SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

To review empirical literature while focusing on the design of operating rooms through the investigation of physical environmental features associated with staff and patient outcomes.

Safety, Performance, and Satisfaction Outcomes in the Operating Room: A Literature Review

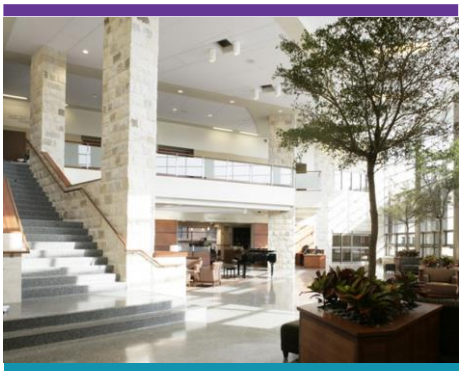
Joseph, A., Bayramzadeh, S., Zamani, Z., Rostenberg, B. 2017 | *Health Environments Research & Design Journal, Volume N/A, Issue N/A, Pages 1-14*

Key Concepts/Context

There are many operating rooms (ORs) constructed more than 30 years ago that remain operational today, and many of these spaces are inadequately designed to withstand the processes, equipment, and people needed for contemporary OR procedures. Even in developed countries, patients undergoing inpatient surgeries experience major complications 3-22% of the time. The World Health Organization suggested that half of these incidents could have been prevented. As healthcare technology continues to advance and larger demands are placed on ORs, data-driven guidance is needed so that best practices for OR designs can be developed and implemented.

Methods

This article reviews peer-reviewed research published from 1996 to 2015. Databases used for the search included PubMed, Google Scholar, ScienceDirect, Pro-Quest, and a university database. A total of 211 articles were chosen for final review. Keywords used in the search for relevant literature involved physical environmental factors, including: OR, operating theater, OR layout, OR size, door openings, noise levels, air ventilation, lighting, airflow, and traffic. Patient and staff outcomes such as infection rates, patient safety, surgical site infections (SSIs), medical errors, airborne infection, SFDs, slips, trips and falls, distractions, fatigue, stress, and staff efficiency were also included in the search.



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Findings

Results from the analysis of the literature were divided into six design categories: OR design, ventilation and air quality, acoustical environment, temperature and humidity, lighting, and materials. Inadequate amounts of space within ORs often resulted in inappropriate ergonomic conditions related to storage shortages, staff functions, adverse patient safety occurrences, general clutter, and improper zone proximities. A link between bacterial contamination in the OR and SSIs was not clearly established, but studies indicated that frequent door openings could contribute to higher SSI rates. No studies examining the impact of door designs or the number of doors on pathogen loads and airflow were found within the review. Key concerns for surgeons included surgical table height, monitor position, and mayo stand height, with monitor position being the most significant factor influencing performance and satisfaction. There was a deficiency of studies focusing on ventilation system designs and air quality factors impacting patient safety. Other general findings included a recurring need for noise reduction and better illumination control within OR environments.

Limitations

This paper presents a literature review, therefore no original quantitative or qualitative data were gathered. All literature reviewed in this study was published in English; including studies from non-English speaking locations could reveal a different variety of ergonomic needs within the OR environment.

Design Implications

Considerations for operation room (OR) design can vary from overall space planning to specific design features, such as tables with adjustable heights, easily maneuverable and highly visible monitors, adjustable lighting levels, or the number and type of doors leading to the OR. Designers might consider consulting with the healthcare personnel working within a given OR to better understand their specific needs so that optimal design improvements can be made.