

Increasing Hospital Noise Levels: a Worldwide Challenge

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Noise pollution, one of the harmful factors in working environments, can cause psychological and physiological complications in people for whom the exposure is not recommended.¹ In recent decades, noise pollution in hospitals has attracted considerable attention.² It can affect communication, comfort, productivity, job satisfaction, and performance of the staff.³⁻⁵ Moreover, it has some adverse effects on patients' recovery and well-being.^{6, 7} Due to special and sensitive conditions of the hospitals' environments, Standards Developing Organizations (SODs) have set limits for hospitals regarding noise levels. The World Health Organization's guidelines on community noise, have recommended that average noise levels in a hospital environment should be up to 35 dBA during the day, and less than 30 dBA at night and peak noise levels should not exceed 40 dBA during the nighttime.⁸ Based on the national standard of Iran, the acceptable noise level in hospitals' environments has been considered 45 dBA during the daytime, and 35 dBA during the night.⁹ It is reported that the incremental trend of the noise level in hospitals is about 0.38 dB per year during the daytime, and 0.42 dB during the night, and is expected to continue.¹⁰ Since the sixth decade

of AD, hospital noise has been increasing to ~4 dB every ten years. By continuing this trend, it is expected that the loudness level in 2020 reaches an increment of 528%, meaning the hospital noise level is over 4 times louder.¹¹ There are several sources of noise pollution in hospitals, which can be classified into four main categories: the outdoor noise sources, the noise produced by diagnostic and treatment equipment, indoor noise from human activities, and noise produced by domestic facilities. Therefore, adopting effective control measures to reduce hospital noise is required. Various control measures and interventions including installation of acoustic enclosures, double-glazed windows, partial mobile barriers, soundproofing walls, doors and windows; installing absorptive material on floors, walls and ceilings; active control, implementation of quiet time protocol; hearing protection devices and some administrative control measures are adopted to reduce hospital noise, but the effectiveness of these methods are controversial.^{12, 13} In addition, there is no consensus on appropriate methods to reduce noise in different departments and wards. As a result, despite the increase of noise levels in hospitals, its decrease remains a challenge. The lack of legal considerations to control hospital noise also

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exacerbates this challenge. Therefore, first, it is suggested that researchers focus on identifying noise sources in the hospital environment and evaluate the control measures to raise awareness of administrative authorities and hospital managers regarding hospital noise. Second, hospitals' noise control guidelines and procedures should be developed by corresponding organizations and institutes. Finally, staff, patients and their attendants should be encouraged to contribute to the noise reduction programs.

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