



KEY POINT SUMMARY

OBJECTIVES

The objective of this study was to examine how daylight in patient rooms can impact ALOS in a hospital in Incheon, Korea.

Impacts of indoor daylight environments on patient average length of stay (ALOS) in a healthcare facility

Choi, J. H., Beltran, L. O., & Kim, H. S. 2012 | *Building and Environment*. Volume 50, Pages 65-75

Key Concepts/Context

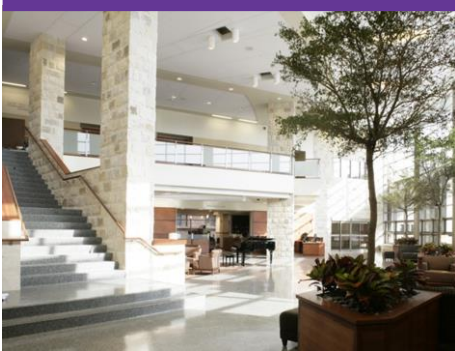
One of the components that increases the quality of the indoor environment in hospitals is window views with access to daylight. The orientation of a window can be significant to the amount of daylight a room can get. This study examined the indoor environments of patient rooms located on different sides of a hospital building to investigate the impact of daylight on the length of stay. The research found that the average length of stay (ALOS) was shorter in the rooms on the side of the building with longer hours of daylight and higher illuminance than in the rooms on the side receiving fewer hours of daylight and lower illuminance.

DESIGN IMPLICATIONS

Patient rooms may be designed with scope for maximum daylight. Rooms facing SE received two hours of more daylight than ones facing NW.

Methods

The methodology involved assessments and measurements of the patient rooms in terms of their geometry, indoor room surface reflectance, and transparency of blinds and glazing. For the study four floors were selected in the 18-story hospital building. The patient rooms selected were designed for single occupancy. There were 24 rooms that faced SE and 24 that faced NW. Large windows with blinds were designed into the exterior wall, allowing for direct/ indirect daylight. Patients with an ALOS of less than three days and those hospitalized more than two times were excluded from the study. RADIANCE lighting simulation models were used to assess seasonal variations in the daylight environment of the patient room. Illuminance meters were used for interior and exterior measurements. A luminance meter and a gray card were used to estimate reflectance of the walls, floor, ceiling and furniture. Data was recorded throughout the year and a total of 1167 patient data sets were collected. Data collected was grouped by orientation of patient room and room type (determined by patient's head position). Data was analyzed statistically using ANOVA and two-sample T tests.



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Findings

- Sky conditions and horizontal exterior illuminance were used to re-define the seasons: During spring (March, April, May, and June) and fall (August, September, and October), the exterior illuminance was between 20,000-30,000 lux. Summer (July), and winter (January, February, November, and December), the exterior illuminance was less than 20,000 lux.
- Reflectance on the different surfaces in all patient rooms was the same irrespective of the room type or orientation, although higher than the recommendations of IESNA.
- Amount of daylight in each room depended on room orientation. Rooms on the SE were brighter in the morning till about 1.30 p.m. Rooms on the NW were brighter from 1.30 p.m. till sunset.
- LR (glare) on the wall adjacent to the TV and between the TV and patient's eyes were in the recommended range of 40:1 and 10:1 and there was no significant difference in room orientations. Closing the blinds helped reduce the LR to moderate ranges between 10:1 and 15:1. LR was higher in the mornings in the SE and in the afternoons in the NW patient rooms. The SE rooms, however, had a higher chance of experiencing glare than the NW rooms.
- Overall illuminance in the SE rooms was about 150-250% higher than that in the NW-facing rooms. Illuminance was higher in the mornings in the SE-facing and in the afternoons in the NW-facing patient rooms, except during the rainy season.
- The duration of daylight in the SE rooms was longer by two hours.
- There was no significant difference in diversity of illuminance in rooms of each orientation. The overall DI was higher than the recommended range. Closing the blinds reduced the DI in all rooms.
- The average length of stay or ALOS in the SE rooms was shorter than in the NW rooms - this was statistically significant in the comparison of six sets of rooms (six SE and six NW).

Limitations

The authors identified the following as limitations of this study:

- The study did not take into consideration activities, frequency of going out/in, controlling blinds, and individual daylight preferences of patients.

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