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**Enhancement of Space Environment
Via Healing Garden**

Ooi Say Jer^a and Fuziah Ibrahim^{a*}

^a *School of Housing, Building and Planning, Universiti Sains Malaysia, MALAYSIA*

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ABSTRACT

Green nature, sunlight and fresh air have been known as important component of healing in healthcare facilities. This paper presents the finding of an exploratory study on healing garden elements in healthcare facilities. The purpose of the paper is to find the elements of healing gardens and its healing factors in the existing garden design. In conducting this research study, site observation and informal interview at selected healthcare facilities have been performed. The study reveals the elements of existing garden design, the interactivity and the end users expectation on a garden. The finding shows that lacking some of the elements of garden design lead to less user friendliness and interactivity in the garden. It also shows that the visibility, accessibility, quietness and comfortable condition in the garden give impact to the utilization of the garden.

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1. Introduction

The article highlights an exploratory study on the elements of garden and how they contribute to healing in general. The exploration would focus on two gardens with different design at two hospitals in Penang, Malaysia. The main methods of data collection were observation and informal interview with the patrons. The patrons were the patients and visitors at the garden. The study requires the exploration of the garden design and users' experience, their expectation to the garden and how garden affect them. The study was a respond to Hartig and Marcus (2006) who emphasis

*Corresponding author (Fuziah Ibrahim). Tel/Fax: +60-4-6532834. E-mail address: fuziah@usm.my. ©2014. American Transactions on Engineering & Applied Sciences. Volume 1 No.1 ISSN 2229-1652 eISSN 2229-1660 Online Available at <http://TUENGR.COM/ATEAS/V03/0281.pdf>.

that garden is a combination of a place with process. Dilani (2001) also claims that the garden is to benefit all users either in general nor specific needs.

According to American Horticultural Therapy Association (2007), garden is a plant dominated environment with nature aspect such as plantations, flowers, waters and other aspects. It is a designed place for users to respite and relax. According to Marcus (2007), the meaning of the word “healing” in healing garden is not meant to “cure” and will not cure hard diseases or any physical damages but it can reduce stress to more balanced state, to build up self-confidence, to provide an environment for therapeutic program with patients and provide an alternative place for visitor from hospital interior.

The history and evolution of healing garden is being a long age and the significant of healing garden can be group into three by its goals and users (Sandel, 2004). The first group is vocational programs. It is design for skill and personal development and the goal is for work adaption and leadership modeling. The main purpose of the program is to help users recover from injures, sickness or disabilities and help users regain and involve into social activities. The main target of the program is employees. Sandel (2004) claimed that the second program is therapeutic program which collaborate with vocational program and is for self-development. The target of this program is more on a group, unlike vocational program which targeted on personal development. The therapeutic program showed effect and helped participants built their self-confident and social soft-skill through various method. The last program is social program which help maintaining personal physical and psychological recovery. The design of the garden under this concept only implements horticulture activities as recreational activity. Many garden designs in hospitals apply social program.

First systematic Post Occupancy Evaluation study on gardens in hospital are conducted in the San Francisco Bay Area in the United State in 1994 and the result shows that ninety percent of garden users experienced a positive change of mood after time spent outdoors (Marcus and Barnes, 1995).

According to Ulrich (1999), there is probably advantages and four potential advantages to healthcare facilities which is the reduction of stress in patients, staff and visitors, to reduced pain in patients, the reduction in depression, higher reported quality of life for chronic and terminally-ill

and improved way-finding (especially if garden in prominent location). Besides, the potential advantages of healing garden to healthcare facilities is to reduced costs, the length of staying for certain patient categories will be shorter and fewer strong pain medication doses will be taken. The other potential advantages are to increased patient mobility and independence, and would increase patient and staff job satisfaction. Ulrich (1999) also claims that healing garden does not only give advantages to the patients, but also to the staff, who working in stressful jobs and difficult conditions. With staff hiring and retention an increasing problem in many Western countries, improving the work environment, includes providing outdoor space for breaks, can be an important investment.

2. Element of Healing Garden

According to Marcus (2007), there are potential activities for users in garden which is viewing, sitting, walking, resting, meditation praying, receiving therapeutic program, reading, playing and sporting. Ulrich (1999) also states that there are four basic garden design guidelines with intent to use garden to reduce user's stress in the Roger Ulrich's Theory of Supportive Garden Design.

The first basic guideline would be to provide opportunities for movement and exercise. Exercise is a combination of movement with physically and psychologically benefits, to improve cardio-vascular health and stress reduction among adults and children (Brannon and Feist, 1997; Koniak-Griffin, 1994). In this theory, setting with looped pathway system offer shorter and longer routes for user with few different functions. The first function is setting which facilitate physical therapist for outdoor therapeutic activity. The second function is setting which allow children running and playing and the third function is setting for contemplative walking (i.e., a maze) and for users to walk or jogging. The last function is setting with landscape for post-surgery exercise.

