

OPTIMUM HEALING SPACES OF PUBLIC AREAS FOR CHILDREN AGED 4 TO 12 IN MALAYSIAN HOSPITALS

Nur Amirah Abd. Samad and Asiah Abdul Rahim

International Islamic University

ABSTRACT

Hospitals are evolving to cater its patients' needs that emphasis on promotive rather than curative healthcare that should become more patients-centric with greater attention paid especially young patients with families and visitors that come regularly to visit these young patients. This research deals with the possible healing environment that caters children while being hospitalized and children are prone to feel unfamiliar of new surroundings, the environment is scary, depressed and frustrated of being hospitalized. The aim is to understand the characteristic in creating an environment that would decrease children anxiety. The research design will look into a concise area of the public spaces in all the three cases analysed. And method used in this paper is mostly through site visits to the case studies and taken photographs of physical observations at public spaces where the general public would experience the environment. The findings would look into three exemplar hospital design that has expertise on children health care in Malaysia and Singapore. The analysis of the cases data will identify whether these case studies comply with the design characteristic and how can it be improved. In conclusion, the research can give a little contribution in the hospital environment settings and creates exciting hospital that applies also for children.

Keywords: Young patients, healing environments, hospital public spaces, children health care

INTRODUCTION

The new trending of healthcare design and developments in Malaysia especially in its major cities of high population are affected by the changing of health patterns. Hospitals are evolving to cater its patients' needs that emphasis on promotive rather than curative healthcare. Hospitals environments are becoming more patients-centric with greater attention paid not only to the patient's need but also their families and staffs' well-beings within its setting (Tong, 2008).

According to Suleiman and Jegathesan (2000), the concern of public health do relate to the design of hospital with

healing spaces as if the environment heals its surrounding, and the surroundings are the patients and public users, it does create a holistic wellness to the space. It is noticed that the public health movement is concerned with the effects of social conditions and relationships on the physical elements of the built environment and the well-being of mental health. It focuses on factors beyond the individual control of medical treatment but broadens the alternatives of healing by concerns beyond health care provisions (Suleiman & Jegathesan, 2000).



Source: A. Samad N. A. (2011)

Diagram 1: The relationship between factors to achieve a holistic balance of health

Even though Malaysia now is trending to promote curative healthcare and its environments are becoming more concerning their patients, there are not enough information and research done in Malaysia concerning environment and its healing attributes towards young patients that are children. Healthcare environment for children are less researched in Malaysia as there are currently no children hospital built yet in Malaysia. There are several researches that deal with children but mostly those researches involve urban planning and landscape.

Most researches provide information on children healing environments that are either western based case study in most developed countries that has been developing interest on healthcare environment that could help with the healing and the recovery process. In this paper, most information gained is from research done by professionals from western and developed countries. As Malaysia has only general hospital that caters

paediatric medicines and not yet has a hospital that focuses on children, the nearest case study example that has the same tropical climate context would be Singapore. Kandang Kerbau Women and Children Specialist Hospital (KKH) in Singapore is the best comparisons with the existing general hospital of Malaysia in understanding the design intention in creating a good healthcare environment for children. KKH has been the referral hospital in South East Asia for paediatric medicine and child health apart for their expertise on women's health. This study on healing environments for young patients can be a huge contribution to the planning for children based healthcare environment that considers children needs and response towards their hospital surroundings.

AIM AND OBJECTIVES OF THE STUDY

This research deals with the possible healing environment that caters children while being hospitalized. Hospitalization is very stressful as it indicates a place of pain, misery and also death even for an adult that can merely understand the condition that they are in. It is the opposite for children as they are prone to feel unfamiliar of new surroundings, the environment is scary and would make them feel quickly alone, depressed and frustrated of being sick and hospitalized (Gibbons, 2009). The aim is to understand the characteristic in creating an environment that would decrease children anxiety as well as bringing exciting experience as if they were treated to be healthy and not being treated because of their illnesses. The identified design criteria and characteristic will be used to assess the current physical environment in Malaysian general hospitals and taking Singapore as the comparison case study.

The author, as an adult, a visitor and also once a patient, claims that being hospitalized do create stress mentally and emotionally especially when being left alone. The surrounding physical built environment does have a prominent affect towards patients as they tend to move about to find something else to distract their mind from illnesses and for recovery. As stated above by Gibbons (2009), children thought of hospital would be different than adults that can understand their current condition but for children they would feel more depressed, frustrated and

lonely once their families has to vacate the wards. Children have less understanding of their condition and could likely be imagining things as a result of their depression.

By analyzing the various existing environments of public hospitals in Malaysia, would eventually gain an image of the overall situation of hospital spaces locally. In this research, the main objective to be explored is whether the existing new hospital built, has the designated environments within the health facilities that promotes healing in its spaces?

Some of the questions asked that could be the reasons this research is conducted to gain a more understanding of the possible environment approach that are associated with healing that is needed to provide the optimum healing environment for hospitalized children. The objectives of conducting this research is to gain answers and laying down several design characteristics that compliments the spaces in hospital public areas with the healing process of these young patients. The research would begin by asking these questions for an understanding of what to be consider in creating children healing spaces;

- Does the built environment in the hospital have the healing affects to children process well-being?
- Does it consider child and family spaces for peer play, socialize, meditate, providing personal space and family support area?
- What are the design characteristic that can be included in public spaces that could create healing attributes to children and their families?

LITERATURE REVIEW

The Healthcare Environment in Malaysian Hospitals

In a research conducted by Goh (2010), it states that many researches done on healthcare environment have been conducted in Malaysia but few are directly related to the built environment. Development of technology outbreaks needs immediate changes of spaces and requires flexibility of planning arrangement to suit the practices of medicine as well as enhancing the patients' well-being. It is important to provide the right environment for

healthcare; both for patients, their families and healthcare provider. This can be achieved by encouraging architects to create an environment that allows comfort, serene and spiritual healing that can affect patients (Goh, 2010).

More stated by Goh (2009), healthcare facilities in Malaysia is yet to meet up with the requirement of patient orientated environment as lots of improvement and studies need to be conducted to achieve a total wellness environment. This patient orientated environment also has less attention in providing children with an environment that suits their condition and needs. Children and young patients are considered the fairly the most visitors of healthcare because of their health precautions. Reports from a research by Goh et al. (2009) indicates that they conducted several interviewing to a group of nurses and the data findings shows that there are facilities and environment which have not been improved for the past 10-20 years in Malaysia's hospitals (Goh, Tahir, Sulaiman, & Surat, 2009).

