

FEATURES OF OCCUPATIONAL MORBIDITY DYNAMICS AT THE REGIONAL LEVEL

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To make managerial decisions on the prevention of occupational and morbidity, it is necessary to track how health status of the working population depends on the degree of occupational risk. This study aimed to identify the features of the long-term dynamics of occupational morbidity at the level of production facilities (various industries) in the Voronezh region. The assessment of the level of occupational pathology was based on the type of economic activity, the administrative-territorial affiliation of the region's constituent, nosological forms, and factors of the workflow. We have identified the main patterns of occupational morbidity dynamics; in 2021–2022, its growth was primarily driven by the biological factor. With the companies/establishments being unready to face the new occupation-related risk factors, there emerge previously unregistered occupational morbidities that largely incapacitate the affected individuals.

Keywords: occupational risk, harmful production factor, occupational morbidity rate, characteristics of production factors

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ОСОБЕННОСТИ ДИНАМИКИ ПРОФЕССИОНАЛЬНОЙ ЗАБОЛЕВАЕМОСТИ НА РЕГИОНАЛЬНОМ УРОВНЕ

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Для принятия управленческих решений по профилактике профессиональной и производственно-обусловленной заболеваемости необходим мониторинг зависимости уровня отклонений в состоянии здоровья работающего населения от степени профессионального риска. Целью работы было выявить особенности многолетней динамики профессиональной заболеваемости на уровне объектов различных отраслей промышленности Воронежской области. Уровень профессиональной патологии оценивали в зависимости от вида экономической деятельности, административно-территориальной принадлежности объекта региона, по нозологическим формам и факторам трудового процесса. Установлены основные закономерности динамики профессиональной заболеваемости, рост которой в 2021–2022 гг. обусловлен прежде всего биологическим фактором. Неготовность учреждений к появлению новых факторов риска в профессии ведет к возникновению ранее не зарегистрированной профессиональной заболеваемости с высокой степенью утраты трудоспособности.

Ключевые слова: риск в профессии, вредный производственный фактор, уровень профессиональной заболеваемости, характеристика факторов производства

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The WHO global plan of action for workers' health mentions that the working population accounts for half of the world's total population. According to Rosstat (Russian Statistics Agency), in 2023, 61.3% of the population of the Russian Federation were working. The current national priorities set by the state policy are fully aligned with the studies that investigate the working conditions and focus on the prevention of occupational diseases and preservation of health of the workers manning Russia's industrial production sector [1].

Preservation of health of the able-bodied citizens is the economic basis of society [2]. The specifics of conditions of work have a significant impact on the health and occupational morbidity of the working population. In the era of scientific and technological progress, the number and dangerousness of various factors associated with the industrial production activities have increased significantly, despite the mechanization, automation and robotization of various fields of human life [3].

Labor has been and remains one of the most important social factors and the basis of human existence. The health of the population in general and its working part in particular is assessed by medical and demographic indicators,

characteristics of physical development, morbidity, and disability [4, 5]. Occupational morbidity is one of the main indicators that characterizes the health of the working people.

When the working day exceeds 12 hours, the deterioration of the conditions of work, which is primarily reflected in the physiological indicators, adds to the person's accumulated fatigue. In all trades and industries, overtime brings dissatisfaction of the staff, which can translate into workplace accidents and increase the risk of occupational pathologies.

It has been established that the prevalence of various types of occupational diseases depends, in the first place, on the type of harmful factors peculiar to the working environment and the labor process that affect the employees; these factors are determined by the specifics of the industry, working conditions, intensity and time of exposure to them [6–9].

All types of industrial production have certain occupational diseases. This problem is also relevant in agriculture, where workers are exposed to a wide range of production factors: hard manual labor, adverse microclimatic conditions, and vibrations from the mechanisms used. In general, agriculture is one of the most difficult and dangerous fields [10, 11]. The effects

of working conditions, for example, in greenhouses, and how they are understood and interpreted by the workers themselves [12], are relevant issues, as they affect the quality of life.