Ulrich (1999) claim that the second guideline should provide opportunities to make choices, seek privacy and experience a sense of control. Patient in hospital is experiencing limitation of freedom (Ulrich, 1999). Stress from limitation of freedom shows negative reaction on immune system functioning among patients and will decreased staff motivation. An interview with garden user shows that one of the major motivations for using garden is regaining freedom and reducing stress (Marcus and Barnes, 1995). As garden is to reduce user stress by sense of control, users

explore with the entire access able route and users must able to make decision by their own on which pathway they prefer, therefore, the design must offer different choices – place to be alone or with others; place to sit under sun or shade; place with broad or narrow view; fixed or moveable seating; different length of walking routes.

The third guideline claim by Ulrich (1999) is the garden design should encourage people gather together and experience social support. Research shows that higher level of social support will improve stress reduction and recovery rate for various medical conditions than isolated ones(Ulrich, 1999). The design is suggested to locate garden close to patient room, waiting area and main entrances in provide moveable seating, sub-space for small group to find privacy and to provide areas with tables and chairs for family and staff group to having meal together.

The last guideline is to encourage positive distractions with nature. According to Ulrich (1999), healing garden can have the effect to calm the mind, awakening the senses, stress reduction and can assist user to master their inner healing resources. To provide maximum therapeutic benefits, garden design must have multi ranging supply of plant material, i.e. with seasonal changes, subtleties of color, texture and shape. The design must also provide views to sky, trees can attract wildlife, and elements reflect sound of moving water.

Besides, there are another six requirement suggests by them to be consideration in garden design to reach garden's full potential which is visibility, accessibility, familiarity, quiet, comfort and unambiguously positive art.

Under the visibility requirement, it stated that there are only three of over hundred acute care hospital included signage to outdoor garden or roof garden in their way-finding system. The design of outdoor space is recommended locating near building entrance or visible from main foyer so that users can access to garden easily without helps of signage.

The second requirement is accessibility. It stated that the garden must be used by all ages and abilities. The wide of pathway must be wide enough for two wheelchairs to pass horizontally (minimum of six feet) at the same time. The paving joints should be narrow enough so as not to harm to catch a cane, wheelchairs or IV-pole. Access to outdoor spaces are keep locked in many hospital to reduce use or maintenance. However, accessibility can be enhanced by have good visual access to garden from indoor.

The third requirement claim by Ulrich et al.(1999) is familiarity. Many seek for familiar and comforting environment while in stressful condition. In medical setting, those who are sick or in anxiety may need to access to garden setting to relieve. They claims this is especially important in the hospices for terminally ill.

The forth is quietness. According to Marcus and Barnes (1995), a study of four hospital gardens found that users are disturbed by mechanical sound such as air conditioners and street traffic. Garden user need to feel calm and relax, and be able to feel the wind, the sound of the fountain, even sound of birds. Hence, the location of garden must be away from traffic, parking space and machinery room.

Comfort is one of the requirements. The garden design need to provide physiological comfort and psychologically secure for users - with choices of places to sit under sun or shade; seating which allowed sprawl or lie down; seats with arms and backs; paving material do not cause excessive glare; a special patio for smokers to separate from non-smoker users.

And the last requirement is unambiguously positive art. According to Niedenthal et al. (1994), people trend to project their stress onto nearby objects and people while anxiety and discomfort experienced inside have developed “emotional congruence” which mean the attention of a person will focus on those parts that match the viewer’s emotional state. Ulrich (1999) also state that the scene may be seen as interesting or discomfort experience by the non-stress person. Hence in place which may increase level of stress especially in hospital, the design elements must be unambiguously positive in their message. Complex sculpture design may be appropriate in museum or corporate setting but is not appropriate in hospital. A research shows that recovery rate of heart surgery patients which exposed to landscape photographs is higher and had lower anxiety and fewer doses of strong pain killer compare with other patients with no pictures (Ulrich, et al., 1999). Ulrich also state that a classic case of in appropriate sculpture design in one of the hospital in United State where abstract figures of birds in courtyard cause dislike and fear emotion by cancer patients in adjacent wards and is been removed.

3. Methodology

The methodology chosen for the preliminary study of garden was the observation method. According to Guba and Lincoln(1994), observation methods can span paradigms in research, from structured observations to highly unstructured participant observation. They quoted that question of method should be secondary to questions of paradigm, which can guides the investigation, not only in choices of method but in ontologically and epistemologically fundamental ways.

