

THE APPLICATION OF THE COMMON DESIGN RECOMMENDATIONS (CDR) IN ASSESSING RESTORATIVE GREEN OUTDOOR ENVIRONMENTS

Siti Nur Fathirah Adnan¹ and Shureen Faris Abd Shukor²

Faculty of Design and Architecture, Universiti Putra Malaysia, Serdang, Selangor^{1*}

Master of Science in Landscape Studies¹, Senior Lecturer²

*Corresponding author: shureenf@yahoo.com

ABSTRACT

The main purpose of this paper is to analyse green outdoor environment (GOE) at a hospital in Malaysia with the aim of identifying the restorative design characteristics found at the gardens. Serdang Hospital was selected due to the existing of gardens using the therapeutic concept. The gardens were also selected due to their accessibility to all users who are mainly the patients, visitors and staffs. A survey tool called the Common Design Recommendation (CDR) which consists of seven themes (location and view; accessibility; layout and space; seating arrangements; planting; design details; and practical services) were used to test the restorative quality of the gardens. The results have shown that two of the CDR themes (location and view; and accessibility) have the highest score among the 19 gardens found at the hospital. The paper also discusses suggestions on how to improve the hospital gardens in Malaysian hospitals.

Keywords: hospital landscape, garden design, Serdang Hospital, therapeutic landscape

1. INTRODUCTION

Since independence, Malaysia has seen tremendous improvements in its healthcare delivery system. The government's commitment towards universal access to affordable and high quality care is ensured by the dominance of public health services, which ranges from health promotion, illness prevention as well as curative and rehabilitative care [1]. An increasing body of scientific evidence, from a wide range of disciplines, indicates that natural environments can promote human health [2]. Well-designed hospital gardens not only provide calming and pleasant nature views, but can also reduce stress and improve clinical outcomes through other mechanisms, for instance, fostering access to social support and privacy, and providing opportunities for escape from stressful clinical settings [3].

Restorative green outdoor environments for the sick have been part of healing since medieval times [4]. Since the early 1980s, environmental psychologists have studied the health effects of contact with nature [5]. The recent past has seen researchers across a range of disciplines, including environmental health, public health policy, psychiatry, land use planning, horticulture, leisure, recreation and wilderness, contributing to the accumulation of evidence that supports the notion that contact with nature is beneficial for human health and well-being [6].

The purpose of this paper is to identify restorative design characteristics at a Malaysian hospital green outdoor environments. There is a lack of research supporting evidence-based design concerning green outdoor environments (GOEs) at healthcare facilities, especially in a Malaysian context. According

to the Tenth Malaysia Plan (10MP), Malaysia is facing issues on globalization and the increasing trend of private health care spending poses a great challenge and concern on maintaining the strength of the current healthcare system. Lack of awareness concerning the benefits of restorative garden towards users lead to the issues that occurred at Malaysian healthcare facilities. A simple landscaped area, entrance beautification and having stepping stones and pebbles for reflexology purposes as mostly found in healthcare facilities in Malaysia, must not be thought of as healing spaces [7]. Thus, it would be a challenge to propose a good practice design of a restorative environment at hospital settings in Malaysia.

2. BACKGROUND OF RESEARCH

2.1 The Common Design Recommendations (CDR)

The Common Design Recommendations (CDR) tool was used to evaluate the hospital GOEs and to identify the quality of the restorative design characteristics in the green outdoor environments. GOEs is defined as the exterior of hospitals such as gardens, courtyards, and roof top gardens found at acute care hospitals. They are designed with soft and hard landscape features that can be used and enjoyed by everyone at the hospitals. Only areas that can be accessed by all users (e.g staff, patients and visitors) are included. On the other hand, restorative environments are defined as the environments beyond the hospital buildings [8] that provide opportunities to reduce direct attention fatigue [9]. In some literature, healing, therapeutic, and supportive environments are used as synonyms to restorative environments. The CDR tool was the result from a review paper discussing common design recommendations (CDRs) for healthcare facilities [10]. According to the paper, a systematic search yielded 21 publications that met the selection criteria, of which ten were peer-reviewed papers and 11 were best practice guidelines. In identifying restorative quality in the GOEs, The CDRs consists of following categories: 1) location and view; 2) accessibility; 3) layout and space; 4) seating arrangement; 5) planting; 6) design details; and 7) practical services. The synthesizing of these design frameworks and design recommendations resulted in seven design recommendation categories (Table 1). A total of 22 design concerns are found in the CDR and it aims at being used by a researcher to evaluate and marked the presence of design concerns through the observation of the GOE [11].

