EFFECT OF HEALING GARDEN USE ON STRESS EXPERIENCED BY PARENTS OF PATIENTS IN A PEDIATRIC HOSPITAL

A Thesis

by

TRACI LEONETTE TOONE

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

May 2008

Major Subject: Health Education

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Approved by:

Chair of Committee,	Buster Pruitt
Committee Members,	Patricia Goodson
	Roger Ulrich
Head of Department,	James Eddy

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ABSTRACT

Effect of Healing Garden Use on Stress Experienced by Parents of Patients in a Pediatric Hospital. (May 2008)

Traci Leonette Toone, B.S., Texas A&M University

Chair of Advisory Committee: Dr. Buster Pruitt

The newly built Dell Children's Medical Center in Austin, Texas was designed with an understanding of the healing power of nature. A perspective randomized design with pre-post measures Post-Occupancy Evaluation (POE) was conducted to test whether the hospital's Healing Garden had an effect on the stress levels of parents of pediatric hospital patients. Participants were asked to sit and relax in the Healing Garden for ten-minutes. Two differing interior spaces, one with views to nature and one without views to nature, were tested as comparisons. Data was collected in the form of surveys and behavioral observation.

Results indicate that the Healing Garden reduced the stress of parents at a greater rate than the two interior spaces included in the study. However, the two interior spaces did not differ in their stress reducing effects despite one having views to nature. Comments from parents indicated a slight stress relieving effect by simply leaving their patient's room. These research findings should be used to encourage parents and other adult family members to use the hospital's gardens to reduce stress felt from their

patient's medical treatment. Further studies need to be conducted to provide more conclusive data.

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I would like to thank my committee chair, Dr. Pruitt, and my committee members, Dr. Goodson and Dr. Ulrich, for their guidance and support throughout the course of this research.

Thanks also go to my friends and colleagues and the department faculty and staff for making my time at Texas A&M University a great experience. I also want to extend my gratitude to Dr. James Varni, who provided the survey instrument, Bruce Hanik for his statistical knowledge, to Chris Brown, Jefra Rees and all the Child Life Specialists at Dell Children's Medical Center, and to all the parents who were willing to participate in this study.

Finally, thanks to my family and friends for their encouragement, patience and love. Without you, I would not be the person I am today. Thank you for supporting me in this endeavor.

TABLE OF CONTENTS

LIST OF TABLES

1. INTRODUCTION: THE IMPORTANCE OF RESEARCH

Throughout history, healthcare practitioners have recognized the relationship between the external, natural environment and its effect on health outcomes. According to Whitehouse et al. (2001), as early as the Middle Ages, hospitals within monasteries utilized the garden cloister as a place of healing. Then, following the development of the germ theory, the focus of hospital design shifted from a focus on patient comfort to a focus on disease treatment. In essence, this separated the patient from the healing process leaving health recovery solely to the medical professional's attack on a disease. Later, layouts of new hospitals were determined by the new discoveries in medical technology, and any lack of attention to patient comfort seemed unimportant (Whitehouse et al., 2001). The current focus of healthcare facility design has shifted back to its historical roots by incorporating access to nature along with advanced technology to treat patients.

Healthcare specialists, architects, and landscape designers, among others, believe once more that the hospital environment can affect the mood, stress levels, and the well-being of patients and their families (Cooper Marcus, 2005; Sherman et al., 2005; Ulrich, 1999; Whitehouse et al., 2001). From research, designers are now shifting their goal when developing healing environments to creating "spaces for patient care that engender

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This thesis follows the style of *Health Environments Research and Design Journal.*

feelings of peace, hope, upliftment, joy, reflection, and solace" in addition to creating user-friendly, medically advanced facilities (Whitehouse et al., 2001, p. 303). Stress reduction is also a key in health facility design. Researchers have identified five areas that fall into stress relief: connection to nature, opinions and choices, social support, pleasant diversions, and the elimination of environmental stressors (Berry et al., 2004).

Dr. Roger Ulrich has pioneered studies on health care environments, internal and external to the facility, and how they affect patients healing. Ulrich's studies are part of the emerging science of evidence-based design "in which the design process is guided by an empirical understanding of the effects of health-care physical environments on safety, efficiency, and clinical outcomes" (Ulrich, 2006). This new process is changing the way architects think, from "believing that it's better to design a unit or facility differently to having evidence-based data that show improved patient outcomes based on a different unit of facility design" (Bishop and Griffin, 2006).

The initial study conducted by Ulrich showcased the physical healing of patients recovering from gall bladder surgery and how the view out their window, either into a brick wall or a tree, affected their healing. Ulrich found that "those looking at the tree stayed for fewer postoperative days, received fewer negative evaluative comments in nurses' notes, and required fewer potent analgesics than matched patients in similar rooms with windows facing a brick wall" (Coiles, 2001).

