KEY POINT SUMMARY

OBJECTIVES

This study sought to examine the affect of the objective built environment through perceived built environment satisfaction on physical and psychosocial outcomes and healthcare satisfaction in pediatric hematology-oncology patients and their parents.

Quantifying the Relationship Among Hospital Design, Satisfaction, and Psychosocial Functioning in a Pediatric Hematology-Oncology Inpatient Unit

Key Concepts/Context

Prior research has shown that healthcare satisfaction and physical and psychological outcomes in adults are affected by the built environment. Research has also suggested that perceived built environment satisfaction acts as a mediator between the objective built environment and healthcare satisfaction and health-related quality of life in adults. However, minimal research has been conducted to understand these concepts within the pediatric population.

Methods

For this study, the objective built environment was assessed using a built environment checklist. The built environment checklist was methodologically exploratory and conceptually driven through literature and expert consultation to include features within the patient room that have been shown as having potential health effects. The checklist quantified the absence or presence of the following considered features to generate the Built Environment Sum aggregate: window, visitor sleep, dimmer, bathroom, bathroom features, sink, color design, overhead light, bed light control, bed light settings, television, VCR, storage, thermostat control, and booster switch. Each raw score was then converted into a z-score that was then summed to create the Built Environment Sum variable. For the SEM analysis, the Built Environment Sum aggregate was combined with room size and nature features to develop the Built Environment latent variable.

To assess built environment satisfaction, the PedsQL Hospital Healing Environment Modules were used. The modules contain both a parent report (for children ages 2-18) and pediatric patient report (ages 8-18), and consisted of the following three subscales: (1) satisfaction with the built environment of the patient's room (18

DESIGN IMPLICATIONS

This research suggests that functioning, mood, and perceived quality of care for parents of hospitalized children can be enhanced by improvements in design features that are placed in the patient room. This research indicates that when considering improvements design features intended to increase perceived control over the hospital room could greatly increase both parental and patient satisfaction. Consideration should also be given to incorporating design features that can assist in creating a more restful ambiance within the patient room of pediatric hospitals, as both parents and children reported tiredness as the greatest stressor impacting Present Functioning.

items); (2) satisfaction with control over the built environment of the patient's room (3 items); and (3) satisfaction with the built environment of the overall hospital (21 items for parents, 18 items for children). For each item the self-report questionnaire asks, "How happy are you with…" each item. Responses are rated on a 5-point scale with "not applicable" (N/A) as an option. Scores for the subscales and total score were obtained by dividing the total for a given scale by the number of items completed for that scale (if at least 50% of the questions in that subscale had been answered).

Outcomes associated with present functioning of both parents and patient were collected using the PedsQL Present Functioning Scales (PFS), which rate the following six items in the present moment: (1) anxiety, (2) sadness, (3) anger, (4) worry, (5) tiredness, and (6) pain. For the Child and Teen Self-Report, nausea is added. Visual analogue scales, 100 mm lines anchored at one end with a happy face and at the other end with a sad face, are used to answer each question. Participants are directed to, "Please put a mark on each line that best shows how you feel now." The location of the mark is then measured in millimeters (0-100). Lower scores represent less dysfunction. Calculating the mean of the following items generates the Emotional Distress Summary Score: anxiety, sadness, anger, and worry. Likewise, calculating the mean of all scores generates the PFS Total Symptom Score.

The positive and negative affect for patients and parents was measured through a self-report measure called the Positive and Negative Affect Schedule (PANAS). This 20-item questionnaire addresses positive and negative affect as separate factors by allocating 10 questions to positive affect and 10 questions to negative affect. Participants are asked the extent to which they are experiencing each mood state "right now." The extent to which they are experiencing a particular mood is rated using a 5-point scale, with 1 = very slightly or not at all to 5 = extremely. Positive affect includes mood states such as active, enthusiastic, excited, interested, proud, and strong, while negative affect includes mood states such as afraid, distressed, guilty, irritable, nervous, and scared.

To assess parents' satisfaction with the healthcare their child is receiving, the PedsQL Healthcare Satisfaction Module was used. This self-report measure for parents contains 24 items in the following six scales: (1) information (5 items); (2) inclusion of family (4 items); (3) communication (5 items); (4) technical skills (3 items); (5) emotional needs (4 items); and (6) overall satisfaction (3 items). A 5-point scale is used to determine "How happy" parents are with each item. From this scores are linearly transformed to a 0-100 scale. Higher scores indicate greater satisfaction.