The CDR	
Location and view	
•	Locate the garden near common facilities
•	Create welcoming garden entrances
•	Provide views of the garden from inside the building
Accessibility	
•	Ensure easy access
•	Ensure paths are accessible for all
•	Provide a way finding system for easy navigation
Layout and Space	
•	Create hierarchy and variety for different spaces and paths
•	Create transitional space between indoors and outdoors
Seating Arrangement	
•	Offer different sorts of seating
•	Offer both static and moveable seats
•	Provide both open and covered seating
Planting	
•	Use plants that offer multi-sensory experience
•	Use native plants
•	Use plants which attract birds and insects
•	Avoid toxic and allergy-triggering plants
Design Details	
•	Use colors in hardscape material to create contrast
•	Include play elements
•	Include water features
•	Include sculptures
Practical Services	
•	Include drinking fountains
•	Provide restrooms
•	Provide storage for maintenance tools

Table 1: The Common Design Recommendations (CDR) tool which has seven themes with 22 design concerns

2.2 Study Area

According to Ministry of Health Malaysia the number of government hospitals in Malaysia in 2015 totalled at 137. A phone survey was carried out to all the listed hospitals in order to gather information on the status of the hospital green outdoor environments. From these numbers, the type of GOEs can be summarized into 4 categories.

The categories as according to the interviewed staff can be mentioned as: 1) There is a signage which labelled the garden as a ‘therapeutic garden’; 2) There is a garden but not labelled as a ‘therapeutic garden’; 3) The garden is being used as a therapeutic garden but no signage indicating the space as one; and 4) no garden in the hospital. From the total of 137 surveyed hospitals, 55 of the government hospitals mentioned they have gardens and the gardens are labelled as ‘therapeutic garden’ while 49 mentioned there were no garden existed at the hospitals. A total of 23 of the hospitals have the gardens but not labelled as ‘therapeutic garden’. Ten hospitals mentioned the gardens were used as ‘therapeutic garden’ but do not have the signage or indication as one.

The study has taken into consideration the Serdang Hospital as a case study as it claimed to apply the therapeutic garden concept for its green outdoor environments [12]. Serdang Hospital is a government-funded multi-specialty hospital located in the district of Sepang in the state of Selangor, Malaysia. Serdang Hospital was also selected as the case study due to the 19 existing hospital gardens which most of the garden are open to all users. The 19 gardens were labelled as follows (Table 2).

Garden 1 (G1)		
Garden 2 (G2)		
Garden 3 (G3)		
Garden 4 (G4)		










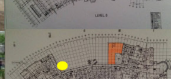

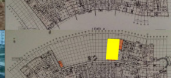



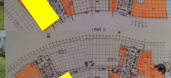



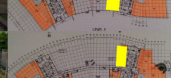







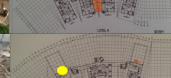

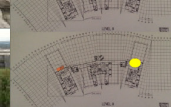
Garden 5 (G5)		
Garden 6 (G6)		
Garden 7 (G7)		
Garden 8 (G8)		
Garden 9 (G9)		
Garden 10 (G10)		
Garden 11 (G11)		
Garden 12 (G12)		
Garden 13 (G13)		
Garden 14 (G14)		
Garden 15 (G15)		
Garden 16 (G16)		
Garden 17 (G17)		
Garden 18 (G18)		
Garden 19 (G19)		

Table 2: The 19 gardens at the Serdang Hospital

3. METHODOLOGY

This study applied the Common Design Recommendation (CDR) survey tool developed by the second author. The Common Design Recommendations (CDR) tool was used to evaluate the 19 existing Serdang Hospital GOE and identify their restorative design characteristics. This evaluation was carried out by rating the existing design of GOE using CDR that developed with likert scale in order to achieve the best design characteristics for restorative environments at Malaysia healthcare-settings.