Others have looked at how healing gardens have impacted patient and family perceptions on the quality of care received at a facility as well as how likely they are to recommend the facility to others. Patients who could view a garden out of a window or

who were physically able to visit a garden were found to be more satisfied with their care. Whitehouse et al. (2001, p. 306) found that "50 per cent of the garden users reported that the garden 'definitely' increased their overall satisfaction" with the children's hospital. Further more, several respondents made the comparison between a facility they were at and other facilities in the area and described how the garden made them feel that they were receiving a higher quality of service.

1.1 Literature Review

A systematic review of the literature was conducted to determine the scope of healing garden use in pediatric hospitals and to identify what research has and has not been conducted regarding healing gardens. The review was designed using the Matrix Method (Garrard, 2007). A search was done using nine electronic databases (Web of Science, MEDLINE, PubMed Central, Cambridge Scientific Abstracts, ERIC, Academic Search Premier, and Avery Index Architecture). Variations of key terms were used in the search: *healing garden, hospital, children, post-occupancy evaluation,* and *study.*

For a study to be included in this review, it had to meet certain criteria: a) be a published study in a peer-reviewed, English journal, b) evaluate garden use among patients, family members and staff, c) use a post-occupancy evaluation, and d) use the existing research to base its rationale. Studies were excluded from this review if they only examined the hospital or healthcare facility in general and not the garden, if staff members and job satisfaction were a primary focus of the study, and if there was not a post-occupancy evaluation conducted. As there were very few studies meeting the stated

criteria for inclusion, studies not examining gardens in children's facilities were also reviewed. (Toone, 2007).

Once collected, each study was critically analyzed and cataloged in the Matrix. Next, a methodological quality score was given to each study. The group of studies was then analyzed by the characteristics outlined in the Matrix to find key themes, similarities, and differences as well as suggestions for further studies and design elements. (Toone, 2007).

A total of three studies were included in the review of the literature (Heath, 2004; Sherman et al., 2005; Whitehouse et al., 2001). Out of these three studies, Sherman et al. (2005) and Whitehouse et al. (2001) were both conducted in pediatric hospitals in California while Heath (2004) was conducted in an Alzheimer's facility in British Columbia. There were three main data collection methods found in the studies: observational analysis, participant surveys, and interviews. All studies were conducted by use of some form of survey; however, no study used all three methods. A previously developed theory was used in the design and implementation of all three studies.

The studies conducted by Heath (2004), Sherman et al. (2005), and Whitehouse et al. (2001) all focused on the patient's perception and use of garden facilities at the hospital. However, none of the studies focused on the family or staff members' use of the garden facilities. It was suggested in all three studies that family and staff members be included in future studies. Therefore, the purpose of this study is to evaluate the effect of the use of healing gardens on the perceived stress levels of parents whose child is a patient in a pediatric hospital.

2. THEORETICAL FOUNDATION

Ulrich's Theory of Supportive Garden Design (Cooper Marcus, 2005) was used in the design of this study. The basic premise of the Theory revolved around four dimensions that the garden provides (1) a sense of control and privacy, (2) views of nature and other positive distractions, (3) opportunities for physical movement, and (4) settings which facilitate social interaction. These dimensions theorized to reduce stress in patients, family and staff members, which was thought to lead to better mental and physical health outcomes for all parties.

First, a *sense of control and privacy* is generally lost upon entering a hospital. Patients suddenly receive unwavering dictation on what they can wear, what and when they can eat, who can visit them when, and where they will be "placed." No space is intimately theirs nor do they have a place to "get away" for some personal time. This sudden change to their normal, familiarized routine can lead to undue stress, which can hinder clinical health interventions. Stress has been linked to a decrease in the functioning of the immune system as well as depression in patients, and staff members often feel a decrease in job satisfaction, leading to high turnover rates (Cooper Marcus, 2005). Design implications involve giving the user choices in the garden: turn left or right on the trail, sit in the sun or in the shade, be accessible to others or "get away."

Next, *views of nature and other positive distractions* can "awaken the senses, calm the mind, [and reduce] stress" (Cooper Marcus, 2005, p. 8). Calming scenes may make medical procedures easier to tolerate by distracting the person from what is going

on. Family and staff members may be provided with an opportunity to "escape the situation" and enjoy a moment outside of reality. Designs implications include large windows that provide views of nature but do not allow others to view them. Gardens can have plants with distinct seasonal characteristics, such as leaves changing from green to red or yellow, blooms appearing at different times of the year, and different smells and textures of plants.