Hammersley and Atkinson (2007) also claim that observation as a methodology clearly contributes to these understandings, as it can be employed in ‘natural’ settings, rather than those set up for research purposes such as interviews. And Walshe et.al (2001) claim that observation methods have advantages when the focus of research is on understanding actions, roles and behaviour. They claim that interview allowed patrons said what they did but an observation allowed researchers to see directly what patrons done.

Both hospitals were chosen for the preliminary study because they have specific therapeutic garden. Observations were made during the day. In the same time, a few of those who visited the gardens were informally interviewed in order to understand the reason they visited the space and their expectation of a garden.

4 Result and Discussion

4.1 Observation at Hospital Seberang Jaya, Pulau Pinang

Hospital Seberang Jaya is located at Seberang Perai Tengah district in Penang state. It started operating since October 1991 to serve people from Seberang Perai district especially people from Seberang Jaya area. Hospital Seberang Jaya is strategically located near to the North-South Expressway (PLUS) and the Butterworth-Kulim Expressway (BKE). The location is also near to the Prai Industrial Park, Bukit Mertajam City and Butterworth City. (Portal Rasmi Hospital Seberang Jaya, 2013). Figure 1 is a schematic plan shows the location of the hospital with its building arrangement.

Figure 2 (a) shows the main entrance and signage at main gate of the therapeutic garden. The main entrance is located in front of the hospital main road. The garden is visible and obviously seen by public. Figure 2 (b) shows the main route at the main entrance for the garden whereas Figure 2

(c) and (d) shows the walkway in the garden. The route design is accessible for all ages and abilities. The pathway is accessible for wheelchair users as the width is about six feet. The paving joints in the garden are narrow enough so will not harm or catch a cane, wheelchairs or IV-pole.