4. RESULTS

4.1 What design characteristics of the GOEs?

As illustrated in Figure 1, the result for ‘location and view’ shows that 17 out of 19 gardens provide views of the garden from inside the building. However, 10 out of 19 gardens were given a rating of below 3 in which were considered as in terms of welcoming garden entrances.

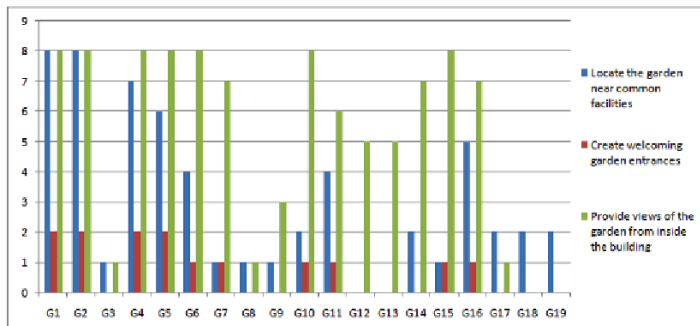


Figure 1: Result of CDR for Location and View

Figure 2 show that 15 out of 19 shown to have easy access to the gardens. Only 2 out of 19 gardens provide a way finding system for easy navigation while the rest did not.

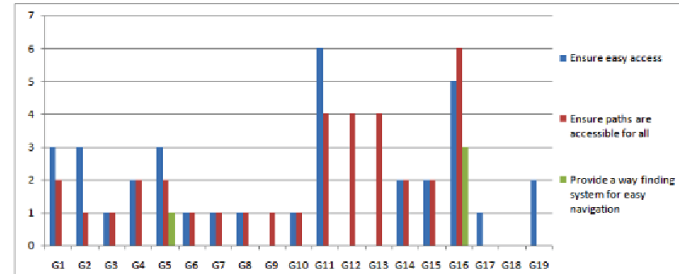


Figure 2: Result of CDR for Accessibility

As shown in Figure 3, 11 out of 19 gardens provide hierarchy and variety for different spaces and paths.

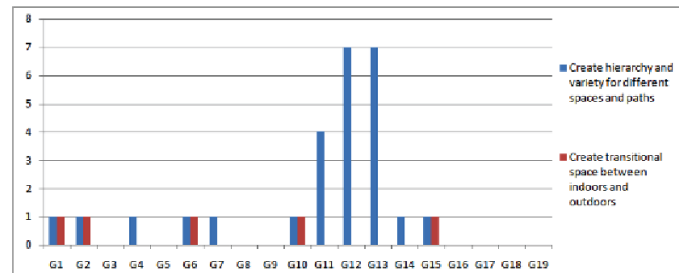


Figure 3: Result of CDR for Layout and Space

Figure 4 has shown the result of seating arrangement all of the 19 gardens, where 11 out of 19 do offer different sorts of seating. Only G15 provide both open and covered seating.

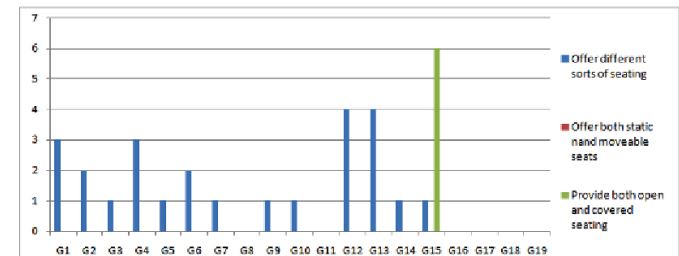


Figure 4: Result of Seating Arrangement

As shown in Figure 5, all of the 19 gardens used native plants.