Then, *opportunities for physical movement and exercise* have long been known to provide many physiological and psychological benefits to people. It has also been suggested that physical movement improves cardiovascular health and reduces depression in adults and children (Cooper Marcus, 2005). Design implications including walking paths and trails, garden planters that allow users to participate in the care of foliage, and areas for therapists to work with patients.

Finally, *settings which facilitate social interaction* have been shown to decrease stress. And those with less stress have been shown to have improved health outcomes at a faster rate (Cooper Marcus, 2005). Design and policy implications that support social interaction include larger waiting areas, patient rooms close to gardens, and hospitals practicing family-centered care. Gardens can provide outdoor tables and seating areas that can be easily moved so that families or staff can do activities such as having a meal together or playing a card game.

2.1 Justification of the Theoretical Approach

Sherman et al. (2005), Heath (2004), and Whitehouse et al. (2001) have all conducted base studies concerning the use of healing gardens. However, following a systematic review of the literature available (Toone, 2007), a gap in knowledge was found to exist between differentiating the benefits of healing gardens use on different users, i.e. parents, patients, or staff members. Whitehouse et al. (2001) and Sherman et al. (2005) were able to obtain a lot of data on patient use, but very little on parents. Furthermore, Heath's study, although providing knowledge on the benefits of healing gardens, focused on geriatric Alzheimer's patients. Again, only a few family member and staff data were recorded.

In conclusion, the Theory of Supportive Garden Design guided the proposed study by providing focus parameters and distinctive architectural definitions to adhere to.

2.2 Hypotheses

The Theory of Supportive Garden Design helped to anticipate certain events in this study. By having four distinct garden characteristics identified that nurture healing, the PI could determine the healing quality of the garden and determine what areas of the garden or interior locations would or would not solicit stress-relieving affects. For this study, it was hypothesized that the Healing Garden would reduce stress on the participants greater than the two interior spaces. In addition, it was hypothesized that the Surgery Waiting Area would reduce stress greater than the 2 North Family Waiting

Lounge. It was predicted that participants in the 2 North Family Waiting Lounge would be fidgety and anxious to leave. Those in the Surgery Waiting Area would be slightly distracted by having a direct view of nature and by sitting in a secluded area of the waiting area. And finally, participants in the Healing Garden Courtyard would be calmer, taking in their surroundings and possibly interacting with the water feature by running their hands in the flowing water.

3. METHODS

The purpose of this study was to determine whether changing environments from interior to exterior would reduce a participant's stress level. In addition, the study investigated two interior spaces; one interior space with views to nature greater in relieving stress, and an interior space without views to nature. By investigating the two aforementioned, the principle investigator wishes to contribute to the literature on evidence-based design and give Child Life specialists insight into methods that may allow stressed parents of patients to relax given the unpleasant situation in which they find themselves.

This study was designed to be a perspective randomized design with pre-post measures focusing on healing gardens and waiting areas at the newly built Dell Children's Medical Center (DCMC) in Austin, Texas. The principal investigator (PI) for the study was Traci Toone. DCMC was chosen due to it's proximity to the PIs university, the newness of the building design, and the use of evidence-based design methods in the construction of the building. Institutional Review Boards from DCMC and Texas A&M University were contacted regarding the study and proper documentation was provided on the study.

The study design was a test-retest model revolving around the parents of patients at DCMC. Child Life Specialists identified possible participants for the study. Participants were (1) parents of a patient in the hospital and (2) willing to participate in the study. Child Life Specialists also identified patients that frequently had parental

visitors in their rooms during the day. These individuals provided a starting point for the PI to begin approaching participants.

Random participant selection was maintained despite having "insight" by Child Life staff. Once possible parents were identified, the PI walked around to each room in each unit checking to see if parents were present in any of the patient rooms. If no hospital personnel were in the room or no procedure was going on, the PI would knock on the door and enter the room. Once in the room, the PI would introduce herself and explain her purpose for being there. She gave a brief synopsis of the study being conducted. Parents were then given the opportunity to accept or deny participation in the study. Denying participation in the study would have no adverse affect on the patient, their care at DCMC, or on the parent.

