



KEY POINT SUMMARY

OBJECTIVES

The objective of the study was to review research related to noise measurements in hospital environments via studies published from 2015 to 2020.

Environmental noise in hospitals: A systematic review

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Key Concepts/Context

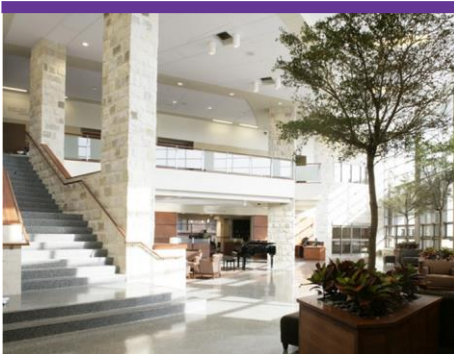
Noise in healthcare environments can aggravate patient health issues and impair the performance of healthcare professionals. The World Health Organization (WHO) has suggested that hospital sound levels should not exceed 35 decibels during the day and 40 decibels at night. This systematic review of the literature found that equivalent sound pressure levels (or L_{eq}) in hospital environments often exceed that recommendation, ranging between 37 and 88.6 decibels during the day, and between 38.7 to 68.8 decibels at night.

Methods

The Scopus, Web of Science, and ScienceDirect databases were searched to identify articles published between 2015 and 2020 that related to noise in hospitals. Additional requirements for inclusion were being written in English, being research articles (not technical and review notes), and is linked to the keywords “noise” and “hospital.” Studies were excluded if the methods involved the use of class 2 equipment instead of class 1 equipment (classes of equipment were not defined by the authors) or noise dosimeters (which only measure the noise dose for individual exposure). Articles were also excluded if they focused on noise from imaging equipment or did not align with the study objective (i.e. if they did not measure sound pressure levels in healthcare environments).

Findings

The researchers learned that most of the studies published were included in journals covering medicine, engineering, environmental sciences, acoustics, and nursing and that most of the people writing the articles published worked in architecture, engineering, medicine, and nursing. Studies were primarily done in Europe, the Americas, and Asia. Reference value sound levels used were those recommended by the World Health Organization (not exceeding 35 decibels during



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the day or a maximum of 40 decibels during the night). The L_{eq} (equivalent continuous sound levels) measurements in hospital environments had daytime ranges from 37 to 88.6 dB(A) and nighttime spans from 38.7 to 66.8 dB(A). L_{eq} values for outdoor noise were 74.3 (daytime) and 56.6 (nighttime) dB(A). Measurements were mainly taken inside hospitals, and studies tended to focus on more sensitive departments such as intensive care units (ICUs).

Limitations

The authors note that some studies included in the review do not include enough information for other researchers to reproduce the methods or review the analysis, making it difficult to confirm the validity and quality of the findings. They also mention how difficult it is to compare results among studies, because of the range of tools and methods used for measuring noise. The authors suggest the need for a standardized method for noise studies in healthcare environments.

Design Implications

Findings from the literature point to design implications for both the interior and exterior of hospitals and even implications at a larger urban scale (e.g., how tires and paving impact traffic noise near hospitals). Noise reduction measures within hospitals include using sound-absorbing materials, using architectural elements that provide sound barriers, and quieter equipment. The authors recommend that future research address the need for guidelines for noise reduction in healthcare facilities.

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