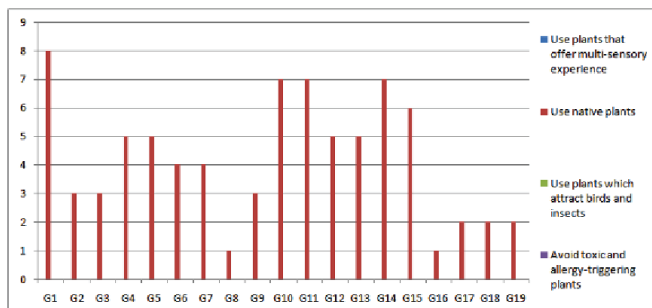


Figure 5: Result of Planting

As illustrated in Figure 6, only 2 out of 19 gardens provide play elements such as playground. Fourteen out of 19 gardens use colours in hardscape material to create contrast. All gardens did not offer any water features or sculptures.

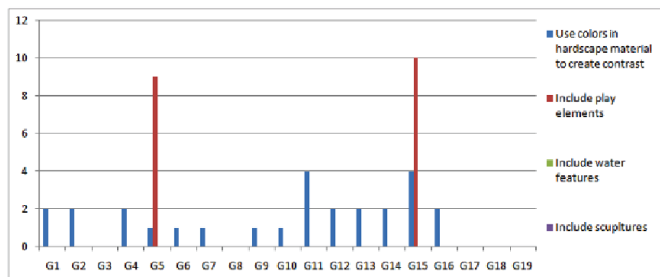


Figure 6: Result of CDR for Design Details

For practical services, the survey has shown that the hospital gardens have no of drinking fountains; nearby restrooms and also storage for maintenance tools.

As shown in Table 3, the findings from the CDRs observation at Serdang Hospital GOE will lead to a better suggestion in designing GOEs at Malaysia healthcare-settings.

CDR Theme	Findings
Location and View	Based on the results, most of the gardens were visible from buildings. Users that pass the hospital building will easily notice the presence of the garden.
	Most of the garden did not have a good welcoming garden entrance.
Accessibility	Most of the gardens have easy access from the nearby offices, wards and common facilities.
	Some of the gardens have unclear entrance which confused the users to enter the garden.
	The uneven surface of path and interlocking and no ramp may give difficulty to those using wheelchair
Layout and Space	A few garden being seen used by many types of users due to its spaces suitable for multi-use
	Used for gathering, occasion, waiting area and others
	Multi-level gardens create safety issues for the patients that have to be emphasized
Seating Arrangement	There is no moveable seats provided.
	Most of the gardens offered open seating.
	Only one garden that provide both open and covered seating

Planting	All of these 19 gardens using native plants to surround the environment.
	Lack of various species of plants especially that attract birds and insects.
	Most of the garden are well-maintained most of the time
Design Details	There is no water features and sculptures were found at the garden hospital
	Only two out of 19 gardens included play elements which is playground for kids
	Fewer colours were found especially in the hardscape details and only one garden provide gazebo
Practical Services	No data was recorded in CDRs practical services. The hospital GOEs did not provide any of drinking fountains, restrooms and storage for maintenance tools.

Table 3: Findings from the CDRs observation

5. DISCUSSIONS

5.1 What Design Characteristics do the GOEs Have?

Location and view

Based on the results, 17 out of the 19 gardens can be seen from the inside the building. However, the gardens are lacking in having welcoming garden entrances in which may lead to the absence of users in the garden. The GOE

should be designed with welcoming entrances so that users easily attracted towards it and have a positive ambience as many the gardens in the hospital are visible from the buildings and invite users to come to the garden.

Accessibility

From the survey, only 1 out of 19 (G11) has scored as having easy access. It can be said that, accessibility is still low for users to easily access to the garden. All type of users should be taken into consideration in order to make the garden accessible for all.

Layout and Space

Only G12 and G13 were recorded as having the highest score in the category of hierarchy and variety for different spaces and paths. Most of the GOEs in the hospital are located at different levels and also served as rooftop gardens. The GOE should have a transition between the indoors and outdoors to encourage users to explore outside.

Seating Arrangement

There is only one garden out of 19 that provides both open and covered seating. However, the G15 is located on the 5th floor in which the garden only can be accessed during the visiting hours. The GOE should provide both open and covered seating so that users can choose which is suitable for them. Some will choose to have a covered seating to avoid direct sunlight due to the Malaysian hot sun but some might choose to be in the open as they wanted to enjoy the sunlight after being in the building during working hours.

