

An Evaluation of the Healing Environment

Children's Convalescent Hospital, San Diego

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The realization that the hospital environment may affect the health and wellbeing of patients and their families has attracted renewed interest in the medical literature as healthcare providers and administrators have sought to differentiate their services in an increasingly competitive healthcare marketplace (Friedrich, 1999; Horsburgh, 1995; Voelker, 1994). The potential that pleasant, user-friendly facilities will attract patients and improve their healthcare satisfaction has been advocated as a marketing strategy in the healthcare industry (Egger, 1999; Hutton & Richardson, 1995). Additionally, healthcare providers, architects, landscape designers, and hospital administrators, among others, have come to believe that the hospital environment can affect the mood, stress level, and perceived overall health of patients and families (Ulrich, 1991). With the renewed focus on the healing potential of the hospital built environment, i.e., the color, light, sound, texture, and other structural-design aspects of the facility, empirical documentation of the putative restorative aspects of the built environment on the healing process has been strongly advocated (Ulrich, 1991).

A relatively small number of peer-reviewed journal empirical studies have investigated the putative healing potential of hospital designs hypothesized to be sensitive to health outcomes and patients' perceptions of the built environment (Rubin, Owens, & Golden, 1998). A landmark study found that 23 patients in rooms with windows looking out on a small stand of trees stayed for fewer postoperative hospital days, received fewer negative evaluative comments in nurses' notes, and took fewer potent analgesics than 23 matched patients in similar rooms with windows facing a brown brick building wall (Ulrich, 1984). Although patients were not ran-

domized to room conditions, they were matched for a number of variables, including age, gender, smoker or nonsmoker, obese or normal weight, general nature of previous hospitalization, year of surgery within 6 years, hospital floor, and a common type of gall-bladder surgery. A review of the extant literature published in 1998 reveals only a small number of programmatic, scientifically rigorous investigations since 1984 to further support these initial findings utilizing the standards of the randomized, controlled clinical trial (Rubin et al., 1998).

Consistent with the growth of the consumer movement within healthcare, there has been a strong and growing advocacy to measure patient satisfaction with the built (physical) environment of healthcare facilities (Pattison & Robertson, 1996; Pilpel, 1996). However, empirical efforts have been few, and relatively inconclusive (Rubin et al., 1998).



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Dr Kurtin is a board-certified adult and pediatric nephrologist. His interests in clinical medicine focused on quality of care and outcomes assessment and management. As Vice President for Clinical Innovations and Director of the Center for Child Health Outcomes at San Diego Children's Hospital, he has continued to focus on evaluating and improving the effectiveness of clinical programs. Dr Kurtin is responsible for the development, implementation, and monitoring of clinical pathways. He is also involved in designing disease-management programs which enhance clinical quality.

What has been generally lacking in the extant literature has been the development of measurement instruments to assess patient, family and staff perceptions of the built environment with a scientifically valid methodology. In essence, what has been missing in large part is the first step in research and evaluation, that is, the development of reliable and valid outcome measures that assess perceived health status and satisfaction with the healthcare environment. Too often, measures are developed without following the measurement instrument design and evaluation methodologies described in detail in the psychological assessment and survey research literatures (Aday, 1996; Fowler, 1995; Schwarz & Sudman, 1996; Varni, Seid, & Kurtin, 1999).

Consequently, the objective of this initial report is to present the development of a family of tailored measurement instruments designed to evaluate the healing environment of Children's Convalescent Hospital. We describe the instrument-development methodology utilized, the descriptive statistics from the initial field trial, initial reliability and validity of the measurement instruments, and the healing environment predictors of parent healthcare satisfaction and staff satisfaction with co-worker relationships.