Occupational safety is one way to reduce work-related illnesses and injuries [13]. It is a set of measures designed to make the conditions of work favorable and harmless. A comprehensive solution to the problem of occupational disease prevention, occupational safety and health must be merged with occupational hygiene, which is reflected in the active regulations (special assessment of working conditions (SAWC), hygienic requirements for conditions of work).

Currently, one of the key areas of occupational hygiene and medicine is the minimization of occupational risks in the context of actively changing legislation [14]. The methodology of risk assessment was used to assess the association of diseases with professions [15]; it shows the level of the occupational morbidity risk depending on the degree of deviation from the hygienic norms.

This study aimed to identify the features of the long-term dynamics of occupational morbidity at the level of production facilities (various industries) in the Voronezh region.

Using the 2019–2023 reports filed in the statistical form #24 "Number of people with newly diagnosed occupational diseases (poisoning)," we analyzed the incidence of occupational diseases in the Voronezh region.

This paper presents the analysis of the features of occurrence of occupational pathologies, and the measures taken to prevent them based on disease investigation reports and the results of SAWC.

We also used information from the reports "On the sanitary and epidemiological situation in the Voronezh region" released by Rospotrebnadzor's (Russian Federal State Agency for Health and Consumer Rights) agency in the Voronezh Region. The reports cover years 2019 through 2023. It is known that the level of occupational morbidity is directly linked to the quality of working conditions [15].

According to Voronezhstat (statistical agency of Voronezh), in 2023, 28.9% of the region's able-bodied population worked in hazardous conditions (14.7% of them were women). These data are based on the results of SAWC and industrial laboratory control efforts.

The analysis of laboratory and instrumental studies conducted as part of the state sanitary and epidemiological supervision program at the region's production facilities and various establishments and institutions revealed that the maximum permissible concentration (MPC) of chemicals of the hazard classes 3 and 4 was exceeded in 0.06% of cases, and that for dust and aerosols — in 1.04% of cases. The values exceeding those considered normal by the hygienic standards were recorded at chemical factories. The main reason for the deviation from the MPC is the imperfection of technological processes.

The analysis of occupational morbidity at the facilities and establishments did not reveal a set periodicity and a characteristic pattern in its dynamics (Table 1).

The key factors are the thoroughness of preventive examinations and the trade or industry the facility or establishment operates in.

In 2020, there is a rise in occupational morbidity associated with the COVID-19 pandemic. In 2020–2021, the most

common reasons behind morbidity were biological by nature. For example, in 2020, 17 cases of occupational diseases out of 21 were caused by the exposure to the COVID-19 agent, and in 2021, there were 20 such cases out of 30, ending in fatalities.

Medical professionals exhibit no vigilance regarding the possibility of getting sick while in professional capacity, which is a reason for concern. This lack of preparedness for the new infection translated into a high incidence of COVID-19 among them. Overall, the last 10 years saw both occupational and general morbidity grow among medical workers [10].

It should be noted that occupational morbidity in the Voronezh region is lower than generally in the Russian Federation. For example, in 2023, the relative occupational disease incidence in the Russian Federation was 0.96 per 10,000 employees, which is 3.5 times higher than in the Voronezh region.

As for the economic sector, the highest rates were registered in agriculture, where the common ailments are the diseases associated with largely manual labor and working in a fixed and unnatural position (as milkmaids do). The people employed in this field were typically diagnosed with a musculoskeletal system pathology (lumbosacral radiculopathy).

Occupational morbidity continues to be registered in the employees of the aircraft manufacturing enterprises, where the main adverse factors are high-frequency noise and local vibration.

Under the top-level nosologies, both absolute and relative indicators exhibit a downward trend. The incidence of work-related illnesses is decreasing in the country overall, but this does not it stops to exist.

For example, there has been no cases registered at small businesses, although physiological examinations of their staff revealed their exposure to such adverse factors as overtime (sometimes 12–15 hours per shift), and general lack of the proper work and rest balance. The conditions of work are poor at the microclimatic level (for example, high or low environment temperatures in smaller shops and logistics hubs) [16, 17].

From the hygienic point of view, the adverse factors at chemical factories are multicomponent chemicals released into the air of the work area, as they create risks for the health of workers; however, there are no occupational diseases registered at such facilities, which may indicate high effectiveness of preventive measures.