Planting

The 19 gardens were observed using native plants to be in the gardens, however there were no plants with multi-sensory or birds and insects attracting attributes. A variety of different colours, species and type of plants should be used in the GOEs to provide attraction to the users.

Design Details

The G5 which is located on the 2nd floor near the paediatric ward and the G15 at the 5th floor had included play elements. However, the G15 is not easily accessed to the users as the entrance to go into the garden is not visible.

Practical Services

No data was recorded in CDRs practical services. The hospital GOEs did not provide any of drinking fountains, restrooms and storage for maintenance tools. The lack of such facilities may hinder users from spending time in the gardens.

Design Recommendation Category	RATINGS		
	Low (Below 10%)	Medium (10-49%)	High (50% and above)
Location and view			
Locate the garden near common facilities			X
Create welcoming garden entrances			X
Provide views of the garden from inside the building			X
Accessibility			
Ensure easy access			X
Ensure paths are accessible for all			X
Provide a way finding system for easy navigation		X	
Layout and Space			
Create hierarchy and variety for different spaces and paths			X
Create transitional space between indoors and outdoors		X	
Seating Arrangement			
Offer different sorts of seating			X
Offer both static and moveable seats	X		
Provide both open and covered seating	X		
Planting			
Use plants that offer multi-sensory experience	X		
Use native plants			X
Use plants which attract birds and insects	X		
Avoid toxic and allergy-triggering plants	X		
Design Details			
Use colors in hardscape material to create contrast			X
Include play elements		X	
Include water features	X		
Include sculptures	X		
Practical Services			
Include drinking fountains	X		
Provide restrooms	X		
Provide storage for maintenance tools	X		

Table 4: Ratings of the 19 gardens in terms of the restorative quality

As shown in Table 4, the overall observation of 19 gardens was sorted out in 3 categories. The level of restorative character was divided into 3 categories based on the percentage of total gardens. The CDR [13] rating table was developed by second author using percentage from the likert scale. Low category which is below 10% is derived from 1 out of 19 gardens. Medium category (10-49%) started from 2 out of 19 gardens and end up until 9 out of 19 gardens. Last but not least, high category which is holds percentage 50% and above is the garden that covered 10 out of 19 gardens.

6. STUDY LIMITATIONS AND FUTURE PERSPECTIVES

The analysis of the GOEs according to the CDRs identified the design strengths and weakness of each of hospital's GOEs. This research study is hoped to improve knowledge based on research on the restorative GOE at hospital settings in Malaysia. This may contribute to the guideline and recommendation for a restorative GOE for health supportive outdoor areas at healthcare facilities and to provide a narrative summary for professionals involved in the design and management of healthcare facilities. This study has been stimulated by the lack of research concerning GOE for hospitals area in Malaysia context. Currently, no study has been carried out to identify the design characteristics of a restorative environment at hospitals in a tropical country like Malaysia. A number of references and projects can be cited where the physical environment was credited with reducing stress levels, shortening recovery periods, decreasing hospital stays, containing and reducing psychopathology, decreasing pain medication dosages and improving staff attitudes and quality of care [14]. This study is the first attempt to investigate the suitable design characteristics of a GOE at hospitals in Malaysia.

7. CONCLUSION

In conclusion, this study gives many advantages to the Ministry of Health Malaysia in support of designing hospital green outdoor environments (GOEs) according to expert recommendations as well as creating awareness on the importance of having GOE can support mental health restoration. However, the needs and preferences of the users should be taken into consideration in order to achieve the best design characteristics of GOE. As for this study, a good practice design proposal of a restorative environment (Table 5) has been highlighted out based on the CDRs evaluation of the current GOEs at Serdang Hospital. This study has contributed to the knowledge base so that more effective GOEs can be designed in hospital settings especially in Malaysia context. In sum, the hospital GOE represents a health-benchmark which, as well as functioning as a restorative environment, can also be a connector to link all users types through the activities and facilities in the GOE itself.