Method

• Facility

The Children's Convalescent Hospital (CCH) located on the campus of Children's Hospital and Health Center, San Diego, has been in existence for over 30 years. It is a licensed 59-bed long-term skilled nursing facility dedicated to the care of medically fragile children with complex chronic conditions, such as severe cerebral palsy and birth defects. It serves as home to the children who reside there, giving them opportunities to attend school, participate in activities, and receive specialized services. The existing facility presents many functional problems as it was originally designed to serve adult convalescent hospital patients. Therefore, the decision

was made to build a new facility.

In preparation for the design, construction, and post-occupancy evaluation of the new Children's Convalescent Hospital, we conducted focus groups and developed a family of interlinking measurement instruments tailored to quantify and characterize the built environment of the existing facility.

• Participants

Participants were the parents of children who were residents of the Children's Convalescent Hospital (CCH) and the staff at CCH. The children who were residents of CCH were not included as participants in the study given the extreme severity of their chronic health conditions. Medically fragile children with complex chronic conditions are generally characterized as significantly developmentally disabled. Their severe and/or multiple disabilities typically include limited speech and communication, significant cognitive impairment, difficulty in physical mobility, substantial sensory losses, and they require extensive support in the major activities of daily living (National Information Center for Children and Youth with Disabilities, 1999). Consequently, the residents of CCH were not developmentally able to be participants in the focus groups or to be respondents in the survey research protocol.

• Procedure

The measurement instruments were designed in close collaboration with the stakeholders involved with the existing and planned facility, which included parents, staff, and senior management, and were integrated into the PedsQL™ Measurement Model (Varni, Seid, & Rode, 1999). The PedsQL™ (Pediatric Quality of Life Inventory[®]) consists of generic core scales measuring health-related quality of life (HRQOL), and tailored modules designed to be integrated with the core instrument. The modules developed for this study followed the PedsQL™ Module Development MethodologySM, based on the instrument-development litera-

ture (Aday, 1996; Fowler, 1995; Schwarz & Sudman, 1996), which consists of a review of the extant literature, key stakeholder focus groups and individual focus interviews, survey item generation, cognitive interviews, pre-testing, and subsequent field testing of the new measurement instrument in the target population.

- *Focus Group Methodology*

Focus groups were conducted separately for the parents and staff at CCH. Eleven parents participated in the parent focus group, and 26 staff participated in the staff focus group. The PedsQL™ Focus Group MethodologySM was followed. Specifically, focus groups have long been widely utilized as a methodology for developing items for standardized questionnaires (Fowler, 1995; Sudman, Bradburn, & Schwarz, 1996). Focus groups generate qualitative data that provide insights into the attitudes, perceptions, and opinions of participants solicited through the open-ended question and answer protocol (Kruger, 1994). Focus group interviews help the researcher discover the vocabulary and the thinking patterns of the target group prior to the development of quantitative standardized items for survey questionnaires. Focus groups also alert researchers to issues that might have otherwise been missed. Once the focus groups were completed, we then proceeded to develop the items based on the PedsQL™ Module Development MethodologySM.

- *Generation of Items*

Items were generated from a review of the extant literature, the parent and staff focus groups' coded qualitative information, and discussions with healthcare providers at CCH and senior management. Items were organized into scale domains based on the conceptualization of the healing environment and included all aspects of the healthcare built environment and healthcare satisfaction.

- *PedsQL™ Measurement Instruments*

- *PedsQL™ Healing Environment*

- *Modules*

The instructions for the parent surveys asked the respondents to "Please answer the following questions telling us how happy you are with the structure, services, and overall facility at Children's Convalescent Hospital. Please tell us how happy you are with each item by circling: 0 if you are never happy, 1 if you are sometimes happy, 2 if you are often happy, 3 if you are almost always happy, and 4 if you are always happy." N/A (not applicable) was also provided as a response option. The instructions for the staff surveys were similar, using the same 5-point Likert scale response categories with the N/A option.