It is known that hospital buildings are designed to incorporate functions which physically support the medical profession but seldom are they architecturally designed to stimulate the body, mind and soul to assist in the recovery of patients especially children. Due to this awareness, some studies are conducted on alternative healing and architecture as well as potential of integrating environment with therapeutic attributes. The potential of exploring healing environment in Malaysian healthcare development is that it could stimulate the body, mind and spirit through architecture intervention. Architecture is not only about the creation of place and space but it has to contain meanings and connections between those spaces. By innovatively exploring these features is believed could lead to a better sustainable and affordable healing environment through design decisions (Goh et al., 2009).

This can be summarized as hospitals in Malaysia are trying to cope with the fast expanding technology in medical facilities and designers make space to house these equipment but the concerns of designing for the users or patients has been less considered. There are some research conducted by architects and landscape architects in alternatives of having therapeutic gardens and outdoor playground for example (Said, February 2003).

Researches done by several researchers that emphasizes on design characteristics and other alternatives that could possibly help in healing through the built environment and spaces has been done in many countries that considers thematic design, colour scheme, provision of sufficient daylighting and sustainable design (Aripin, 2010; Coad & Coad, 2008; Coull & Cahnman, 2004; Schweitzer, Gilpin, & Frampton, 2004; Zimring, 1981).

Overview of Paediatric Healthcare in Malaysia

Paediatric healthcare in Malaysia is one of the challenges of the Malaysian health system that still need to be addressed as to give equal medical services to all ages in the community. In Malaysia, designers have to comply with requirements by the MOH in Malaysia (*Official Web Portal Ministry of Health Malaysia*, 2010) and also in Singapore (*Healthcare Institution Statistics*, 2009) that they should be in line with medical and building needs such as for diagnostics, treatments, waste management's and building services but in the same time they should embrace the notion of creating a supportive healing environment in hospital design that can stimulate the body, mind and spirit. In Malaysia, the healing experiences of patients especially children are not entirely being explored or have not been considered as hospitals in Malaysia provide general medical services. A children and women hospital has been built in Singapore but in Malaysia it is not common in having specialized hospital dedicated for children or for women. This research is one of the steps in making a contribution to the hospital healing environment that studies the impact of it to the well-being of children's and speeding their recovery process. Malaysia and Singapore has the young population being the most age group to be admitted in the hospital for the year 2009 and 2010 according to the health institution admission rate statistics (*Health Facts 2010*, August 2011; *Healthcare Institution Statistics*, 2009). This means that providing an environment that response to the most age group being hospitalized can be an innovation in design approach of healthcare buildings.

According to Schweitzer, Gilpin and Frampton (2004), hospitals are designed to deliver state-of-the-art medical treatment in the most efficient way possible. While it is well-documented

that stress, depression, and anxiety have a deleterious effect on health, modern hospitals, with their emphasis on diagnosing, curing, and treating, have become noisy, cluttered, institutional environments with little regard for the potentially detrimental effects these environments have on the patients' physical or psychological well-being (Schweitzer et al., 2004). This statement was agreed by Sorana with some additional insight of dealing with children as patients, architects must bear in mind about their sensitivity and fragile psycho-social nature that makes them particularly vulnerable when constrained into hospitalization. Understanding the condition of children as patients is the first step to begin imagining new qualities for hospital spaces and the hospital's role in promoting health and wellbeing for all its users (Sorana D.).

A Therapeutic Environment for Children

From children point of view, they define and manage the hospitalization in a variety of ways as reported in the research by Knafl, Cavallari and Dixon (1988) that said 23% of the hospitalized children viewed it as a special treatment and an exciting experience. So this group of children generally cooperated during treatments and procedures. In contrast, about 14% indicate by their words and behavior that the hospitalization was intolerable. They were either visibly upset or withdrawn for most of their stays. The other children, the majority of 63% fell in between these two extremes, describing hospitalization as neither a special treatment nor terrible experience. They adapted to the fact that they were hospitalized to be treated. As noted in the statement, family participation has a caring social impact towards children but most felt at their worst when their families have gone home (Knafl, Cavallari, & Dixon, 1988). Another researcher, Gibbons (2009) also state that children major fears in preschoolers and school age child are besides injuries, they are scared of the dark, being left alone and the failure to live up to expectation of others and also fear of death. It is believed that this has to do with the surrounding environment of the stay in wards as they are limited to express play and enjoyment (Gibbons, 2009).

It is believed that the environment as a whole has a significant effect on a child's development and well-being. Therefore, it is important that the children experience an environment that will enhance and rejuvenate their well-being, which can be achieved by conscious use of colour, soothing fun images, rhythmic in-ward conditions and social activities which are warm and creative. According to Brown (2009) play, in all its many forms and experiences, contributes to each child's growth, development and well-being. Every aspect of their development; physical, motor, cognitive, language, social and emotional is facilitated through play. Brown states that the Child Life Council recognizes the importance of play as; play is an essential life process, a natural part of childhood, and vital to normal development. Through play the child learns, mastering experiences, expresses themselves, copes with anxiety, creates, achieves and develops skills. Children particularly those who are struggling to cope with stressful circumstances, benefit greatly from play and other activities that facilitate self-expression and understanding. It is well researched that therapeutic play is play that facilitates expression, coping and mastering. It addresses the child's needs to express feelings, solve problems, resolves conflict and distress. Toys, props, creative arts materials and books can be use very effectively to support the development and psychosocial well-being process (Brown, 2009).

The therapeutic environments are mostly implemented in landscapes and gardens in most hospital planning in Malaysia as garden and open spaces are the new adopted feature in the new trend of hospital design. As researched by Said (2003), with proper design and implementation the hospital outdoor spaces can be made into therapeutic platforms for the children to play, rest and socialize. The design must turn the place into a respite where the children's body and mind are engaged into a structured setting (Said, February 2003). Some research does exist to support the idea of nature as healer in an essay in *Healing Gardens*, by Ulrich (1984) summarizes some of the research and theory relevant to the effects of nature on health outcomes (R. S. Ulrich, 1984). Arguable by Whitehouse et. al. (2001), have indicated potential healing processes that may be supported by gardens, from reducing stress to achieving perspectives about life and death. A

small but growing body of empirical research supports the healing potential of gardens in hospital settings (Whitehouse S. et al., 2001).