CDR Theme	Recommendation
Location and View	The GOE should be design with welcoming entrances so that users easily attracted towards it.
	The GOE should have a positive ambience of environments as many of the gardens in the hospital are visible from the buildings so that could inject positive feelings to the users towards the garden.
Accessibility	The GOE should implement universal design in aspect of accessibility as this is one of the important parts in designing the hospital GOE. All type of users should be taken into consideration as the garden is accessible for all.
	The entrances of the GOE also have to highlight in the early stage of design proposal.
Layout and Space	Most of the GOEs in the hospital are multi-level and rooftop gardens. The GOE should have a small transition between the indoors and outdoors to encourage users to explore outside.
Seating Arrangement	The GOE should be provided both open and covered seating so that users can choose which one is comfortable with them. Some will choose to have a covered seating to avoid direct sunlight as Malaysia is a tropical country but some will choose to have open seating as they want to enjoy the sunlight after one whole-day staying in the building.

Planting	A variety of different colors, species and type of plants should be used in the GOEs to provide different feelings towards the users.
	A suitable plant also taken into consideration as the gardens is accessible for all type of users. Plants with less threat to the users are more suitable to be planted.
Design Details	Any of hardscape design in the hospital GOE should have a continuous maintenance in order to keep the garden long-lasting and always in a good condition.
Practical Services	The location of the restrooms should be clearly marked even if they are located inside the buildings

Table 5: Design recommendation according to CDR themes

8. ACKNOWLEDGEMENTS

This research was made possible by financial support from Malaysia's Ministry of Higher Education and Universiti Putra Malaysia.

9. REFERENCES

- The Tenth Malaysia Health Plan, 2010-2015
- Nilsson, K., Sangster, M., Gallis, C., Hartig, T., de Vires, S., Seeland, K., Schipperijn, J. (Eds.) 2011. Forests, trees and human health. Dordrecht: Springer.
- Ulrich, R.S. (1999). Effects of gardens on health outcomes: Theory and research. In Cooper Marcus, C., & Barnes, M. (Eds.), *Healing gardens - Therapeutic benefits and design recommendations*. New York: John Wiley & Sons, Inc., 27-86
- Gierlach-Spriggs, N. Kaufman, R. E., and S. B. Warner, Jr. (1998). *Restorative Garden: The Healing Landscape*. New Haven: Yale University Press.
- Nielsen, T. S. and Hansen, K. B., 2007, 'Do green areas affect health? Results from a Danish survey on the use of green areas and health indicators', *Health and Place*, vol. 13, no. 4, pp. 839-850.

- Maller, C. and Townsend, M., 2006, 'Children's Mental Health and Wellbeing and Hands on Contact with Nature: Perceptions and principles of teachers', *International Journal of Learning*, vol. 12, no. 4, pp. 359-372.
- Faris, S.A.S., (2007): *Design Characteristics of Healing Garden for Down's syndrome Children in Malaysia*.
- Gierlach-Spriggs, N. Kaufman, R. E., and S. B. Warner, Jr. (1998). *Restorative Garden: The Healing Landscape*. New Haven: Yale University Press.
- Kaplan, S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15(3), 169-182.
- Faris, S.A.S, Ulrika, K.S and., Kjell, N., (2012). A review of Design Recommendations for Outdoor Areas at Healthcare Facilities. *Journal of Therapeutic Horticulture*, Volume 12.
- Shukor, S.F.A., (2012): *Restorative Green Outdoor Environment at Acute Care Hospitals. Case Studies in Denmark*. *Forest & Landscape Research*. No. 57-2012. Forest & Landscape Denmark, Frederiksberg. (https://en.wikipedia.org/wiki/Serdang_Hospital).
- Shukor, S.F.A., (2012): *Restorative Green Outdoor Environment at Acute Care Hospitals. Case Studies in Denmark*. *Forest & Landscape Research*. No. 57-2012. Forest & Landscape Denmark, Frederiksberg.
- Ulrich, R. S. (1991). Effects of health facility interior design on wellness: Theory and recent scientific research. *Journal of Healthcare Design*, 3, 97-109