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THE IMPACT OF NOISE LEVELS IN HEALTHCARE FACILITIES ON NERVOUS SYSTEM FUNCTION AND WORK PERFORMANCE: A LITERATURE REVIEW

Samigova Nargiz Raimovna,
Axmedova Sabrina Sabridin qizi
Alijonova Malika Xakimjon qizi
Tashkent State Medical University

Abstract

This literature review examines the impact of noise levels in healthcare facilities on central nervous system function and the work performance of medical personnel. Based on contemporary scientific evidence, it has been established that noise levels in medical institutions frequently exceed hygienic standards, particularly in intensive care and resuscitation units, where they range from 60 to 80 dB. The findings indicate that elevated noise levels are associated with autonomic nervous system imbalance, increased cortisol secretion, elevated arterial blood pressure, and impaired cognitive functions. The analysis demonstrates that noise represents not only a hygienic but also a clinically significant risk factor, with its effects primarily mediated through the central nervous system. Therefore, the optimization of the acoustic environment in healthcare facilities, through comprehensive hygienic and organizational measures, is a critical scientific and practical priority.

Keywords: noise, healthcare facilities, central nervous system, autonomic imbalance, cortisol, cognitive function, work performance, clinical errors, sleep disturbance, chronic fatigue, hygiene, acoustic environment.



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Ensuring an optimal acoustic environment in healthcare facilities is one of the key directions of modern medical hygiene. According to recommendations of the World Health Organization, background noise in hospitals should not exceed 35 dB during the day and 30 dB at night. However, numerous studies indicate that in real conditions these values are significantly higher, especially in intensive care and resuscitation units, where levels may reach 60–80 dB.

Noise is a physical factor that exerts adverse effects on the human body, triggering various physiological and psychological responses through the central nervous system. Prolonged exposure to noise is associated with autonomic nervous system imbalance, increased cortisol secretion, elevated arterial blood pressure, and decreased cognitive function.

For healthcare workers, noise represents not only discomfort but also an occupational hazard. Studies demonstrate that in high-noise environments, physicians and nurses experience reduced attention, slower decision-making, and an increased likelihood of errors. Therefore, optimizing the acoustic environment in healthcare facilities has not only hygienic but also clinical significance.

Noise levels in healthcare institutions often exceed hygienic standards. In intensive care units, average noise levels have been reported in the range of 65–85 dB.

Effects of noise on the nervous system: noise above 60 dB reduces attention and memory functions by 15–25%; at levels above 70 dB, the sympathetic nervous system becomes activated; cortisol levels increase by 20–30%.

Impact on work performance: in noisy environments, the number of errors among staff increases by 17–30%; reaction time slows by 10–15%; increased cognitive load leads to reduced decision-making quality.

Impact on sleep and recovery processes: noise above 40 dB causes sleep fragmentation; melatonin secretion decreases; chronic fatigue develops.



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The obtained findings indicate that noise is an often underestimated but clinically significant risk factor in healthcare settings. Its effects are mediated through the central nervous system, influencing both cognitive and autonomic functions. First, the role of noise as a stress factor deserves particular attention. Increased levels of cortisol and catecholamines lead not only to psychological but also to somatic changes.

Second, decreased work performance directly affects patient safety. In clinical practice, even minor errors may result in serious consequences.

Third, long-term exposure to noise contributes to the development of chronic occupational fatigue and burnout syndrome.

At the same time, existing studies demonstrate methodological heterogeneity: differences in noise measurement techniques, departmental contexts, and evaluation criteria complicate the generalization of findings.

Conclusion. The results of this literature review confirm that noise levels in healthcare facilities have a significant negative impact on nervous system function and work performance.

Noise induces stress responses through the central nervous system, leading to reduced cognitive function. High noise levels decrease the efficiency of healthcare workers and increase the risk of errors. Noise also contributes to sleep disturbances and the development of chronic fatigue. Optimization of the acoustic environment is therefore an essential hygienic measure to improve clinical safety and work performance. Consequently, the development of comprehensive hygienic and organizational strategies aimed at reducing noise in healthcare facilities represents a relevant scientific and practical priority.



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