Parents that agreed to be a part of the study were taken to a previously identified common place, a lobby area on the main floor of the hospital and near the elevators, to review and sign the informed consent form (see Appendix A). After signing the consent form, participants were then asked to fill out the PedsQL Present Functioning Visual Analogue Scale Parent Self-Report (PedsQL; 2005, Varni) before being taken to one of three locations in the hospital (to be described in a later section). Any casual chatting and discussions were kept to a minimum while walking to the location in order to avoid altering the participant's mood on the PIs part through the discussion. Once at the location, participants were asked to "sit and relax" and were informed that the PI would return in ten minutes. The ten minute time limit selected for this study was justified by a previous study conducted by Whitehouse et al. (2001) that revealed that study

participants overwhelmingly perceived their garden experiences as positive although the majority of participants spent less than 5 minutes in the garden. While participants sat in their assigned area, the PI would unobtrusively observe the participant, their behavior, and the environment (i.e. the weather or atmosphere, if anyone entered or exited the space, etc.) The participants were not aware that they were being observed; however, hospital IRB members had approved this prior to beginning the study. Following the ten minute period, the PI returned to the participants and asked them to once again fill out the PedsQL. Participants were then thanked for their participation and informed that they were free to leave the area or stay, whichever they preferred. The PI then left the area following the participant's completion of the scale.

The three areas chosen in DCMC to be used in the study had distinct characteristics that followed Ulrich's Theory of Supportive Garden Design (to be described in a later section). See Table 3.1 for ratings of the areas at DCMC based on Ulrich's Theory of Garden Design.

First, the Healing Garden Courtyard is a multi-level garden located in the center of the hospital. There are a total of four levels to the garden with each level having an entrance on its respective floor. There is a combination of colorless and multi-colored green glass windows surrounding the garden. It can be speculated that the chosen multi-color glass combination enables those in indoor corridors to view the garden while those in the garden may feel a sense of seclusion rather than exposure. The spot chosen for participants to sit at is a partially shaded bench on the second floor. The bench has views to two water features and two of the other garden levels.

Next, the Surgery Waiting Area is located on the first floor of the hospital. It has a large, open feel to it; there are many movable seating areas and distractive toys and books for children, magazines and telephone access for adults. The waiting area has floor to ceiling glass doors that look out on a garden. Patrons are able to enter the garden through these doors if they so choose. Seating of participants in the Surgery Waiting Area is in a semi-secluded area of the waiting room that directly faces the garden.

Finally, the 2 North Family Waiting Lounge is located on the second floor and has windows that only face interior corridors. There are no views of exterior nature nor are there any plants located in the room. There is a small kitchenette at one end of the lounge and a few chairs and one table at the other. Mounted on the wall is a flat screen television with no remote control access. Trash and recycling receptacles are located below the television. The room has books, games and toys for children, and magazines and telephone access for adults.

Table 3.1 – DCMC Setting Ratings Based on Theory of Supportive Garden Design

Setting	*Sense of control and privacy*	*Access to nature*	*Opportunities for physical movement*	*Setting to facilitate social interaction*
Garden	X	X	X	X
2 North				X
Surgery	X	X		X

Participant assignment to a location was randomized from the beginning. Before the first participant was approached, the PI flipped a coin to decide if the participant would go to an indoor or the outdoor location. Based on the method, the outdoor Healing Garden Courtyard space was selected by the toss, making it the first location to be visited. Then the coin was flipped once more to determine which indoor facility to use first, 2 North Family Lounge or the Surgery Waiting Area. The 2 North Family Lounge was selected by the toss. From there on out, the order that participants were taken to was repeated as follows: Healing Garden Courtyard, 2 North Family Lounge, Surgery Waiting Area.

The study took place over two weekends in the fall of 2007 consisting of a weekday and weekend day. Friday and Saturday were chosen to be the best days to be in the hospital for several reasons. First, in meeting with Child Life specialist, Jefra Rees, Fridays were identified to have less hospital procedures going on as physicians were working to discharge patients for the weekend. Additionally, parents were generally able to make a visit at the end of the workweek or on the weekend rather than the middle of the week. Lastly, no major hospital procedures are usually scheduled during the weekend, therefore, allowing for less clinical distractions for parents and the possibility for higher participation rates in the study.

The survey instrument selected for this study was the PedsQL Present Functioning Visual Analog Scale Parent Self-Report developed by Dr. James Varni (see Appendix B). The PedsQL was designed with six questions intended to measure perceived stress of an individual. Four of the questions related to emotional indicators of

stress and two related to physical indicators of stress. Below each question was a 100 millimeter line that acted as a spectrum. At one end of the line was a happy face with a statement indicating disagreement with the question, and a sad face at the other end with an answer indicating agreement with the question. Participants were asked to put a mark on the line that best indicated how they felt at that time. Scoring of each question was figured by measuring how many millimeters the participant's mark was away from the happy face. For example, a mark at the happy face was a zero and a mark at the sad face was a 100.