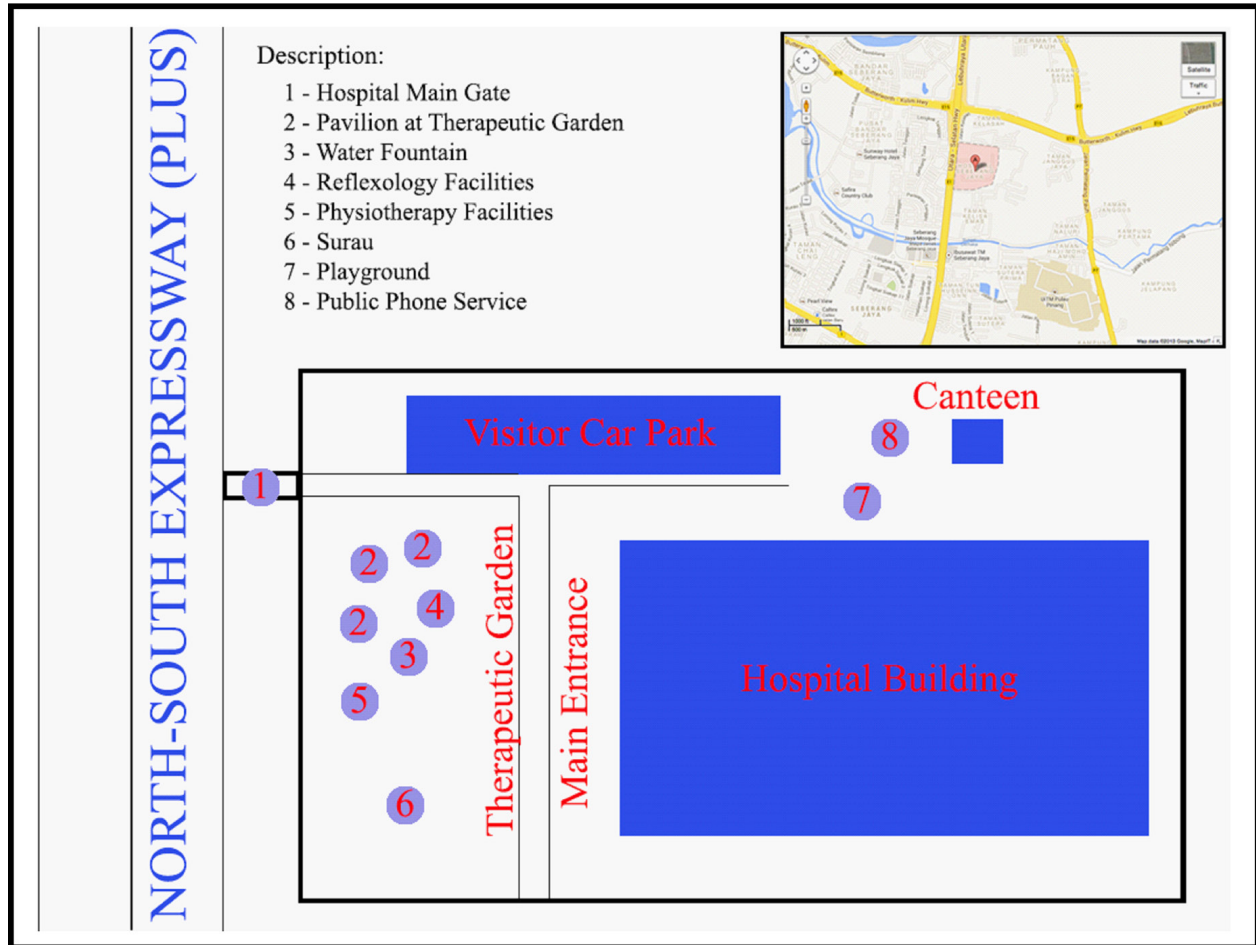


Figure 1: The schematic plan of the healing garden in Hospital Seberang Jaya.

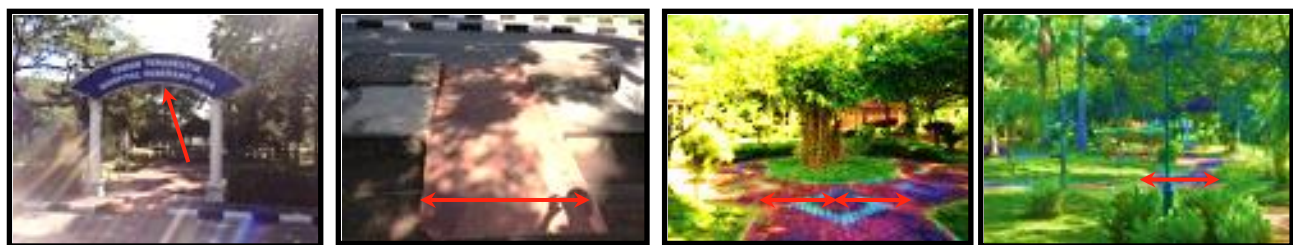


Figure 2: (a-b) The main entrance; (c-d) The walk way in the garden

There are three pavilions in the garden. Figure 3 (a) and (b) shows the outlook of one of the pavilion. Figure 3 (c) and (d) shows the interior view in the pavilion. Figure 3 (c) shows that the route into the pavilion is designed accessible for wheelchair user and seat is provided in the

pavilion. Figure 3 (d) shows there is dustbin provided in the pavilion for user handling their disposal. Figure 3 (e) and (f) shows there are visitors resting inside the pavilion. The pavilion provided space for users to sit rest and to calm down.

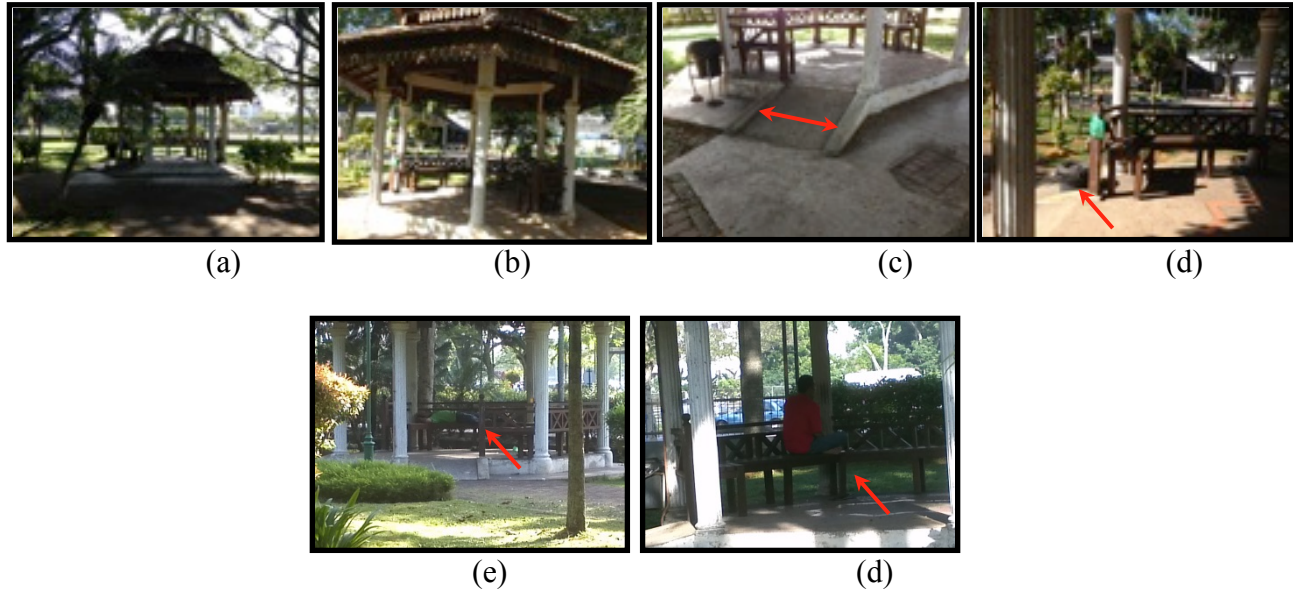


Figure 3: (a-b) pavilions in the garden; (c-d) interior view of pavilion; (e-d) activities in pavilion