In addition, all of the author on healing therapeutic gardens, having the same thought among others, to believe that the hospital environment can affect the mood, stress level, and well-being of patients and their families. With increased focus on the overall hospital healing environment, a renewed interest in using the restorative aspects of nature to aid in the healing process has emerged. The term “healing garden” refers to “features that foster restoration from stress and have other positive influences on patients and staff”. Through passive and /or active participations with the garden elements, the children are able to get away from the confinement of ward conditions and routines of medical treatments and in children the responses are known as psychological peacefulness and these adjustments that include less crying, more cooperation and more obedient toward clinical treatments given by caregivers of the hospitals (Said, February 2003; R. Ulrich, 2006; R. S. Ulrich, 1984; Whitehouse S. et al., 2001).

The Healing Environment and Healing Spaces

Blundell P. and Crisp J. (2002) defines provision of healthcare architecture as a concept of a life enhancing environment, as a place built or created to support and sustain the well-being of the particular occupant of time, place and culture, where the body as a whole, both inner and outer, is regarded as essential to how the space is experienced. They described that human bodies articulate our relationship to the world around us where how we perceive spaces relate directly to body size, its acuity, range or motion and intentions such as ergonomics, will eventually dictate how we move through space as well as interacts with its geometric forms and sensory stimuli. This movement defines our realm in specific environment or place and place emphasis on our five senses of see, hear, smell, touch and taste as fundamentals in architecture (Blundell P. & Crisp J., 2002).

This research is based on the source research conducted by Ulrich in early 1980, where Ulrich and Zimring (1981) have

proposed a list of design changes that would improve patients' safety by reducing infection, falls and medical errors; mitigate stress and promote healing. These include the use of single room that could be adjusted to the medical needs of their occupants, improve air quality and ventilation; use sound absorbing ceiling tiles and flooring, better lighting and natural light access. The creation of pleasant, comfortable and informative the environment is to reduce stress and provide patients, staff and family with comfort zones, including gardens, nature views and rooming in spaces for families. These spaces; the sensory perception of patients is taken into consideration in design hospital that will support brain functions and eventually aid the body's own healing process. These perceptions are; visual perception of depth, light, colour, texture, scenes and landmarks; auditory perception of sounds and silence, aroma recognition; navigation and the effects of meditation and believes of healing (R. Ulrich, 2006; Zimring, 1981).

As passionate Ulrich is in conducting more research on healing environment, he continued in 1984 and 2006 where he has gathered evidences in his studies on features that can affect patients' well-being and devoted his career to applying these principles to healthcare design. He identify the features scientifically that enhances window views their healing powers towards patients' outcomes by providing architects with the ammunition they need to build hospitals that optimizes healing. These efforts grew into a field called *evidence-based design*; that uses psychological and health-outcome measures to evaluate the health benefits of architectural features in hospitals which looks at building design not only as physical space, but includes the total sensory environment of sight, sound, touch and smell. These design innovations will benefits children, their families and staff as well as reducing healthcare cost by the speeding recovery, reducing complication and medical error rates (R. Ulrich, 2006; R. S. Ulrich, 1984).

More in Ulrich (1984, 2006) research, stressors in hospital environment are identified as it has impact to patients' psychology and perception the hospital's built environment such as narrow hallways, rooms near noise nursing stations, lack of privacy for families, windows with unpleasant views, and

coldness and eeriness of a space. Solutions are by removing stressor and adding features that enhance comfort by taking into account the spiritual and social aspect of patients. By adding these features, is what Ulrich referred to as ecological health that includes the addition of gardens, views of nature, pleasant artwork, soothing music, nature sounds, soothing colours and spaces where family members can congregate for mutual support (R. Ulrich, 2006; R. S. Ulrich, 1984).

In a more Malaysian context research, as discussed by Said (2003), the planning and designing of outdoor spaces in assisting the healing process of children in the hospital environment is new in Malaysia but is full of prospect in health service sector. Experience in the natural environment would nurture ill children through provision of space to play and are able to get away from the confinement of medical treatments through passive or active participations with the garden elements. The children experience diversity of forms, colours, shapes of landscape elements and dynamism of light, wind and rain. All senses stimulated by the garden environment would eventually lead to reduction of stress that would result in several positive physiological outcomes including lower blood pressure and reduced muscle tension. Said (2003) suggested that the considerations and recommendations involved in designing the children therapeutic garden has six aspects that includes site planning and zoning, security, microclimate, accessibility and circulation, planting composition, garden structures and accessories. But there are also some current research studies on certain architectural features that have healing effects through space planning of formal and informal public interaction spaces (Said, February 2003).

Some terms are strongly agreed among architects and designers such as Coull and Cahnman (2004), which believes that helping children in social welfare, education and medicine would benefit society as a whole. In their article they laid out critical characteristics in a children hospital that would result in the quality of child care. As stated before by some researchers about family-centered approached, they discussed about patient and family interaction by acknowledging the family's central roles in a child's life. As a result, healthcare facilities are designed to

support the presence and participation of families. They provide provision of some responsive design for issues unique to children hospital that includes the followings; Theme, creating design themes that has universal appeal and child-friendly; Image and Scale, children are high in anxiety going to hospital so scale down features so they are less intimidated; Landscape and Art, intimate with nature has the potential to heal patient; Connectivity, as children are far from their usual surrounding, designed social spaces can serve their needs for communication (Coull & Cahnman, 2004).

As to support these design characteristics, there is a detailed research done by Coad and Coad (2008), which they has conducted interviews on children and young people about preferred thematic design on doors, walls and floors as well as findings regarding colour preferences for wards entrances and outpatient's areas. They discussed that most planners decide on colour palate that ranges from white or cream to very bright primary colours with little consultation with children. Designs in the UK and USA many have identified the importance of environment that can contribute to health, making research into reality from children views that identify the use of bright strong integrated colours scheme. As appropriate art, images, themed design and colour are vital in children environment often they say that those visualizations are too young or outdated. Based on the interview with 180 children conducted by Coad and Coad, through presented collectively broad themes outlined, the following table is the results (Coad & Coad, 2008):

Table 1: Common Preferences for Themed Design

Design / Texture	Respondent
Sea, water, beach or ocean design	55
Metal, glitter or shinny	43
Nature, plants, trees or flowers	36
Patterns, starts and striped materials	32
Animals	31
Character Design e.g. Disney	25
Space and Sci-fi	15
Rainbow designs	11
Children's own design pictures	10
Total responses	180

(Source: Coad and Coad, 2008)

The themed design worked for both genders and the colour preferred by children interviewed from the findings were three range of colours; blue-green, red-pink-purple and orange-yellow spectrum; and the popular colour preferences were the mid blue-green spectrum for children below 11 years old. The findings are then analyzed according to different parts of the hospital and more would be suggested in the data analysis for this particular research in the next section (Coad & Coad, 2008).

