SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

The objective of this study was to determine the effectiveness of built environment interventions in managing behavioral and psychological symptoms of dementia among residents in long-term care settings.

DESIGN IMPLICATIONS

Design interventions that require no changes in spatial networks could be used to either encourage or discourage interaction-related behaviors in ICUs. In other words, furniture, workstations, and equipment can be strategically placed to control levels and types of human activities in a given space.

Network of spaces and interaction-related behaviors in adult intensive care units

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Key Concepts/Context

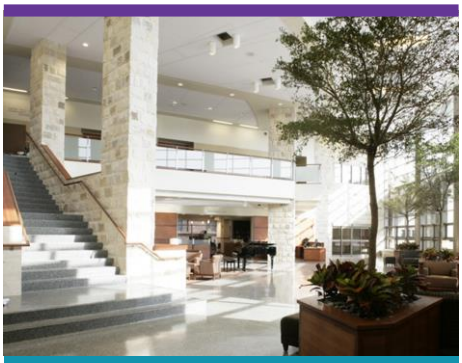
"Space syntax" considers a set of theories and methods for analyzing spatial configurations. Several recent studies focusing on space syntax reveal strong relationships between environmental behavior, psychology, and spatial network measures. One such study found strong correlations between the projected "integration values" of spaces, the frequency of nurses' interactions, and overall peer awareness in two different sections of a neurological intensive care unit (ICU). There is a lack of research offering theories that explain the effects of the network properties of spaces on psychological responses, behavior, and health in nursing units.

Methods

Research was conducted at four adult ICUs in two large hospitals located in metropolitan areas. The ICU types are: a 12-bed Coronary Care Unit (ICU-A), an eight-bed Cardiac Intensive Care Unit (ICU-B), a 14-bed Transplant Intensive Care Unit (ICU-C), and a 16-bed Cardiothoracic Surgical Intensive Care Unit (ICU-D).

Spatial analysis was conducted using visibility graph analysis (VGA) and angular segment analysis (ASA) to describe the network properties of the four ICUs in terms of environmental visibility and accessibility. Depthmap software was used for axial and node network analyses.

For network measures of space syntax, the variables of "integration" and "control" were used. The integration value of a node in a graph converts the mean depth value of the node into an algebraic function, resulting in the sum of the shortest distances between the node and all other nodes in the graph, divided by the total number of nodes minus 1. These values are summed for each receiving node to assign a control value to that node.



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160 rounds of behavioral observations were conducted during weekdays in the four ICUs. Generally, there were eight to 10 rounds of observations lasting about 20 to 30 minutes, all conducted during day shifts. Observations were made in locations that had the most areas of a unit visible with the least impact on unit activities. In total, 148 ICU spaces were viewed: 53 patient rooms, 19 nurses stations, 26 circulation spaces, and a miscellaneous remainder.

Findings

Analysis of the floor plans of each ICU revealed no differences based on node integration. ICUs A, B, and C were similar based on axial integration and node control. This is significant since each ICU is noticeably different in terms of size, composition, and shape. The study's hypothesis that the four ICUs would have similarities in spatial network properties describing environmental accessibility and visibility was confirmed. It was also confirmed that the distribution of interaction-related behaviors was different - for instance, "standing and interacting" behaviors were common in two areas in ICUs A and B while they were common in several areas in ICUs C and D.

Limitations

The authors identified several limitations within the study. Data was limited to who participated in observed interactions, where and how often they participated, and what they did. These observations exclude when, why, and for how long these interactions took place. The gender, education, age, and experience of observed subjects also were not taken into account.

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AIA Academy of Architecture for Health of the American Institute of Architects

ASHE American Society for Healthcare Engineering, A personal membership group of the American Hospital Association

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