Figure 4: (a) Water fountain in the garden; (b-d) Facilities in the garden

Figure 4 (a) shows the water fountain in the garden. The sound of water would give a calming effect on the people and would encourage positive distractions with the nature. Figure 4 (b) shows the reflexology facilities in the garden and Figure 4 (c) shows the physiotherapy facilities in the garden. The facilities would provide opportunities for movement and exercises. Figure 4 (d) shows that there is a little Surau provided beside the garden. The Surau would be convenient to Muslim users whose punctually in praying is important while they are in the garden.



Figure 5: (a) View beyond the garden; (b) Lacking of benches in the garden



Figure 6: (a) View playground; (b) Sitting area in the playground; (c) Waiting area beside of the playground; (d) Public phone facilities near to the playground.

Figure 5 (a) shows that the garden is located near to the main road (please refer to schematic plan). The main road beyond the garden is North-South Expressway (PLUS) which would cause heavy traffic and noise. This might cause discomfort and disturbance to the users in fact might harm their health. Figure 5 (b) shows there are lack of benches in the garden; users might not have enough space to sit and rest when in the garden. The location of the therapeutic garden is strategically located for the hospital in the sense that it acts as a buffer zone from the noise of the heavy traffic to the hospital interiors.

There are playground facilities provided in the hospital and is located opposite the therapeutic the garden as shows in Figure 6 (a). Even though it is not included as part of the garden but the researcher felt that it is relevant to the garden element as it provided opportunities for movement and exercises especially for children. At the same time, it also provides area for children to play when they felt bored waiting in the treatment rooms or the wards. Figure 6 (b) shows the sitting area in the playground for parents to sit and rest while their children playing at the playground. Besides, waiting area is also provided beside of the playground as shown in Figure 6 (c) as alternative place to stay if sitting area in playground is full. Besides, since the playground is located

beside of the orthopedic clinic, patients prefer to be in the outside waiting area rather than staying in the clinic while waiting to receive treatment. Figure 6 (d) shows the public phone service is provided near to playground.