In the context of nosologies, long-term dynamics are characterized by the diseases caused by noise, vibration, and physical exertion, which are registered every year (Table 2).

Riveting assemblers and mechanics of IL-VASO mechanical works are exposed to noise and vibration; the common diagnoses at these facilities are vibration disease and sensorineural hearing loss, both work-related illnesses.

As for medical professionals, the occupational morbidity among them is still often associated with contacts with tuberculosis patients. The sporadic incidence of the respective pathology is seen in tuberculosis dispensaries every year; the main reasons are the improper use personal protective equipment during medical and preventive procedures, predisposition to the infectious agent, and imperfection of disinfection measures.

Occupational diseases are registered when the affected individuals seek medical assistance, which points to the low quality of preventive medical examinations or absence thereof.

Table 1. Occupational morbidity, industrial facilities and establishments of the Voronezh region, 2019–2023 (per 10,000 employees)

2019	2020	2021	2022	2023
0.15	0.3	0.46	0.19	0.27

Table 2. Dynamics of occupational morbidity (cases in absolute numbers)

Indicators	2019	2020	2021	2022	2023
Occupational diseases, total	10	21	30	12	17
From vibration	2	2	4	3	2
From noise	5	1	4	5	5
From exposure to chemicals and dust	2	–	1	–	–
From physical exertion	–	1	–	–	7
From exposure to a pathogenic infectious agent	1	17	21	4	3

We have established a clear connection between such diseases and disability; there were three cases (female patients) in 2023. The reasons behind permanent disability are irregular attendance of medical examinations, refusal to visit a doctor when the first signs of the disease appear, and lack of proper prevention programs at work.

Another problem is the tendency to attend medical examinations only when the workplace is labeled hazardous based on SAWC. Such assessments are conducted only every 5 years, and the quality of the involved laboratory tests is low. Between the assessments, the changes in the status of health of the workers are not monitored, which disallows timely implementation of preventive and corrective measures aimed at improving working conditions and reducing occupational risks.

The conditions of work do not always reflect the level of occupational morbidity in a workplace [4, 18, 19].

Fewer registrations of occupational diseases is associated with poorly executed medical examinations, the exclusion of physiological parameters from SAWC, including shift-based nature of employment and irregular working hours. In addition, the working conditions of self-employed individuals are not controlled and depend on their personal ability to organize them.

Morbidity depends on the accountability of managers and officials for the organization of a disease prevention system.

The approaches to noise registration are a subject of arguments, too: SAWC investigates only the equivalent noise level and skips the analysis of frequencies, while it is possible to have some of them exceeding the norm without violation of the maximum permissible level (MPD) [19–21].

There are petrochemical industry facilities in the (Voronezhskintezkauchuk), but work-related diseases

have not been registered there for many decades, which points to a highly effective prevention system, including special preventive nutrition following exposure to organic chemical compounds, as well as regulated breaks and a rational work and rest regime.

CONCLUSION

Responsible managers of organizations need to improve their preventive efforts aimed at reducing the risk of occupational diseases. A responsible and realistic approach to the certification of workplaces by the conditions of work should contribute to the prevention of occupational morbidity [22–24].

The special assessment of working conditions (SAWC) substantiates reasonable solutions of the matters of evaluation of working conditions, providing benefits and compensations [24, 25], but this approach does not involve a hygienic assessment. There is no practice of assessing the noise by frequencies, nor are the physiological parameters regulating the intensity of labor are fully normalized. The frequency of SAWC is once every 5 years, provided there are no violations of hygiene and working conditions. However, even when the maximum permissible concentrations are exceeded insignificantly, but this deviation is persistent, in the production environment, the health of the employees may deteriorate. The maximum permissible concentration cannot cause the disease, but when the respective content is slightly above it, there is a risk of occupational pathology.

High levels of occupational risk [25–27] necessitated the development of a risk-based program that includes priority areas and ways to prevent damage to workers' health.

The morbidity prevention system should factor in the complexity of the problem [28–30].

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