The scales of the 21-item *PedsQL™ Healing Environment Module – Parent Survey* included 14 items measuring *Structure* (e.g., "The number of private areas where you can be with your child."; "The parking that is available."; "The amount of closet space in your child's room."), 4 items measuring *Facility Aesthetics* (e.g., "The amount of natural light [i.e., from windows] in the Convalescent Hospital."; "The decoration of the interior of the Convalescent Hospital."), and 3 items measuring *Services* (e.g., "The kinds of sensory experiences [i.e., things your child can touch, see, and hear] provided for your child").

The scales of the 50-item *PedsQL™ Healing Environment Module – Staff Survey* included 18 items measuring *Structure* (e.g., "The size of the residents' showers."; "The size of doorways to accommodate wheelchairs."; "The space available for wheelchairs or other equipment."; "The size of the dining room."; "The wheelchair ramps."; "The size of the staff break room."; "The space available for wheelchairs or other equipment."). *Facility Aesthetics* was measured by 11 items (e.g., "The colors of the walls."; "The pictures in the hallways."; "The visual stimuli [i.e., fish tanks, interactive wall art]."; "The lighting in the facility."; "The furniture in the facility."; "The windows."). *Work Environment* was measured by 21 items (e.g., "The availability of

personal storage space.”; “Access to employee restrooms.”; “The availability of staff break rooms.”; “Privacy to make sensitive phone calls.”; “; “Storage for medical supplies.”).

- *PedsQL™ Healthcare Satisfaction Module*

The scales of the 27-item *PedsQL™ Healthcare Satisfaction Module – Parent Survey* were tailored for the Convalescent Hospital from our previous Pediatric Hematology/Oncology Parent Satisfaction survey (Varni, Quiggins, & Ayala, in press), and included 6 item measuring *Information* (e.g., “How much information is provided to you about your child’s overall health condition.”), 4 items measuring *Inclusion of Family* (e.g., “The sensitivity shown to your family during your child’s stay at the Convalescent Hospital.”) 3 items measuring *Technical Skill* (e.g., “How quickly the staff responds to your child’s health needs.”), 7 items measuring *Communication* (e.g., “How well the staff listens to you and your concerns.”), 4 items measuring *Emotional Needs* (e.g., “How well the staff responds to your child’s emotional needs.”), and 3 items measuring *Overall Satisfaction* (e.g., “The overall care your child is receiving.”).

- *PedsQL™ Staff Satisfaction Scale – Co-Workers*

The *PedsQL™ Staff Satisfaction Scale – Co-Workers* was measured by 4 items at the end of the Staff Healing Environment Module (e.g., “The relationship you have with your co-workers.”).

- *Mail Survey Methodology*

The newly developed *PedsQL™* parent and staff surveys were mailed to 59 parents and 99 staff. The *PedsQL™* Mail Survey MethodologySM was followed in mailing the measurement instruments to the parents and staff of the CCH. The 5 steps of the *PedsQL™* Mail Survey MethodologySM are based on the survey research literature (Fowler, 1993; Salant & Dillman, 1994), and include: 1) mail the *PedsQL™* survey instrument and initial cover letter to selected recipients; 2) mail a reminder postcard 7 to 10 days later; 3) mail the *PedsQL™* survey instrument again and second mailing cover let-

ter 1 to 2 weeks after sending the reminder postcard to all nonrespondents; 4) utilize a telephone reminder call approximately 3 weeks after the initial mailing to all nonrespondents; and 5) offer nonrespondents the option of a telephone interview at the 3-week reminder call.

Forty parents completed the *PedsQL™* parent survey, representing a 68% return rate. Seventy-two staff completed the *PedsQL™* staff survey, representing a 73% return rate.

- *Statistical Analysis*

Descriptive statistics on the item and scale means, standard deviations (SD), and range of measurement were computed. Scale internal consistency reliability was determined via Cronbach’s coefficient alpha (Cronbach, 1951). A reliability of ≥ 0.70 is recommended to compare groups of patients, whereas a reliability of ≥ 0.90 is recommended for comparing individuals (Nunnally & Bernstein, 1994). Initial scale construct validity was determined by examining the associations between the hypothesized built environment predictors of parent and staff satisfaction. Computing hypothesized inter-correlations among the scales provides initial information on the construct validity of the instrument (Pedhazur & Schmelkin, 1991). Statistical analyses were conducted utilizing SPSS 8.0 for Windows (SPSS, 1998). The 5-point (0-4) Likert scale for the response categories was linearly transformed into a 0-100 scale to facilitate interpretation of the results, with higher scores indicating greater satisfaction.