FINDINGS FROM LITERATURE REVIEW

Responsive Design Characteristics

There are several approaches and alternatives of creating healing spaces in hospital spaces that could be identified in this study in helping planners and architects design better environment that has more healing qualities in contributing for the well-being of children. Children do relate on how they perceive spaces and relate them directly to body size and scale, the interaction with spaces can trigger sensor and stimuli of our five senses of see, hear, smell, touch and taste as fundamentals in architecture (Blundell P. & Crisp J., 2002).

By identifying the characteristics in creating hospital healing spaces and to study whether the existing Malaysian hospital has considered these characteristics in the hospital design. These characteristics will be selected based on the agreed criteria recommended by most authors and what is believed to be appropriate for designing children hospital that has the features of creating optimum healing environment. The characteristic identified are according as stated in the literature review of perceptions of pertaining healing values are through; visual perception of depth, light, colour, texture, scenes and landmarks; auditory perception of sounds and silence, aroma recognition; navigation, the effects of meditation as follows;

- Thematic design, conscious use of colour scheme, soothing fun images, rhythmic in-ward conditions, texture (Brown, 2009; Coad & Coad, 2008; Coull & Cahnman, 2004; Schweitzer et al., 2004; Zimring, 1981)
- Toys, props, creative arts materials and books can be used effectively to support well-being process (Brown, 2009).
- Provision of healing gardens and therapeutic outdoor spaces can enhance the recovery process. (Coull & Cahnman, 2004; Said, February 2003; R. Ulrich, 2006; R. S. Ulrich, 1984; Whitehouse S. et al., 2001).
- Designed area of social interaction, social activities and spaces where family members can congregate for mutual support and communication. (Brown, 2009; Coull & Cahnman, 2004; Knafelz et al., 1988).
- Sustainable design by using sound absorbing ceiling tiles and flooring, (Aripin, 2010; R. Ulrich, 2006; Zimring, 1981)
- Provision of sufficient daylighting, better lighting and natural light access (Aripin, 2010; R. Ulrich, 2006; Zimring, 1981).

METHODOLOGY

Case Study Research

This research design will look into a concise area of the public spaces in all the three cases analysed. One is a particular hospital that concentrates on women's and children's healthcare facility located in Singapore and the other two cases are among the new and well-designed hospitals in Malaysia. The purpose of selecting these hospitals is because of its contextual approach in the design and building adaptation to tropical climate. The study is to research on new approach in designing environment that relates to children and this will help in the well-being of the healing process while being hospitalized. The location and the reasons of the case studies were selected will be deliberately elaborated through thorough explanation in the introduction and some background of the cases aimed. Why these hospitals are being selected as they are because all of these hospitals have expertise on child healthcare.

Methods of Data Collection

The method used in this paper is mostly through site visits to the case studies and taken photographs of physical observations at public spaces where the general public would experience the environment. Does the existing environments in these case studies impacts their patients and visitors experience towards its spaces? These spaces are to be analysed using evidences used in doing case studies to follow the principles in working with sources of evidences and what can be done to improve or make the spaces more convincing in having healing attributes.

Case study evidence can come from many sources available and for this research; the evidences used here are documentation, archival records and physical artifacts. The documentary information are literature review of healing spaces that are good for children, pictures and building plans of the case studies are well documented according to the public spaces. Archival records of government acts in Malaysia and Singapore are referred to for design guidelines in hospitals and the built environment that relates to public usage of spaces. The final source is the physical

artifacts, where in this case are collected photographs and personal observation of site visits to case studies. Most physical artifacts appears less important but it could be the primary evidence because has much influence on the case study process analysis; as in this research where taking the documentations and analyse it by considering arguments and guidelines of designs (Groat & Wang, 2002; Yin, 2009).

These physical artifacts of photographs and available building plans will focus on identifying the existing spaces in public area do considers the healing in physical / built environmental aspect of the space and does it affect the well-being of occupants? These spaces will have the consideration of light penetration (natural and artificial), colour and texture, viewing and experiencing nature, art, aesthetics and entertainment and positive distraction; humour, entertainment interaction and social supports as discovered in the literature reviews.

Case Studies

Case Study A: Kandang Kerbau Women's and Children's Hospital (KKH), Singapore

The first case study is the Kandang Kerbau Women's and Children's Hospital (KKH) in Singapore that has evolved over the decades, since its founding in 1858, into a regional leader in Obstetrics, Gynaecology, Paediatrics and Neonatology. Today, the 830-bed hospital is a referral centre providing tertiary services to handle high-risk conditions in women and children. (*KK Women's and Children's Hospital*, 2011).

The KKH consists of two towers and shared public zones at ground floor. The children's tower on the left (south tower) has been decorated on its walls with paintings of the circus, zoo and underwater world. Characteristic such as clowns and balloons as well as the availability of many toys, games and books galore for the patients and visitors to share the enjoyment. What is important is that the medical equipment that is specifically made and scaled down for young patients. Most importantly, professionals specially trained and skilled in paediatrics care. They have knowledge that knowing that children are not mini-adults and should not also be treated like small adults. Their anatomy and

physiology, the kinds of illnesses they suffer from, and the ways they are treated are very different. KKH provide service that handle severe and acute illnesses that include care and diagnose of neonatal, paediatrics and adolescents health. (*KK Women's and Children's Hospital*, 2011).

Case Study B: Putrajaya Hospital

The second case study selected for this paper is the Putrajaya Hospital that is located in Presint 7 within the new government administrative area of Putrajaya in Malaysia. The hospital provides general services but it specializes in pediatrics and supports children health in organizing 1Malaysia Diabetesity Camp at outdoor activities in increasing awareness of diabetes as reported in News Straits Times (Diabetic kids get health tips at camp, 18 September 2010), that talks about teaching obese children in how to deal with their condition in a fun-filled environment.