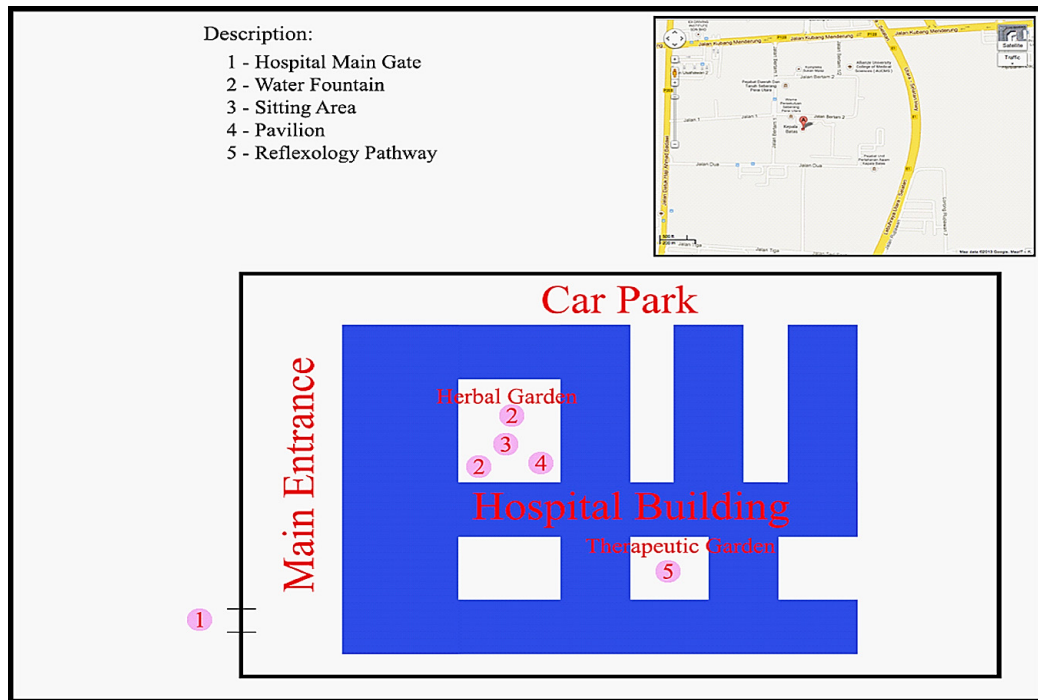


Figure 7: The schematic plan of the healing garden in Hospital Kepala Batas

3.1 Observation at Hospital Kepala Batas, Pulau Pinang

The second observation site is the Hospital Kepala Batas, Pulau Pinang. Hospital Kepala Batas is located at Seberang Perai Utara district in Penang state and is operated since January 2003. It was built to give services to people in Seberang Perai Utara district and to served over two hundred and ninety thousand people from the district. In fact, Kepala Batas city is a new emerging develop district for Seberang Perai Utara. Kepala Batas is planned to move towards “Medical City” in the future and Hospital Kepala Batas plays an important role in the planning deveoplment. (Portal Rasmi Hospital Kepala Batas, 2013).

The design of the garden in the Hospital Kepala Batas is different with Hospital Seberang Jaya as it is designed with the courtyard within the hospital building as shows in Figure 8 (a). The garden fully utilize all spaces and is compacted in the courtyard (please refer to the schematic plan). Figure 8 (b), (c) and (d) shows the main entrance of the garden, the mixture of hard and soft landscape provides a pleasing and comfortable environment. Besides the main entrance it could be

accessed from four other entrances. Tall trees which provided the needed shade are mixed well with herbal shrubs which enhances the space with colorful flowers, and sweet smelling Jasmine and other herbal flowers.



Figure 8: (a) Location of the garden; (b-c) Main entrance of the garden; (d) Garden appearance

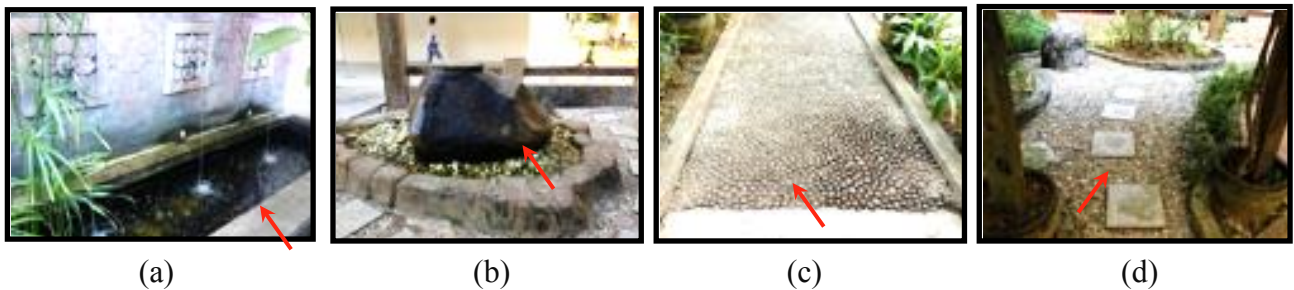


Figure 9: (a-b) Water element in the garden; (c-d) Pathway design in the garden.

Figure 9 (a) and (b) shows two different designed water fountains in the garden. The sound of water would provide calming down and soothing effect to the users. Figure 9 (c) and (d) shows the pathway design in the garden. Although the pathway arrangements were too narrow and was not accessible for wheelchair users hence discouraging the wheelchair users, it was pleasant enough for other users to walk through the garden. The observation reveals that some patrons used the garden as a way to get to other parts of the building.

Figure 10 (a) shows the design of covered pathway in the garden. The covered pathway provided shading and users are not exposed to the sunlight and would stayed in the garden for longer period. Figure 10 (b) shows the sitting area in the garden. The sitting area is fully covered by the atap roofing material, hence users might free from exposure to sunlight and raining. Figure 10 (c) shows that people used the pathway in the garden as a short cut. The observation, shows that many people preferred to use the garden as a short cut to across to another place rather than using corridor.

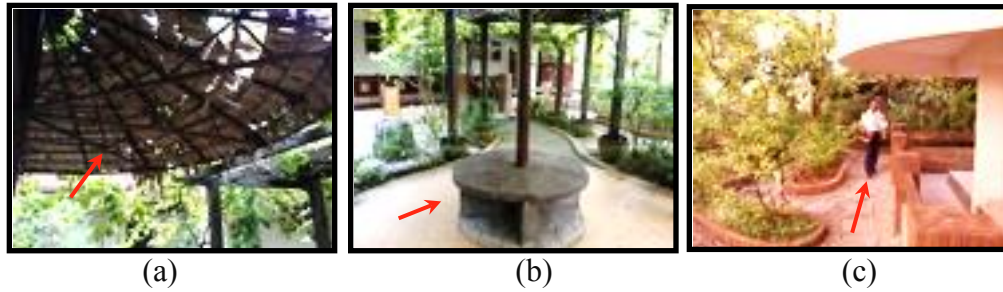


Figure 10: (a) Design of roof in the garden; (b) Sitting area in the garden; (c) User pass by the garden



Figure 11: (a-b) Pavilion in the garden.

