



## KEY POINT SUMMARY

### OBJECTIVES

The objectives of the study were to adapt the Perceived Hospital Environment Quality Indicators (PHEQIs) through the examination of the factor structure, the internal reliability, and to validate and shorten the PHEQIs scales to provide a tool for architects, designers, and facility managers to evaluate the hospital physical environment.

## Users' views of hospital environmental quality: Validation of the Perceived Hospital Environment Quality Indicators (PHEQIs)

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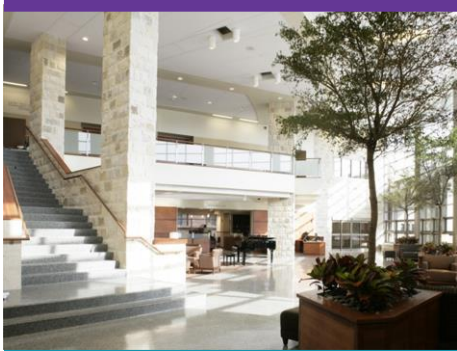
### Key Concepts/Context

The hospital physical environment has been researched for years but its impact on patient outcomes is still in need of validation. The perception of the medical facility as a “healing environment” rather than a “curing machine” is being adopted by new hospitals. Improved physical environments generate overall satisfaction with medical services. Therefore, it is important to have the users’ feedback to be able to evaluate quality improvements by architects, designers, and facility managers. This study examines the user’s perception of the hospital environment and how it can be measured using quality indicators that were developed in Italy and confirm the factor structure in a different cultural context, specifically at Portuguese hospitals.

### Methods

The study started with a literature review to show the importance of the patient’s perception of hospital facilities and its impact on health outcomes. It was hypothesized that the factor structures of PHEQIs scales would be replicated for factorial validity, internal consistency, reliability, and convergent and discriminant validity. In addition, it was assumed that PHEQIs had a correlation with the patients’ global evaluation of the environment and were sensitive enough to detect EQP (Environmental Quality Perception) differences between the users of different physical and spatial environments. As evidence for predictive validity, it was expected that patients and experts used for validation would rate the physical environment of older facilities lower compared to the newer facilities.

Orthopedic units at four hospitals with different spatial and physical conditions in Portugal were selected for the study; the original PHEQIs had been developed using a sample of users from an orthopedic unit. The selection criteria dictated using two



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newer and two older hospitals, and two general and two orthopedic hospitals. Two scales were used to evaluate the physical environment and one to evaluate the social environment. They were completed by 562 users at the four orthopedic units of the two newer and two older hospitals. The participants included 221 patients, 165 staff members, and 193 visitors, with 310 contacted in the inpatient area and 252 in the outpatient area. The total number of women was 372 and the median age of all participants was 48 years. Seventeen participants were not included in the study, without an explanation given by the authors.

The data was collected between October and December 2009 using a questionnaire for the users including patients, staff, and visitors. In addition, an observation grid was used by two architects for the technical evaluation of the hospital environment. The questionnaire had five sections, the first contained the most recent version of the PHEQIs scales which were updated by adding and removing several items depending on their relevance. The result was a version containing three scales: (a) Spatial-physical aspects of proximal external spaces including 16 items: (b) Spatial-physical aspects of the care unit and specific in/outpatient area including 36 items (c) Social-functional aspects of the care unit including 18 items. The items had a 5-point Likert-type scale corresponding to sentences on the environmental evaluation. Also included after each PHEQIs scale were three 10-point items to measure environmental global evaluation. The other sections had questions to measure the following: 1- Satisfaction with the care unit 2- Well-being 3- Familiarity with the hospital and with hospitals in general 4- Socio-demographics. The data was collected using a trained researcher and the participants were informed of the purpose and nature of the questionnaires. The users answered the questions in reference to their location; those who couldn't participate due to physical disability were interviewed instead. The experts' observation grid covered the same issues of the PHEQIs scales on the spatial-physical aspects of the hospitals except for the quietness dimension. The observation was done by two expert judges with architectural design backgrounds rating the items on a 5-point scale.

## Findings

The three scales indicated a predictable congruence that the users of the two newer hospitals reported more positive and higher scores than the users of the two older hospitals. The objective evaluations by the experts were higher for the newer hospitals, including inpatient and outpatient areas, and the external spaces, which were in agreement with the users' opinions. Scale 1, external space results, indicated a correlation between the experts and users as being positive and high, particularly with the upkeep, orientation, green spaces, and building aesthetics. Scale 2, care unit, inpatient and outpatient area evaluation, showed a correlation between the experts and users regarding spatial-physical comfort, orientation, views, and lighting. Scale 3, social functional features, showed evidence of



agreement in the evaluation between the physical and social environment. Overall the results pointed out that good and newer physical environments enhance EQP.

## Limitations

The study only included four hospitals, which was a limited number that weakened the test results and, in some cases, made the correlations not statistically significant. Furthermore, the questionnaire had problems and might have confused the participants because of the positive and negative wording of a number of items. Some questions were difficult to answer using the 0-4 scale such as “The view from the window has little interest”. The participants might have given a 0 instead of a 4 when they actually agreed. There was also an issue with the negatively worded items that might have emphasized a certain bias, thus reducing the validity of item responses. These issues need to be examined in future studies and in different cultural contexts to improve the interpretation of the items of the scales and confirm the reliability of PHEQIs.

## Design Implications

Having a tool to measure and evaluate hospital physical environments is important for architects and designers. The items evaluated were the following:

**External space scale** – Upkeep and care, orientation, green spaces, and building aesthetics.

**Inpatient area scale** – Spatial-physical comfort, orientation, quietness, and views and lighting.

**Outpatient area scale** – Spatial-physical comfort, orientation, quietness, and views and lighting.

**Social-functional features scale** – Privacy, care for social and organizational relationship.

The study pointed out that PHEQIs indicators can provide the following:

- 1- Inform future physical environmental interventions using information provided by the users.
- 2- Evaluate the success of a user-centered hospital design to satisfy the needs of the users.

It is hoped that this study and other future studies will help improve the design process and develop better hospitals through the users’ feedback.

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