Putrajaya Hospital has good provision of public spaces as the main hospital street that accommodates the waiting areas of the outpatients' clinical areas, the rehabilitation unit, the admission, revenue and payment unit, the cafeteria and shops. The main hospital street is wide and accessible for the general public to use (*Official Web Portal Putrajaya Hospital*, 2011). The main question raised is that the areas for children are just an addition space to the overall planning of the public waiting area. As a hospital that provides expertise on Paediatric medicine and care, the hospital should be created with an environment that is also inviting for children not only focusing on the paediatric wards.

Case Study C: Serdang Hospital

The third case study is the Serdang Hospital that is a government-funded multi-specialty hospital located in the district of Sepang in the state of Selangor, Malaysia. Serdang Hospital is referred to as a medium district hospital that provides secondary level care and is being a reference for clinics and hospitals in the vicinity,

especially for people from Serdang, Kajang, Putrajaya, Dengkil and Puchong. (*Serdang Hospital*, 2011).

Serdang Hospital is a district general hospital that also takes paediatrics health into consideration as reported by News Straits Times (*89 Serdang Hospital Patients Go To 'School'*, 11 August 2011), the Serdang Hospital started the 'School in Hospital' project, which has proven to be successful with 89 patients in the hospital having attended classes during hospitalization in supporting their education for major Malaysian examinations.

DATA ANALYSIS

The focus in this research is the hospital's public spaces where these areas provide first impression to parents and children that being hospitalise is a fun and enjoyable place to see the doctors and receive treatments in return for their health.

The Public Spaces and Research Approach on Cases

As previously stated, the identification of spaces that are considered public usage for children as patients and used their families and friends as visitors are the main discussion in this research. The data will have the building layout to indicate the location of public area and spaces that are sufficient for children as well as their families. The spaces identified are named accordingly to the responsive design characteristic identified in the literature review for the data analysis for all case study are as follows:

- Thematic design, conscious use of colour scheme, soothing fun images, rhythmic in-ward conditions, texture
- Toys, props, creative arts materials
- Healing gardens and therapeutic outdoor spaces
- Designed area of social interaction and social activities
- Daylighting, better lighting and natural light access
- Sustainable design

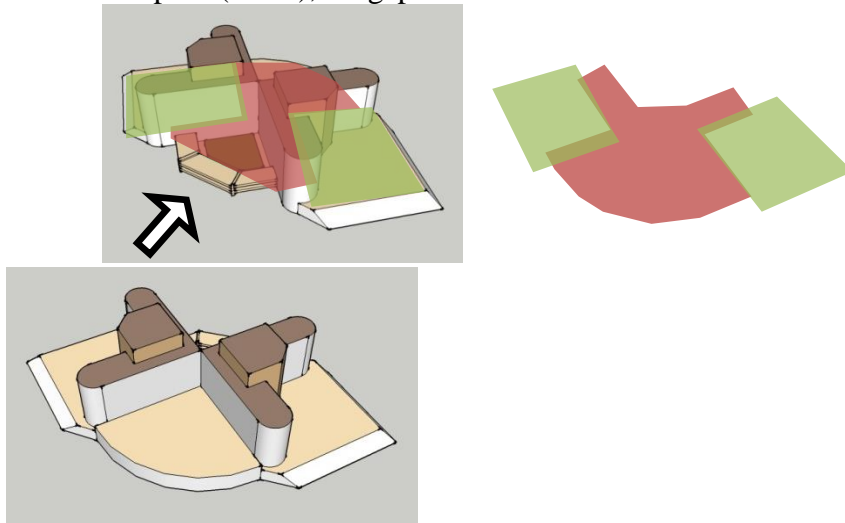
The public spaces of interest within cases to be analyzed are:

- Emergency Department and Entrance Drop Off
- Entrance Lobby and Reception
- Outpatients Clinical Waiting Area
- Hospital Streets and Corridors
- Cafeteria and Eatery Area
- Children Play Area and Day Care Ward
- Outdoor Playground, Courtyard and Roof Garden

The Cases Building Form

All case studies are analysed according to its public spaces and the cases are identified as follow:

- Case Study A: Kandang Kerbau Women's and Children's Hospital (KKH), Singapore

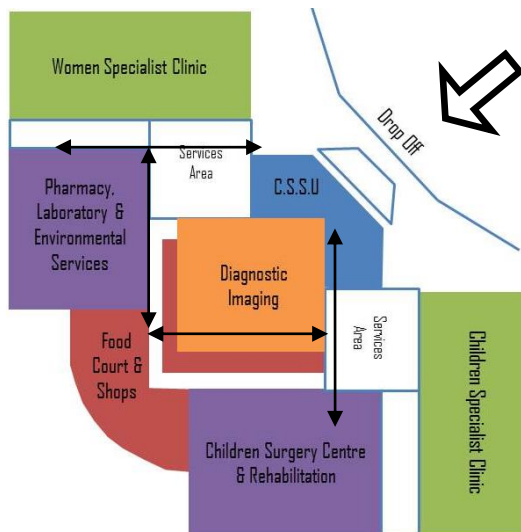


Source: A. Samad N. A. (2011)

Figure 1 & 2: The building form of KKH to indicate the public shared spaces of both two towers

The arrow indicates the main entrance and drop off area for visitors and outpatients receiving area. The highlighted area is the public shared spaces that is surrounding by the two towers. The schematic plan of the public area where the KKH Mall is located that consist of eatery area and other public facilities. The arrows

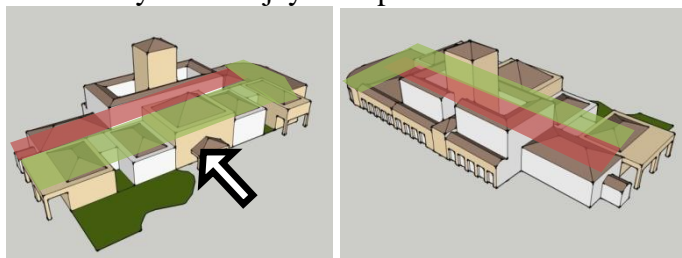
indicate entrance and flow of public circulation that has the potential of having healing attributes.