The PedsQL was designed to measure stress based on two scores: a Total Symptom Score (TSS) and an Emotional Distress Summary Score (EDSS) (Sherman et al., 2006). The Total Symptom Score was calculated for each individual by finding the average of all six items on the instrument. The Emotional Distress Summary Score was the mean of anxiety, sadness, anger and worry items. Both pre and post TSS and EDSS were calculated and sorted according to setting.

Reliability and validity of the PedsQL had been tested in previous studies (Sherman et al., 2006). Test re-test reliability was demonstrated from Time 1 (T1) to Time 2 (T2) to be in the large effect size range. Internal consistency reliability was demonstrated in the Total Symptom score (T1 alpha = .80, T2 alpha = .84) and the Emotional Distress Summary Score (T1 alpha = .76, T2 alpha = .81). No changes were made to the scale. Prior permission had been obtained from Dr. James Varni to use the PedsQL in this study.

4. RESULTS

All data were collected over four weekend periods in November and December. A total of 27 parents participated in the study (n = 27), equaling to nine per group. There were 23 female and 4 male participants. Information regarding age, race, ethnicity, or nationality was not collected.

The study was conducted on Fridays and Saturdays. The data collection time frame ranged from 9:30 am to 3:30 pm each day. Outdoor temperatures were between 60-85 degrees Fahrenheit, and weather conditions in the garden ranged from sunny and warm to overcast with a slight chill.

Data were analyzed using SPSS. The TSS and EDSS, including the change that occurred from pre to post, can be found in Table 4.1.

Table 4.1 – All Pre/Post Total Symptom and Emotional Distress Summary Scores

ID	*Group*	*Pre TSS*	*Post TSS*	*Pre EDSS*	*Post EDSS*
1	1	14.33	11.50	12.75	10.00
2	2	24.67	24.33	25.00	25.50
3	3	15.17	15.17	10.25	11.00
4	1	47.83	40.33	43.50	40.50
5	2	26.67	20.17	16.50	13.50
6	3	44.67	48.00	50.50	54.00
7	1	39.83	18.67	52.25	28.00
8	2	31.33	59.50	23.00	47.00
9	3	35.00	29.50	40.25	37.75
10	1	24.33	23.67	17.00	20.50
11	2	19.83	18.00	29.25	27.00
12	3	49.50	45.33	53.75	46.75
13	1	28.50	26.83	29.75	36.25
14	2	32.33	34.17	30.00	35.75
15	3	46.67	44.33	46.25	42.25
16	1	40.67	42.33	39.25	45.25
17	2	18.83	13.67	15.25	9.00
18	3	12.50	13.00	17.00	18.00
19	1	22.83	13.67	24.50	14.75
20	2	3.17	6.67	4.00	9.75
21	3	6.00	5.67	2.00	2.25
22	1	29.67	10.17	23.25	8.25
23	2	19.83	18.33	4.50	2.50
24	3	13.00	11.83	13.50	11.75
25	1	35.83	30.67	38.00	25.25
26	2	23.83	21.83	19.00	17.75
27	3	3.67	2.33	1.75	2.00

Groups: 1 – Healing Garden, 2 – 2 North Family Lounge, 3 – Surgery Waiting Area

There were nine participants randomly assigned to each space for a total of 27 participants (n=27). The change from pre to post was measured numerically and indicated either a reduction or increase in stress. Ranges in change scores for each space

varied significantly with the 2 North Family Lounge having the greatest range of 34.67. However, the change range indicated by the 2 North Family Lounge included several participants who experienced great increases in their stress levels as a result of spending time in the space. The mean change score for 2 North Family Lounge was -1.7963 as compared to the Healing Garden Courtyard's mean change score of 7.3333. Complete results for TSS and EDSS change scores can be found in Table 4.2.

Table 4.2 – Descriptive Statistics of Change Scores Within Groups

Total Symptom Score

Setting	*N*	*Range*	*Minimum*	*Maximum*	*Mean*
Garden	9	22.83	-1.67	21.17	7.3333
2 North	9	34.67	-28.17	6.50	-1.7963
Surgery	9	8.83	-3.33	5.50	1.2222

Emotional Distress Summary Score

Setting	*N*	*Range*	*Minimum*	*Maximum*	*Mean*
Garden	9	30.75	-6.50	24.25	5.7222
2 North	9	30.25	-24.00	6.25	-2.3611
Surgery	9	10.50	-3.50	7.00	1.0556

To test for changes within each group based on the pre and post TSS and EDSS, the nonparametric Wilcoxon test was run. The Wilcoxon test was applied to this study due to its testing of repeated, or "before" and "after", measures when there are more than two groups in a study, and its ability to indicate a significant correlation between the before and after data. Significance was tested against an alpha of .05. The Healing

Garden Courtyard was the only setting to show a statistically significant (p=.015) impact on stress levels from pre to post survey results. Results can be found in Table 4.3.