All self-report measures contained both Spanish and English versions. Preliminary analysis consisted of basic descriptives for all measures and calculating scale internal consistency reliabilities through Cronbach's coefficient alphas. Assessment of the model fit was conducted using the root mean square error of approximation

(RMSEA) and the comparative fit index (CFI). After determining the model fit was good, the relationship between observed variables and latent variables, and the relationship between latent variables was evaluated for magnitude and significance. All analysis was conducted using EQS software.

Participants for this study included 90 pediatric hematology-oncology patients who were at least 21 days post-diagnosis, were not in acute medical crisis, and were currently hospitalized at a large children's hospital in Southern California, as well as 149 parents of pediatric hematology-oncology patients.
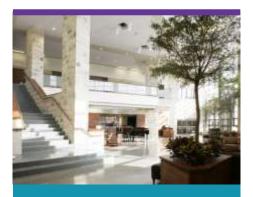
Findings

For this study the mean age of the child was 12.4 years, with more boys participating than girls. The most prevalent diagnosis was leukemia, followed by solid tumors. Over half of the patients who participated were Latino, and the majority of patients came from lower-middle-class families. Length of hospitalization and time since diagnosis varied greatly among patients who participated.

Results from the patient surveys revealed Built Environment Satisfaction to be moderate, with children reporting lowest satisfaction with Perceived Room Control and highest satisfaction with Hospital Built Environment. Children reported low levels of distress on the Present Functioning Scales and Negative Affect, while they reported moderate levels of Positive Affect. However, when the scores were placed into the structural equation models, no direct relationship was seen between the Objective Built Environment or Built Environment Satisfaction and Present Functioning or Affect. However, a statistically significant relationship was seen between the Objective Built Environment and Built Environment Satisfaction. These results indicate that while patient rooms containing more "beneficial" features did increase satisfaction with the built environment, that satisfaction did not impact Present Functioning, Positive Affect, and Negative Affect.

Of the parents who participated, the majority were women who represented a child with the mean age of 9.67 years. Consistent with the child demographic statistics, more parent participants represented boys than girls, and the most prevalent diagnosis for the children represented was leukemia, followed by solid tumors. Ethnicity and economic status were also consistent with patient demographics.

Parent ratings also reported moderate levels of Built Environment Satisfaction, with Hospital Built Environment receiving the highest satisfaction. However, parents reported almost equal ratings for Perceived Room Control and Room Satisfaction. Parents reported moderate levels of distress on the Present Functioning Scales. Results from the Negative Affect reported low levels, while moderate levels were seen for Positive Affect. Healthcare Satisfaction ratings were overall high, with the Emotional Needs subscale reporting a comparatively lower score. Results from the structural equation models revealed no direct relationship between the Objective

The Center for Health Design:
Moving Healthcare Forward

The Center for Health Design advances best practices and empowers healthcare leaders with quality research that demonstrates the value of design to improve health outcomes, patient experience of care, and provider/staff satisfaction and performance.

Learn more at
www.healthdesign.org

Built Environment and Present Functioning, Negative Affect, and Healthcare Satisfaction. A statistically significant relationship was seen between the Objective Built Environment and Positive Affect. However, the relationship moved in the opposite direction hypothesized. These findings suggest that for parents, more "beneficial" features in the patient room are associated with lower Positive Affect. Consistent with the patient results, a statistically significant relationship was seen between the Objective Built Environment and Built Environment Satisfaction. However, unlike the patient results, significant relationships were seen between Built Environment Satisfaction and Present Functioning, Negative Affect, and Healthcare Satisfaction. The relationship was not significant between Built Environment Satisfaction and Positive Affect. These results indicate that Built Environment Satisfaction does act as a mediator between the Objective Built Environment and the HRQoL outcomes studied for parents of hospitalized children.

Limitations

This study has several limitations due to its methodologically exploratory nature. One limitation is its cross-sectional design using both objective and subjective measures. Due to the design, findings may only be considered as correlational, not causal. Another limitation is that some of the tools used in this study had not yet been tested or validated and were self-report. Self-report measures from children, while highly beneficial, are generally considered less reliable than adult report. Sample size, ethnicity, and location may also impact the generalizability of these findings. It is also important to recognize that this study took into account only the patient room, and that other areas such as play rooms, laundry facilities, and other family amenities within a pediatric hospital may also impact parent and child satisfaction within that environment.