Results

- *Descriptive Statistics*

Parents were generally happy with the Structure (Mean = 74; SD = 25; Minimum = 0; Maximum = 100) and Facility Aesthetics (Mean = 77; SD = 24; Minimum = 0; Maximum = 100) of the existing CCH. Staff were generally not happy with the Structure (Mean = 30; SD = 22; Minimum = 0; Maximum = 100), Facility Aesthetics (Mean = 38; SD = 23; Minimum = 0; Maximum

= 100), and Work Environment (Mean = 33; SD = 22; Minimum = 0; Maximum = 100) of the existing CCH.

Parents were very happy with the overall healthcare provided (Mean = 92; SD = 13; Minimum = 50; Maximum = 100). Staff were happy with their relationships with co-workers (Mean = 61; SD = 25; Minimum = 13; Maximum = 100).

- *Internal Consistency Reliability*

Cronbach's alpha internal consistency reliability coefficients for the PedsQL™ instruments were mostly in the .85-.90 range, supporting the initial reliability of these newly-developed scales.

- *Construct Validity*

The intercorrelations among the scales of the PedsQL™ instruments measuring the built environment with parent healthcare satisfaction and staff co-worker relationship satisfaction were hypothesized to demonstrate a predictive relationship, with higher satisfaction with the built environment predictive of higher parent healthcare satisfaction and staff co-worker relationship satisfaction. Parent satisfaction with the structure and facility aesthetics of the existing CCH was associated with higher overall healthcare satisfaction ($r = 0.54$; $p = 0.001$ for both). Staff satisfaction with the structure of the existing CCH was associated with higher co-worker relationship satisfaction ($r = 0.53$; $p = 0.001$). Staff satisfaction with the facility aesthetics ($r = 0.51$; $p = 0.001$) and work environment ($r = 0.45$; $p = 0.001$) were similarly associated with higher co-worker relationship satisfaction.

- *Changes in Design*

Based on the findings from the focus groups and the mailed surveys, the planned Children's Convalescent Hospital has undergone a number of significant design changes to address the responses of the key stakeholders of the existing facility. For instance, patient room size and layout, including the size of the closets, the

amount of natural lighting, and the bathroom facility accommodations, have been redesigned to meet key stakeholders feedback. Other design changes are pending as the data are further analyzed.

Discussion

The results of this study provide initial support for the measurement properties of the newlydeveloped PedsQL™ Healing Environment Modules and the PedsQL™ Healthcare Satisfaction Module tailored for the Children's Convalescent Hospital evaluation. The findings demonstrate that it is feasible to quantify and characterize the qualitative aspects of the healing environment using standardized instrument development methodologies.

It is vital to empirically document the impact of the built environment on patient health and wellbeing given the rising demands on healthcare resources, and the need to allocate these scarce resources in the most cost effective manner. These analyses illustrate the potential of employing scientific methods in the empirical evaluation of the healthcare built environment, and may help inform design decision-making.

Summary

Parents and staff are key stakeholders and critically important informants in the design of pediatric healthcare facilities. Their perceived needs for and satisfaction with the built environment can be rigorously, reliably, and validly assessed. The development of standardized measurement instruments allows for the comparison of different facilities' ability to meet the needs of its key stakeholders. The ability to compare leads to the ability to discover and share best demonstrated practices in the design of healthcare facilities. The use of best-demonstrated practices can lead to the continuous improvement of healthcare design. The planned Children's Convalescent Hospital will be a better facility than originally designed due the

quantitative input of its key stakeholders.

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