Table 4.3 – Wilcoxon Signed Ranks Test

Total Symptom Score	*P*	*Emotional Distress Summary Score*	*P*
Garden	.015	Garden	.214
2 North	.678	2 North	.953
Surgery	.161	Surgery	.514

Kruskal-Wallis test was used to analyze the variance in the change scores between the groups. One of the hypotheses was to investigate if there was a decrease in stress due to spending time in another area of the hospital other than the patient's room. There was no statistically significant difference in either the TSS or EDSS. However, the TSS had a P score of 0.081 which indicated a tendency for stress to be reduced among participants. This preliminary finding, with consideration of the small sample size, may indicate an effect size and can be viewed as practical significance for application and further study. Results can be found in Table 4.4.

Table 4.4 – Kruskal-Wallis Nonparametric Analysis of Variance

	Total Symptom Score	*Emotional Distress Summary Score*
H	5.015	1.881
df	2	2
P	.081	.390

Participant behavior was recorded through inconspicuous observations. All patients were told to sit in a particular, predetermined spot upon entering the setting, and most chose to sit there the entire time. However, there were a few exceptions. In the Healing Garden Courtyard, five participants became actively engaged with their surroundings. Some simply walked around observing different areas of the garden. One interacted with another family that entered the garden. Two played with the water feature by running their hands through the water. And one participant became really engaged in the garden by touching and inspecting the plants along with engaging in the aforementioned activities. One participant's family (spouse and patient) came and joined them in the garden after the study had begun. The family then began to interact with the water feature and moved around the garden while engaging in conversation.

Behaviors observed in the Surgery Waiting Area and 2 North Family Lounge were quite different. Only one person in the Surgery Waiting Area got out of their seat to observe their surroundings, look out at the garden, browsed at artwork on the walls, or thumbed through books. Two participants sat starring outside the whole time while five sat and read a magazine or the newspaper.

Not a single person left their seat while in the 2 North Family Lounge to engage themselves with their surroundings. One participant did get up simply to reactivate the motion detection sensor when the light went off only to go back to their seat. Four sat reading a children's book or magazine, and two interacted with children playing near them. Four watched the television regardless of whether the show was in English or Spanish.

Many participants made positive comments after completing their time in the study, further leading the PI to believe that they experienced a decrease in their stress level. Most participants exclaimed that they just enjoyed being out of the room, while others stated excitement about their participation in the study. While walking into the Healing Garden Courtyard, one participant commented, “I’m excited to go to the garden. I haven’t been there yet.” Another participant who was assigned to the Surgery Waiting Area stated after their participation in the study, “It’s different when you’re not waiting for someone; it makes it better.” A final participant assigned to the 2 North Family Lounge said that they “enjoyed getting out of the room and seeing something different.”

5. DISCUSSION

From the data presented, participants experienced a greater decrease in stress when sitting in the Healing Garden Courtyard than when in either of the interior spaces, which was in accordance with the hypotheses. Because the Healing Garden Courtyard has adequate seating and shade, was wheelchair accessible, and provided pleasant distractions, parents were able to get out of the patient's room and take time to relax. The findings of this study suggest that parents in waiting should be encouraged to take their patient and/or well-children outside as well if they are able to go. This may provide a sense of normalcy among all parties as well as adding an element of play to their time in DCMC.

Although no statistical significance was found in this study between the two interior spaces, the descriptive statistics of the TSS and EDSS indicated that the Surgery Waiting Area reduced stress among participants greater than the 2 North Family Lounge, also in accordance with the hypotheses. The behavior of participants in both interior spaces reflected the hypotheses as well.

The commentary by all participants, regardless of what area they were assigned to, indicated that most parents were just bored, looking for a change of scenery, and something to stimulate their senses. Just getting out of their patient's room was enough for them to feel a sense of relief.

5.1 Limitations

There were several limitations to the study; the major one being the weather. DCMC is located in Central Texas and the study was conducted during the fall when weather can often times have unpredictable fluctuations in temperature and condition. Second, many parents were not be too keen on leaving their child "unattended" in a hospital room. Parents may have become distracted or experienced an increase in their stress levels by wondering if their child was alright or if they would have missed an opportunity to speak with the doctor if they had come by while they were participating in the study. And finally, many of the patients did not have parental visitors during the times that the PI is in the hospital. This may say something about the population of parents that were at the hospital while the study was being conducted. The parents may be in a higher socioeconomic class or have jobs that allow them to take off time at work to be with their child.