Source: A. Samad N. A. (2011)

Diagram 3: The KKH schematic plan of public circulation within the shared public spaces

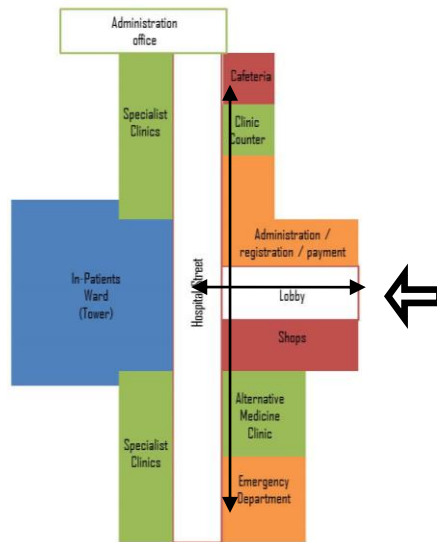
- Case Study B: Putrajaya Hospital



Source: A. Samad N. A. (2011)

Figure 3 & 4: The building form of Putrajaya Hospital to indicate the public hospital street that links to the entrance lobby

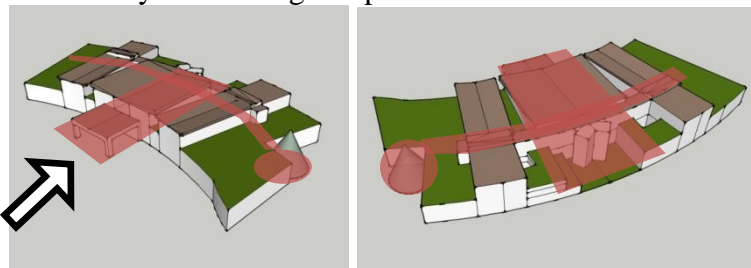
Putrajaya Hospital design approach is a more compact hospital where less provision of outdoor garden but mainly enhancing its indoor hospital street to support all outpatient clinics waiting area.



Source: A. Samad N. A. (2011)

Diagram 4: The Putrajaya Hospital schematic plan of public circulation within the hospital street

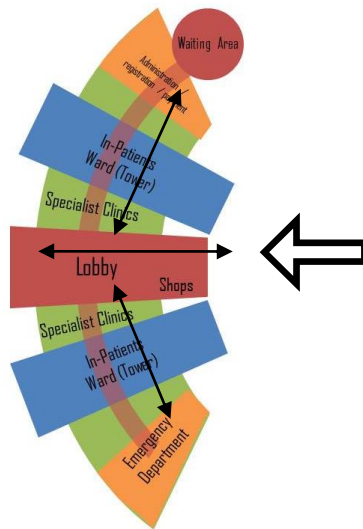
- Case Study C: Serdang Hospital



Source: A. Samad N. A. (2011)

Figure 5 & 6: The building form of Serdang Hospital to indicate the public hospital lobby and hospital street corridors

The Serdang hospital receives visitors at the main entrance but there is another entrance located at for outpatient clinical waiting area (cone like shape building). The waiting area for clinics area is link to the lobby and the emergency department by hospital corridors that are repeated at every level to connect every space.






Source: A. Samad N. A. (2011)

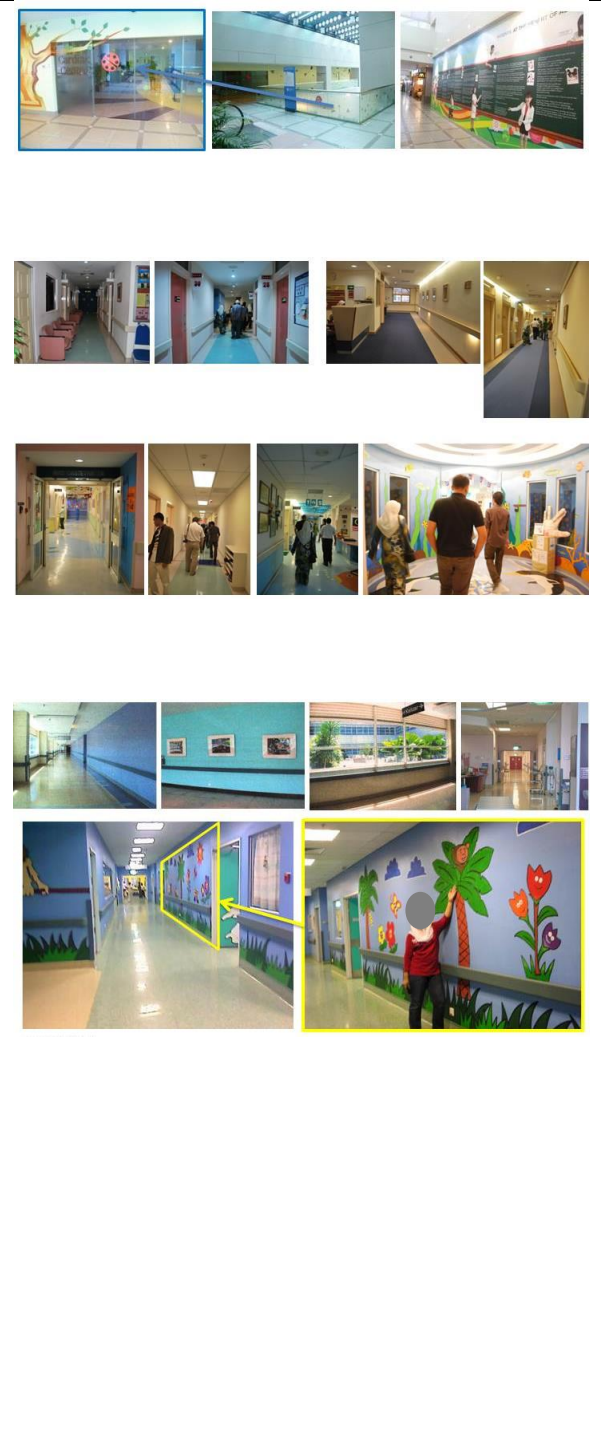
Diagram 5: The Serdang Hospital schematic plan of public circulation within the lobby area and the hospital corridors