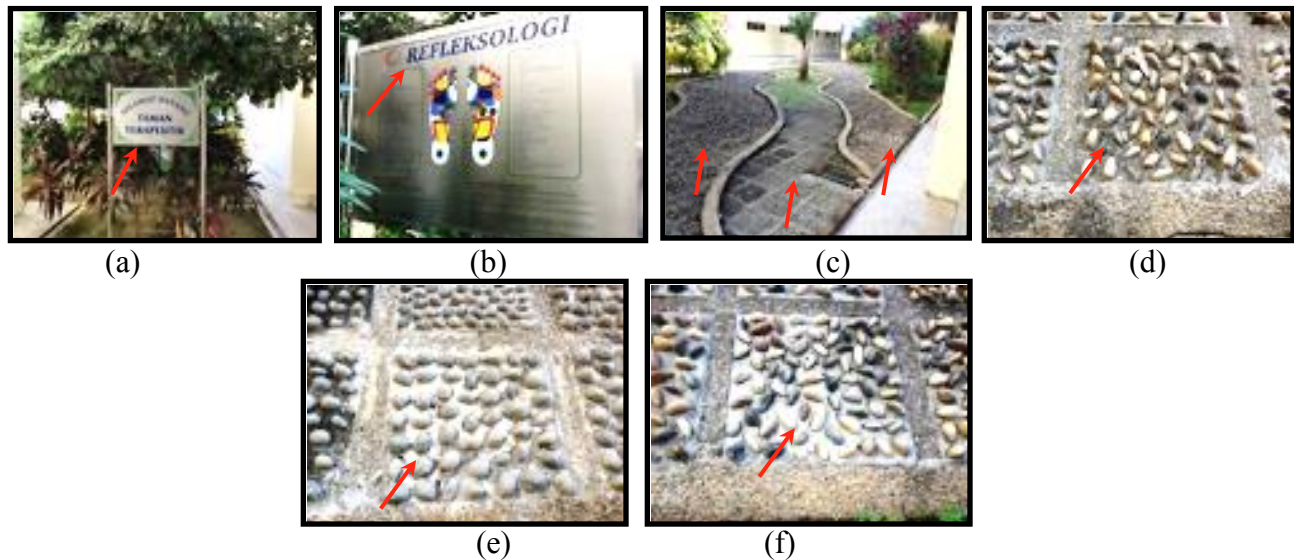


Figure 12: (a) Therapeutic garden in the hospital; (b) The function of the therapeutic garden; (c-f) The pathway design of the therapeutic garden.

There is only one pavilion in the garden as shows in Figure 11 (a) and (b). The small number of the pavilion would limit the amount of user. Figure 11 (a) and (b) shows that people used the pavilion for relaxing and having their meals. Interviewed conducted revealed that the pavilion is also used as a praying space by some Muslim patrons especially male Muslims.

Figure 12 (a) shows the label of the Therapeutic Garden. The garden is also used for

reflexology as there is a reflexology pathway provided and shows in Figure (b). Figure 12 (c), (d), (e) and (f) shows the pathway design in the therapeutic garden with different tactile pathway. As the function is limited for reflexology, patient with leg injuries might be discouraged to use the garden.



Figure 13: (a-b) Route appearance at entrance

Figure 13 (a) and (b) shows the route at the garden entrance. The step from the corridor to the garden is too high and might be dangerous to the users. The users need to alert while walking to the garden.

4. Summary of Discussion

Table 1 shows the comparison of the finding of the elements of garden from Hospital Seberang Jaya and Hospital Kepala Batas with Roger Ulrich's Theory of Supportive Garden Design (Ulrich, 1999). The overall design from each hospital met the requirement state in Roger Ulrich's Theory.

In term of visibility, some user might not be aware there is a therapeutic garden in the Hospital Seberang Jaya as the location is located in front of hospital main door and is less strategic because most people are using side door to enter the hospital building. Comparatively, the location of the therapeutic garden in Hospital Kepala Batas is more visible due to its strategic location in the centre of the building. It is a nice calm retreat for all patrons, since it is located beside the pharmacy section. All out patients will go to the pharmacy to get their medications will not miss to see the garden and will eventually venture into it while waiting for their medications.

In term of accessibility, the therapeutic garden in Hospital Seberang Jaya could be accessible to all users, inclusive of wheelchair bound patients. The therapeutic garden in Hospital Kepala Batas is not accessible to wheelchair users because the paving of the pathway in the garden is too narrow for the wheelchairs.