Other limitations to the study included language barriers. Many of the patients and family members that come to DCMC only spoke Spanish. As the PedsQL and informed consent letter were only printed in English, this cut out many other potential participants who did not speak or read English.

5.2 Future Studies

Studies done to expand the idea of healing gardens having an effect on the stress levels of parents of pediatric patients can be done in several ways. First, a larger sample size should be studied. Second, studies should extend the participant base to include

staff members and adult visitors of patients, which may include extended family and friends. People who are waiting in the Emergency Room may be included as well. Additionally, the number of men represented in the study was low, and it was observed by the PI that more men turned down participation in the study than did women. Third, data collection should be extended to the entire week and to different seasons. Fourth, with the changing demographics of the United States, surveys and other data collection materials should be in Spanish as well as English. Fifth, the addition of open-ended questions at the end of the survey would provide further insight into what the participants were thinking and why they may have marked the survey the way they did. Sixth, researchers should take a Child Life Specialist or volunteer along with them when approaching participants. Many parents were hesitant to leave their child in the hospital room without supervision to participate in the study. Finally, expanding the study to include oral swabs of each participant to test cortisol levels in the body would add some hard evidence to changes in stress levels besides the participant's perceived changes indicated on the PedsQL.

6. SUMMARY

In summary, parent participants indicated greater reductions in stress when seated in the Healing Garden Courtyard. Several participants indicated a sense of relief in simply leaving their patient's room and experiencing something different. While the interior spaces indicated slight reductions in the stress levels of participants, neither the Surgery Waiting Area nor the 2 North Family Lounge spaces made a significant impact. However, further studies are encouraged to investigate the change in stress by participants.

REFERENCES

Berry, L., Parker, D., Coile, R., Hamilton, D., O'Neill, D., and Sadler, B. (2004). The business case for better buildings. *Frontiers of Health Services Management 21*(1),3-24.

Bishop L. and Griffin C. (2006). Holistic healing methods positively advanced patient care. *Nursing Management 37*(7),31-35.

Coiles, R. (2001). Healing environments: Progress toward "Evidence-Based Design". R*uss Coiles Health Trends 13*(11),8-12.

Cooper Marcus, C. (2005). Healing gardens in hospitals. Retrieved November 2, 2007, from http://www.idrp.wsu.edu/Invited_files/Clare%20Cooper%20Marcus%20--%20Healing%20Gardens%20August%2029%202005.pdf

Garrard, J. (2007). *Health Sciences Literature Review Made Easy: The Matrix Method*, (2nd ed.). Boston: Jones and Bartlett Publications.

Heath, Y. (2004). Evaluating the effect of therapeutic gardens. *American Journal of Alzheimer's Disease and Other Dementias 19*(4),239-242.

Sherman, S., Varni, J., Ulrich, R., and Malcarne, V. (2005). Post-occupancy evaluation of healing gardens in a pediatric cancer center. *Landscape and Urban Planning 73*,167-183.

Sherman, S., Sarajane, E., Burwinkle, T., and Varni, J. (2006). The PedsQL present functioning visual analogue scales: Preliminary reliability and validity. *Health and Quality of Life Outcomes 4*(75). Available at http://www.hqlo.com/content/4/1/75.

Toone, T. (2007). Pediatric hospital healing garden use among patients, family members and staff: A systematic review. Health 605 with Dr. Patricia Goodson, Spring 2007, Texas A&M University, College Station.

Ulrich, R. (1999). Evidence based environmental design for improving medical outcomes. Retrieved November 15, 2007, from http://www.swiz.nl/evidence_based_design_ulrich.pdf

Ulrich, R. (2006). Essay - Evidence-based health-care architecture. *Lancet 368*,S38-S39.

Whitehouse, S., Varni, J., Seid, M., Cooper Marcus, C., Ensberg, M., Jacobs, J., and Mehlenbeck, R. (2001). Evaluating a children's hospital garden environment: Utilization and consumer satisfaction. *Journal of Environmental Psychology 21*(3),301-314.

APPENDIX A: INFORMED CONSENT FORM

Texas A&M University
Department of Health and Kinesiology

Healing Garden Use in Pediatric Hospitals

Traci Toone
(512) 694-8990
ttoone@aggienetwork.com

Dr. B.E. Pruitt
(979) 845-3503

I am a student at Texas A&M University, and I am conducting a study for my graduate thesis. I am researching the use of healing gardens and other waiting areas in pediatric hospitals.

During this study, you will be asked to sit in one of three designated areas on the hospital grounds for ten minutes. Before and after sitting in the designated area, you will be given a short questionnaire. If there are any questions on the questionnaire that you would rather not answer or that you do not feel comfortable answering, please say so or refrain from answering the question. Participation in the study should take no more than 20 minutes.

