

MODERN ALGORITHMS FOR HYGIENIC ASSESSMENT OF WORKING CONDITIONS OF HEALTHCARE PERSONNEL IN THERAPEUTIC PRACTICE

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Abstract. This article analyzes modern approaches and algorithms for the hygienic assessment of working conditions of healthcare personnel in therapeutic practice. The work environment of physicians and mid-level medical staff in healthcare institutions is characterized by numerous harmful and hazardous factors, including biological, chemical, physical, and psycho-emotional loads. The paper addresses the development of modern algorithms aimed at the comprehensive assessment of these factors, their monitoring, and the determination of compliance with hygienic standards. In addition, system-based approaches for optimizing working conditions, preventing occupational diseases, and strengthening the health of medical personnel are substantiated. The proposed algorithm includes step-by-step assessment, determination of risk levels, and the development of preventive measures. The research findings have significant scientific and practical importance for creating safe and comfortable working conditions for healthcare personnel in therapeutic settings.

Keywords: Therapeutic Practice, Healthcare Personnel, Working Conditions, Hygienic Assessment, Modern Algorithm, Occupational Risk, Biological Factors, Psycho-Emotional Load, Occupational Hygiene, Prevention, Healthcare, Monitoring, Risk Analysis.

Relevance. In recent years, the transformation of the healthcare system, the growing volume of medical services, demographic changes in the population, and the increasing prevalence of chronic diseases have significantly intensified the workload placed on healthcare personnel in therapeutic practice [9]. Under such conditions, their professional activities take place in a complex, multifactorial environment, where they are simultaneously exposed to multiple harmful and hazardous factors [8].

Physical factors inherent to the work environment, including unfavorable microclimate conditions (deviations in temperature and humidity), insufficient or excessive lighting, elevated noise levels, and ergonomically inadequate workplaces, may lead to functional disorders when exposure is prolonged [3]. In particular, the predominance of static workload and constrained working postures contributes to the development of musculoskeletal disorders, osteochondrosis, and chronic pain syndromes.

Among chemical factors, continuous exposure to disinfectants, antiseptics, and pharmaceutical substances plays a significant role. These agents may adversely affect the respiratory system, skin, and mucous membranes, increasing the risk of allergic reactions, dermatitis, and respiratory diseases. Biological factors are especially relevant for therapeutic personnel, as direct contact with patients increases the likelihood of exposure to infectious agents. This represents not only a risk to individual health but also a significant epidemiological concern in terms of the spread of nosocomial infections [4, 7].

At the same time, increased psycho-emotional workload has become an integral challenge in modern healthcare systems. High levels of responsibility, time constraints, the need for complex clinical decision-making, and stress associated with communication with patients and their relatives contribute to chronic fatigue, emotional burnout syndrome, reduced attention, and decreased work efficiency among healthcare workers. Prolonged psychological strain may also lead to the development of cardiovascular diseases, neurotic disorders, and psychosomatic conditions [6].

Importantly, the above-mentioned factors rarely act in isolation; rather, they interact synergistically, amplifying their adverse effects. For instance, high workload and psycho-emotional stress, combined with biological risk factors, may weaken the immune system and increase susceptibility to infections. Therefore, assessing working conditions based solely on individual indicators is insufficient; a comprehensive, systematic, and multi-criteria approach is required [9].

Modern scientific approaches in occupational hygiene emphasize the implementation of digital monitoring systems, integrated risk indices, and algorithm-based assessment models. Such algorithms enable the evaluation of diverse factors within a unified framework, facilitate the identification of their interactions, and allow for accurate risk prediction [1]. As a result, they not only support objective assessment of existing working conditions but also enhance the prevention of occupational diseases, promote the development of safe and healthy work environments, and improve evidence-based decision-making in management.

Thus, the hygienic assessment of working conditions of healthcare personnel in therapeutic practice based on modern, systematic, and precise algorithms is of great scientific and practical importance and represents a key factor in ensuring the sustainable development of the healthcare system [5, 9].

Objective. To develop a modern algorithm for the comprehensive hygienic assessment of working conditions of healthcare personnel in therapeutic practice and to evaluate its effectiveness.

Methods and Results. To ensure a comprehensive hygienic assessment, a combination of hygienic, instrumental, sociological, and statistical methods was applied in the study. Workplace parameters such as microclimate (temperature, humidity, air velocity), illumination, noise, and vibration levels were measured using specialized instruments. Biological risk factors (infectious load and degree of contact with patients) and chemical exposures (disinfectants) were analyzed. Psycho-emotional strain was assessed using standardized questionnaires and workload indicators.

Based on the obtained data, a modern algorithm was developed. This algorithm includes the following stages: initial monitoring involving the collection of a comprehensive description of the workplace and labor process; multi-criteria identification of factors, including physical, chemical, biological, and psychophysiological components; digitalized assessment, where each factor is evaluated using a scoring system in comparison with hygienic standards; calculation of an integrated risk index, combining all factors into a single indicator; risk stratification into low, moderate, and high levels to identify priority issues; a forecasting module to determine the probability of future risks if current conditions persist; and the development of preventive and managerial decisions, proposing both individual and system-level measures.

The results demonstrated that among healthcare personnel in therapeutic practice, psycho-emotional strain, biological risks, and high workload are particularly predominant. The proposed algorithm improved the accuracy of identifying risk factors compared to traditional

assessment methods and enabled their prioritization based on significance. Furthermore, the application of the algorithm contributed to the standardization and digitalization of the process of assessing working conditions [10].

Conclusion. The developed modern algorithm ensures a systematic, consistent, and highly accurate hygienic assessment of the working conditions of healthcare personnel in therapeutic practice. This approach not only enables the identification of existing harmful factors but also allows for a comprehensive evaluation of their interactions and the prediction of potential future risks.

The practical significance of the algorithm lies in its ability to support continuous monitoring of working conditions, facilitate early detection of occupational risks, and enable evidence-based planning of preventive measures. In addition, it optimizes the decision-making process in healthcare institutions and enhances the overall performance efficiency of medical personnel [2].

As a result, the implementation of this algorithm in practice contributes to the creation of safe and comfortable working environments in therapeutic departments, the prevention of occupational diseases and burnout syndrome, and the overall improvement of the quality of healthcare services.

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