of major depressive disorder. *Psychiatry investigation*, 6(4), 245.

Morakinyo, T. E., Adegun, O. B., & Balogun, A. A. (2016). The effect of vegetation on indoor and outdoor thermal comfort conditions: Evidence from a microscale study of two similar urban buildings in Akure, Nigeria. *Indoor and Built Environment*, 25(4), 603–617. <https://doi.org/10.1177/1420326X14562455>

Naderi, J. R., & Shin, W. H. (2008). Humane design for hospital landscapes: A case study in landscape architecture of a healing garden for nurses. *HERD: Health Environments Research & Design Journal*, 2(1), 82-119.

Reeve, A., Nieberler-Walker, K., & Desha, C. (2017). Healing gardens in children's hospitals: Reflections on benefits, preferences and design from visitors' books. *Urban Forestry and Urban Greening*, 26, 48–56. <https://doi.org/10.1016/j.ufug.2017.05.013>

Shashua-Bar, L., Pearlmutter, D., & Erell, E. (2011). The influence of trees and grass on outdoor thermal comfort in a hot-arid environment. *International journal of climatology*, 31(10), 1498-1506.

Shukor, S., Stigsdotter, U. K., Faris, S., & Nilsson, K. (2012). A Review of Design Recommendations for Outdoor Areas at Healthcare Facilities. *Journal of Therapeutic Horticulture*, 22(2), 32–47.

Staats, H., Kieviet, A., & Hartig, T. (2003). Where to recover from attentional fatigue: An expectancy-value analysis of environmental preference. *Journal of environmental psychology*, 23(2), 147-157.

Taleghani, M. (2018). Outdoor thermal comfort by different heat mitigation strategies: A review. *Renewable and Sustainable Energy Reviews*, 81, 2011–2018. <https://doi.org/10.1016/j.rser.2017.06.010>

Thompson, C. W., Roe, J., Aspinall, P., Mitchell, R., Clow, A., & Miller, D. (2012). More green space is linked to less stress in deprived communities: Evidence from salivary cortisol patterns. *Landscape and urban planning*, 105(3), 221-229.

Ulrich, R. S. (1984). View through a window may influence recovery from surgery. *Science*, 224(4647), 420-421.

Ulrich, R. S., Simons, R. F., Losito, B. D., Fiorito, E., Miles, M. A., & Zelson, M. (1991). Stress recovery during exposure to natural and urban environments. *Journal of environmental psychology*, 11(3), 201-230.

Ulrich, R. S., Bogren, L., Gardiner, S. K., & Lundin, S. (2018). Psychiatric ward design can reduce aggressive behavior. *Journal of Environmental Psychology*, 57, 53-66.

Ulrich, R. S., Cordoza, M., Gardiner, S. K., Manulik, B. J., Fitzpatrick, P. S., Hazen, T. M., & Perkins, R. S. (2020). ICU patient family stress recovery during breaks in a hospital garden and indoor environments. *HERD: Health Environments Research & Design Journal*, 13(2), 83-102.

Ulrich, R. S. (1981). Natural versus urban scenes: Some psychophysiological effects. *Environment and behavior*, 13(5), 523-556.

Ulrich, R. S. (1991, January). Effects of interior design on wellness: theory and recent scientific research. In *Journal of Health Care Interior Design: Proceedings from the... Symposium on Health Care Interior Design. Symposium on Health Care Interior Design* (Vol. 3, pp. 97-109).

Ulrich, R. S. (1999). Effects of gardens on health outcomes: Theory and research. *Healing gardens: therapeutic benefits and design recommendation*.

Verderber, S., & Reuman, D. (1987). Windows, views, and health status in hospital therapeutic environments. *Journal of Architectural and Planning Research*, 120-133.

Wilson, E. O. (1984). *Biophilia*. Harvard University Press.