All the information will be kept confidential. I will keep the data in a secure place. Only I and the faculty supervisor mentioned above will have access to this information. Upon completion of this project, all data will be destroyed or stored in a secure location.

Participant's Agreement:
I am aware that my participation in this study is voluntary. I understand the intent and purpose of this research. If, for any reason, at any time, I wish to stop the study, I may do so without having to give an explanation.

The researcher has reviewed the individual and social benefits and risks of this project with me. I am aware that the data will be used in a graduate thesis that will be publicly available on the Texas A&M University campus and may be published in a scholarly journal. I have the right to review, comment on, and/or withdraw information prior to the graduate thesis submission. The data gathered in this study are confidential with respect to my personal identity unless I specify otherwise.

If I have any questions about this study, I am free to contact the student researcher or the faculty advisor (contact information given above). If I have any questions about my rights as a research participant, I am free to contact the director of the Institutional Review Board (IRB) of Texas A&M University, Angelia Raines: araines@vprmail.tamu.edu, 979-847-9362; or I may contact the chair of Brackenridge Hospital IRB, Sharon Horner: 512-324-7911.

I have been offered a copy of this consent form that I may keep for my own reference.

I have read the above form and, with the understanding that I can withdraw at any time and for whatever reason, I consent to participate in today's interview.

_____ _____

Participant's signature Date

_____

Interviewer's signature

APPENDIX B: PedsQL PRESENT FUNCTIONING VISUAL ANALOG SCALE

PARENT SELF-REPORT

ID#: _____
Date: _____

PedsQL™

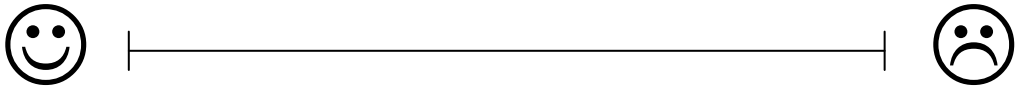
Present Functioning Module

Parent Self-Report

DIRECTIONS

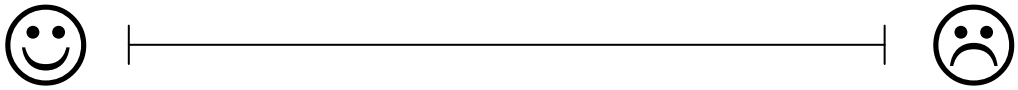
Please put a mark on each line that best shows **how you feel now**. If you have no problem and feel fine, put a mark at the end of the line by the happy face. If you have some problems and do not feel that well, put a mark near the middle of the line. If you feel very bad or have lots of problems, put a mark by the sad face.

1. I feel anxious



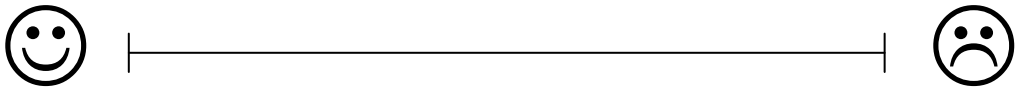
Not anxious — **Very anxious**

2. I feel sad or blue



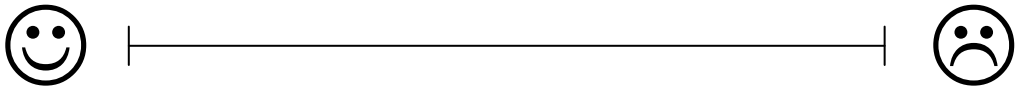
Not sad
Not blue — **Very sad**
Very blue

3. I feel angry



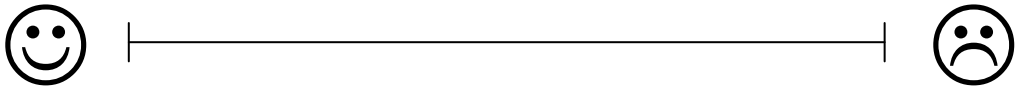
Not angry — **Very angry**

4. I worry about what will happen to my child



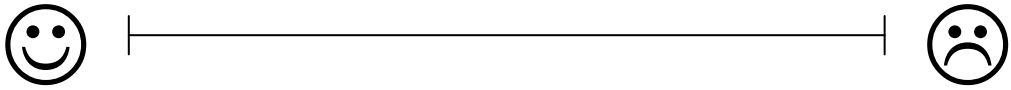
Not worried — **Very worried**

5. I feel tired



Not tired **Very tired**

6. I feel pain or discomfort



No discomfort
No pain

Very Uncomfortable
Severe Pain

PedsQL 3.0 Hospital Healing Environment - Parent 07/02

VITA

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