SYNOPSIS

KEY POINT SUMMARY

OBJECTIVES

To study background noise levels and their respective sources in a geriatric ward, while also examining the sound fields of a patient room both in the field and through computer simulation.

Acoustic Environments of Patient Room in a Typical Geriatric Ward

Jerlehag, C., Jik Lee, P., Hee Park, S., Jones, T., Carroll, N., 2018 | *Applied Acoustics* Volume 133, Issue N/A, Pages 186-193

Key Concepts/Context

Previous studies have thoroughly demonstrated the harmful effects of background noise within healthcare environments; one study found that high levels of background noise disrupted patient sleep cycles, while even higher levels of noise led to elevated heart rates among nurses. Geriatric wards within hospitals are often operated by large multi-disciplinary teams carrying out a variety of tasks, which may result in trace levels of background noise affecting a potentially sensitive patient population. The way in which exposure to noise specifically affects patient behaviors within geriatric wards is relatively unexplored, as are the origins of these noises within this specific context.

Methods

Data collection took place over a three-day span within one university hospital's geriatric ward, which contained two single-bed rooms, two four-bed rooms, and one six-bed room. All rooms had an identical height to 2.8m. Larger rooms featured greater length and width dimensions. Temperature and relative humidity data were gathered from each room three times a day. Researchers monitored and recorded noise levels with a field-recorder microphone, and analyzed the recordings by calculating sound pressure levels at one-minute intervals. A total of 24 hours of noise levels were recorded over the three-day study period. The researchers also produced a computer simulation of an unoccupied, fully-furnished six-bed patient room in order to investigate how alterations in material finishes would affect the overall acoustic environment.

Findings

The four primary sources of noise within the geriatric ward (in order of volume) were: talking (43.3% of all noise), doors opening/closing, general physical activity, and talking from outside of the recording area. Noise levels in the geriatric ward

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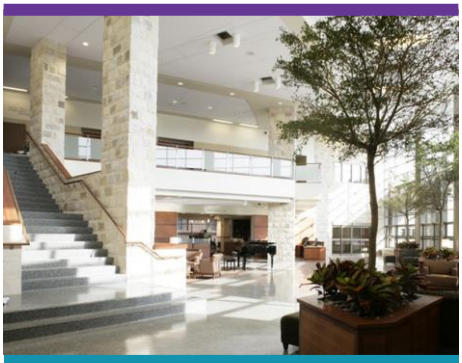

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used for this study far exceeded the recommended World Health Organization (WHO) guideline, which is in line with the findings of several previous noise-level studies. Within a 24-hour period, noise levels within single-patient rooms were greater than within four- or six-bedded rooms; this finding conflicted with previous studies, highlighting the idea that the nature of patients and physical room structures may significantly factor into noise levels.

Limitations

This study took place in a single location over a relatively short window of time; different seasons, schedules, or even days of the week may have produced different noise level results. No patient or staff perspectives were involved in the collection or analysis of the data. The computer simulation portion of the study did not account for occupied patient rooms, which could produce significantly different results during acoustic analysis.

Design Implications

Since the sound of talking -- both inside and outside of the geriatric ward -- accounted for nearly half of all documented noise levels, designers might consider creating designated areas in which staff members can speak privately or in a hushed manner. Physical designs could influence the way staff members remember to be aware of noise levels. Doors could be positioned in locations that prevent the projection of opening and closing sounds directly towards patients. Soundproofing technologies, such as acoustic foam materials, could be considered for patient populations that are especially sensitive to noise.

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

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