Table 1: Comparison of the finding of the elements of garden from Hospital Seberang Jaya and Hospital Kepala Batas with Roger Ulrich’s Theory of Supportive Garden Design (Ulrich, 1999).

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

Due to the location of the garden in Hospital Seberang Jaya, is quite noisy from the traffic of the North-South Expressway (PLUS), which is located in front of the hospital. In contrast, the patrons in Hospital Kepala Batas could really enjoyed the quietness of the garden since the location is in a form of courtyard in the hospital. The “noise” that the patrons could hear is the sound of the water fountain and sometimes the chipping sound of birds.

In term of comfort, patrons in Hospital Seberang Jaya would felt less comfortable compared with Hospital Kepala Batas due to less number of benches in the garden. The only sitting area in the garden is the three pavilions and patrons might not have enough sitting place when all the pavilions were fully occupied. However there are plenty of benches around the hospital compound itself. Patrons in Hospital Kepala Batas would enjoyed more comfortable environment in the garden even though there is only one pavilion and one sitting area in the garden. The garden is located at the courtyard of the building and patrons might sit on the benches located at the corridor or in front of the pharmacy clinic.

Both the gardens do not actually have the element that would encourage people to gather together and experience social support. Both the gardens are meant for seclusion, resting and relaxing. Both the gardens also do have any unambiguously positive art. It is in accordance to Ulrich, et al(1999) as inappropriate sculptural abstract figures of birds in courtyard cause dislike and fear emotion by cancer patients in adjacent wards and had been removed in their respective hospitals.

Beside the observation, informal interviews were conducted to identify level of the user's satisfaction on the current garden condition.

Among the patrons, the major reason of them attending the hospital are for visiting family member or friends and others receiving treatment. Patrons went to the garden are to accompany their children to playground and waiting for relatives to receiving treatment. Some of them went to the garden for relaxation, having some quiet moments and even to do a bit of light stretching and excises.

On their satisfactory level to the current garden condition, for Hospital Seberang Jaya most of them are not satisfied due to the poor maintenance of playground and the cleanliness issues. Patrons comment about not well maintained playground would be dangerous or even cause injury to the children. The grass in the garden is not well maintained and the cleanliness on the chairs and tables are not at acceptable level. There are areas in the garden that are quite hot in the afternoon that the patron refused to choose as substitute location to the clinic. However the garden in Hospital Kepala Batas is well maintained as approved by the patrons.

Since this study is conducted as a preliminary study to a prospective cohort study, the interviews were only conducted from the convenient samplings from the patrons who visited the garden. On the continuation of the study, further interview will be carried out to the staff of the healthcare facilities to reveal if they actually use the garden to calm down from their stressful work load. More healthcare facilities will be looked into especially those who claimed to have therapeutic gardens as well as healthcare facilities which do not have any therapeutic gardens.

5. Conclusion

The study reveals that both the gardens met most of the requirement state by Roger Ulrich's Theory of Supportive Garden Design, even though their design are different from each other. They have all the features of visibility, encouraging positive distraction with nature, easily accessible to most patrons, seeking some privacy from the crowded waiting areas in the hospital, some positive arts for relaxing the eyes.

The study reveals the patrons would chose to go to garden as their substitute location before or

while waiting for a treatment. The garden is a relief to the children who are getting easily bored while in hospital building. This exploratory study also shows that the playground for children and waiting space was the main demand among others and it should be taken as primary consideration in garden design. This finding suits to Ulrich (1999) as quoted in the Roger Ulrich's Theory of Supportive Garden Design that the garden would provide opportunities for movement and exercise, to encourage positive distractions with nature and comfortable environment for users. Garden with playground provided opportunities for movement and exercise, and comfortable environment lets users waiting their relatives in comfortable situation. The current condition in the garden is upgradable and the interactivity among users is expandable.

Hence, based on the findings in this preliminary study, playground and comfortable waiting space would be the added elements in the healing garden.

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Ooi Say Jer is a postgraduate student from School of Housing, Building and Planning in Universiti Sains Malaysia, Malaysia. He is pursuing his MSc. (Interior Design) program in research. His research work encompasses healing garden.



Dr. Fuziah Ibrahim is an Associate Professor in School of Housing, Building and Planning from Universiti Sains Malaysia, Malaysia. She is a lecturer in the Architectural Programme. Her Ph.D. is from Manchester Metropolitan University (1995), M.A. (Industrial Design) from Manchester Polytechnic (1991) and Hons. (HBP) from USM. She received a letter of commendation from the Head of Department for her research achievements carried out for her M.A. dissertation. Dr. Fuziah's specializes in product design and development and interior design.

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