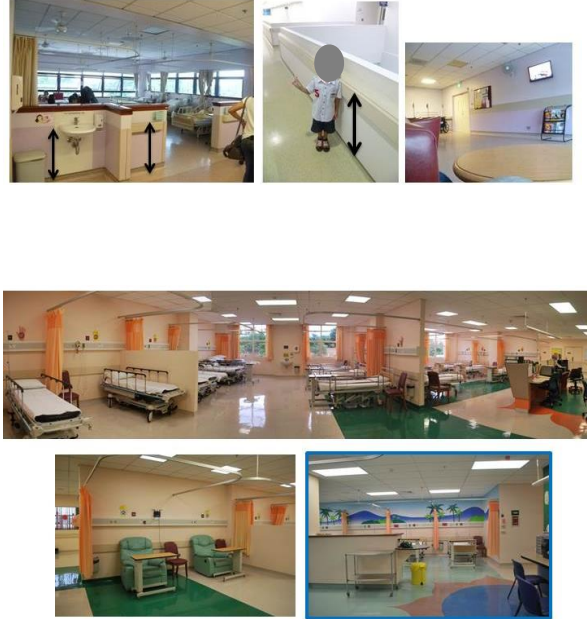
RESPONSIVE DESIGN CHARACTERISTIC IN ALL CASES

Thematic design, conscious use of colour scheme, soothing fun images, rhythmic in-ward conditions and texture

Existing Features	Description
<p data-bbox="266 1239 795 1315">Emergency Department and Entrance Drop Off</p> 	<p data-bbox="849 1239 948 1271">Case A</p> <ul data-bbox="849 1309 1094 1709" style="list-style-type: none"> • As this is the only case study that specialises on children so they would have a particular emergency department specifically for children

	<ul style="list-style-type: none"> The interior has a thematic design, a colour scheme and scaled furniture
<p>Entrance Lobby and Reception</p> 	<p>Case A</p> <ul style="list-style-type: none"> At the lobby has a wall of artwork with soothing image with legible directory plan The colour scheme are strong to suggest indication
<p>Outpatients Clinical Waiting Area</p> 	<p>Case B</p> <ul style="list-style-type: none"> The wide hospital street incorporated with waiting area uses strong vivid colour to indicate the clinics' department entrance contrast to surrounding colour
<p>Hospital Streets and Corridors</p>	<p>Case A</p> <ul style="list-style-type: none"> Thematic



	<p>design and soothing fun art images on glass balustrade and wall to create welcoming and fun feeling</p> <p>Case B</p> <ul style="list-style-type: none">• Most corridors are according and themed to the type of wards and only the paediatric ward that has thematic design on walls with colourful art images <p>Case C</p> <ul style="list-style-type: none">• The same in case c where only the paediatric ward has thematic design and all other corridors are plain with only soothing colour
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<h3 style="text-align: center;">Cafeteria and Eatery Area</h3>	
<h3 style="text-align: center;">Day Care Ward</h3>  	<p>Case A</p> <ul style="list-style-type: none"> Case A has a street mall like approach for its cafeteria section and its rhythmic conditions by having popular and well known eateries restaurant <p>Case A</p> <ul style="list-style-type: none"> Paediatric wards are all designed to suit children scale with soothing colour <p>Case B</p> <ul style="list-style-type: none"> Day care wards has basic colour themes as all other wards but the paediatric section has some thematic design on wall


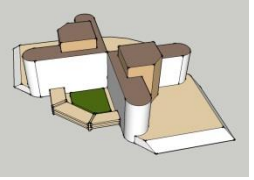


	<ul style="list-style-type: none"> • This is good as there are initiative for young patients
	<p>Case C</p> <ul style="list-style-type: none"> • Day care wards in case C also has the same initiative with case B as to separate adult and young patients


Toys, props and creative arts materials

Existing Features	Description
<p style="text-align: center;">Children Play Area</p>	<p>Case A</p> <ul style="list-style-type: none"> • The awareness for young patients make most of its furniture suit children scale
	<p>Case B</p> <ul style="list-style-type: none"> • Only located within the children play areas only


	<p>Case C</p> <ul style="list-style-type: none"> • Only located within the children play areas only
<p>Outdoor Playground, Courtyard and Roof Garden</p> 	<p>Case A</p> <ul style="list-style-type: none"> • Indoor and outdoor playground give option for children and outdoor garden artwork could increase children curiosity and play <p>Case C</p> <ul style="list-style-type: none"> • The provision of playground at case C also has the awareness for children




Healing gardens and therapeutic outdoor spaces

Existing Features	Description
<p data-bbox="235 323 813 399">Outdoor Playground, Courtyard and Roof Garden</p> 	 <p data-bbox="840 599 934 637">Case A</p> <ul data-bbox="840 675 1095 856" style="list-style-type: none"> • The outdoor garden has interaction with the surroundings and the visitors  <p data-bbox="840 1123 934 1161">Case B</p> <ul data-bbox="840 1199 1108 1456" style="list-style-type: none"> • The therapeutic garden has no use as the placement is not with the planning and is not welcoming 

	<p>Case C</p> <ul style="list-style-type: none"> • The gardens are most courtyard concept and link the wards and corridors to the outside • This approach are more interactive with patients
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Designed area of social interaction and social activities

Existing Features	Description
<p>Emergency Department and Entrance Drop Off</p> 	<p>Case A</p> <ul style="list-style-type: none"> • The open concept makes visitors free to mingle <p>Case B</p> <ul style="list-style-type: none"> • The area at clinic entrance has the potential for social interaction

<p>Entrance Lobby and Reception</p> 	<p>Case B</p> <ul style="list-style-type: none">• The wide lobby area can be a social congregation area
<p>Outpatients Clinical Waiting Area</p> 	<p>Case B</p> <ul style="list-style-type: none">• The wide hospital street sometimes makes a good area to socialise but less private spaces available <p>Case C</p> <ul style="list-style-type: none">• The waiting area is like case B where its wide and has less personal spaces
<p>Cafeteria and Eatery Area</p> 	<p>Case B</p> <ul style="list-style-type: none">• The cafeteria area is not welcoming for patients and only for visitors and staffs

	<p>Case C</p> <ul style="list-style-type: none"> The cafeteria area is more open and welcoming than case B
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Daylighting, better lighting and natural light access

Existing Features	Description
<p>Entrance Lobby and Reception</p> 	<p>Case A</p> <ul style="list-style-type: none"> The design decision and planning has provide the building with sufficient amount of natural light access through open plan, sky lights and double volume glazed windows
<p>Outpatients Clinical Waiting Area</p>	<p>Case A</p> <ul style="list-style-type: none"> The clinical area has separate circulation for public and patients that

	<p>provide limited access to public</p> <ul style="list-style-type: none"> • This is a good approach for natural and artificial lighting used areas <p>Case C</p> <ul style="list-style-type: none"> • Case C also has provision of natural light access through triple volume atrium at lobby area and full glazed wall at waiting area
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DISCUSSION AND RECOMENDATION

There is much recent research about environment that is increasingly important in understanding children experience as patients in hospital setting. This study actively analyse the environment that is conducive for children that will eventually affect their well-being. The case studies helps in identifying the good and bad examples of the existing hospital and the identification of the responsive design characteristics found from findings of the literature review, has been implemented or otherwise in those case studies.

Case A has a more prominent feature that has all the design characteristics as the hospital has been identified before in the data findings that Case A is an establish specialist children hospital and has more awareness on children psycho-social needs. Case B and case C has quite the similar approach on creating a

wide hospital street and lobby area but they differ in terms of openness and enclose spaces between indoor and outdoor area. Case B has less provision on outdoor landscape and its awareness towards the well-being of patients especially children.

As to provide recommendations and contribution to the field of hospital environmental, some extension could be done with this research by detailing the design characteristics and focuses more on every public spaces that has the potential to be planned and redeveloped for new children hospital design and existing hospital building that would be refurbish for paediatric or children section.

REFERENCES

- 89 *Serdang Hospital Patients Go To 'School'*. (11 August 2011). Retrieved 16 August 2011, from <http://www.nst.com.my/articles/4scho/Article//Article#ixz z1VBu6vtQN>
- Aripin, S. (2010). *Healing architecture: A study of daylight in public hospital designs in Malaysia*, . Unpublished PhD Paper, The University of Queensland, Brisbane, Australia.
- Blundell P., & Crisp J. (2002). *The Hospital as Building Type. The Architecture Review*.
- Brown, C. D. (2009). Therapeutic play and creative arts helping children cope with illness, death and grief. In A. Dailey & S. Zarbock (Eds.), *Hospice care for children* (3rd edition ed.). Oxford: Oxford University Press.
- Coad, J., & Coad, N. (2008). Children and young people's preference of thematic design and colour for their hospital environment. *Journal of child health care*, 12(1), 33-48.
- Coull, A., & Cahnman, S. F. (2004). Kids' Stuff: Features and factors driving children's hospital design. *Health Facilities Management Magazine*, 38-44.

- Gibbons, M. B. (2009). Psychosocial aspect of serious illness in childhood and adolescence: Responding to the storm. In A. Dailey & S. Zarbock (Eds.), *Hospice care for children* (3rd edition ed.). Oxford Oxford University Press.
- Goh, N. (2010). *50 years of Public Healthcare in Malaysia: Evaluation of Architecture Design Ideas, Planning and Development*.
- Goh, N., Tahir, M., Sulaiman, M., & Surat, M. (2009). *Medical and the Architecture of Total Wellness the Potential and Development in Malaysia*. Paper presented at the Proceedings of World Academy of Science: Engineering & Technology.
- Groat, L., & Wang, D. (2002). *Architectural research methods*. Canada: John Wiley & Sons.
- Health Facts 2010*. (August 2011). Retrieved 10 Oct, 2011, from http://www.moh.gov.my/v/c_report
- Healthcare Institution Statistics*. (2009). Retrieved 10 Oct 2011, from <http://www.moh.gov.sg>
- KK Women's and Children's Hospital*. (2011). Retrieved 17 August 2011, from <http://www.kkh.com.sg/Pages/Home.aspx>
- Knafelz, K. A., Cavallari, K. A., & Dixon, D. M. (1988). *Paediatric Hospitalization; Family and nurse perspectives*. Illinois: Scott, Foresman and Company.
- Lewis, P. (2007). Portrait of the patients as a young man: an exploration of the use of photographs in hospital. *Journal of Bioethical Enquiry*, 4(1), 51-55.
- Ministry of Health Malaysia, Strategic Plan 2006 - 2010. (2008). Ministry of Health Malaysia.

- Newman, B., & Newman, R. (2009). *Development through life; a psychological approach*. New York: Wadsworth Cengage Learning.
- Official Web Portal Ministry of Health Malaysia*. (2010, 16 September 2011). Retrieved 16 September 2011, from <http://www.moh.gov.my/>
- Official Web Portal Putrajaya Hospital*. (2011, 16 August 2011). Retrieved 17 August 2011, from <http://www.hpj.gov.my/pjh>
- Returning home on a painless footing. (2007, November 12). *The Borneo Post*.
- Said, I. (February 2003). Research Management Centre Vote 72338: Universiti Teknologi Malaysia.
- Schweitzer, M., Gilpin, L., & Frampton, S. (2004). Healing Spaces: Elements of Environmental Design That Make an Impact on Health. *The Journal of Alternative & Complementary Medicine*, 10, pp. S-71-S-83.
- Serdang Hospital*. (2011). Retrieved 16 August, 2011, from <http://www.malaysiacentral.com/information-directory/>
- Sorana D. *Hospital Spaces for Children Care*
- Suleiman, A. B., & Jegathesan, M. (2000). Health in Malaysia Achievements and Challenge. In P. a. D. Division (Ed.), *Ministry of Health Malaysia*.
- Symptoms and treatment for childhood leukaemia. (2007, November 19). *The Borneo Post*.
- Thayer, P., & Nee, R. (2009). Spiritual care of children and parents. In A. Dailey & S. Zarbock (Eds.), *Hospice care for children* (3rd edition ed.). Oxford Oxford University Press

Tong, C. T. (2008). Hospital design and planning: An interview with Ar Chiam Tat Hong. *Health Facilities, Journal of the Malaysian Institute of Architect, Volume 2*, 18-21.

Treating and surviving childhood liver cancer. (2007, December 3). *The Borneo Post*.

Ulrich, R. (2006). *Evidence-based health-care architecture*.

Ulrich, R. S. (1984). *View through a window may influence recovery from surgery* (Science).

Whitehouse S., Varni J.W., Seid M., Cooper-Marcus C., Ensberg M. J., Jacobs J. R., et al. (2001). Evaluating A Children's Hospital Garden Environment: Utilization and Consumer Satisfaction. *Journal of Environmental Psychology*, 21(Academic Press), 301-314.

Yin, R. K. (2009). *Case study research: design and methods* (4th ed. Vol. 5). California: Sage Publications Inc.

Zimring, C. (1981). Stress and the Designed Environment. *Journal of Social Issues*(3791), 145-171.