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Trends and Challenges of Chronic Occupational Morbidity in Ukraine: A Sectoral Analysis and Preventive Strategies

Tren dan Tantangan Morbiditas Kerja Kronis di Ukraina: Analisis Sektoral dan Strategi Pencegahan

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Abstract
Occupational morbidity remains a critical public health issue worldwide, including in Ukraine, where the prevalence of chronic occupational diseases has shown an increasing trend. High-risk industries, particularly the mining sector, exhibit alarming rates of chronic occupational diseases, mainly affecting the respiratory system, musculoskeletal structure, and auditory functions. This study aims to analyze trends and causes of chronic occupational morbidity in Ukraine from 2016 to 2022, utilizing statistical data and quantitative analysis. The findings indicate that the primary contributing factors to chronic occupational diseases include outdated technological processes, inadequate working tools, and the failure to use personal protective equipment. The study recommends strengthening medical surveillance by reducing the interval between health examinations, enhancing labor protection training, and implementing stricter industrial hygiene regulations. These findings underscore the urgent need for policy reforms and workplace interventions to mitigate occupational morbidity and protect workers' health. From an ethical and religious perspective, ensuring a safe and healthy work environment aligns with Islamic teachings that emphasize justice, fairness, and the well-being of workers.

Abstrak
Morbiditas akibat kerja masih menjadi masalah kesehatan masyarakat yang penting di seluruh dunia, termasuk di Ukraina, di mana prevalensi penyakit akibat kerja kronis menunjukkan tren yang meningkat. Industri berisiko tinggi, terutama sektor pertambangan, menunjukkan tingkat penyakit akibat kerja kronis yang mengkhawatirkan, terutama yang memengaruhi sistem pernapasan, struktur muskuloskeletal, dan fungsi pendengaran. Penelitian ini bertujuan untuk menganalisis tren dan penyebab morbiditas pekerjaan kronis di Ukraina dari 2016 hingga 2022, dengan menggunakan data statistik dan analisis kuantitatif. Temuan menunjukkan bahwa faktor utama penyebab penyakit akibat kerja kronis termasuk proses teknologi yang sudah ketinggalan zaman, alat kerja yang tidak memadai, dan kegagalan menggunakan alat pelindung diri. Studi ini merekomendasikan untuk memperkuat pengawasan medis dengan mengurangi interval antara pemeriksaan kesehatan, meningkatkan pelatihan perlindungan tenaga kerja, dan menerapkan peraturan kebersihan industri yang lebih ketat. Temuan ini menggarisbawahi kebutuhan mendesak akan reformasi kebijakan dan intervensi di tempat kerja untuk mengurangi angka kesakitan akibat kerja dan melindungi kesehatan pekerja. Dari perspektif etika dan agama, memastikan lingkungan kerja yang aman dan sehat sejalan dengan ajaran Islam yang menekankan keadilan, kejujuran, dan kesejahteraan pekerja.

Graphical Abstract

Keyword
morbidity; occupational diseases; occupational health; respiratory system; working conditions

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INTRODUCTION

The development strategy of each state and ensuring the financial and economic stability of enterprises are closely related to the problems of reducing industrial injuries and occupational diseases. According to a WHO/ILO report, approximately 2 million people die annually from occupational diseases and injuries (Nagorna, 2022). The European Agency for Safety and Health at Work reports that occupational diseases are responsible for 2.4 million deaths worldwide each year (Foulis, 2020). Although the problem of occupational diseases is a global issue, the situation in Ukraine has its own challenges, especially in certain industrial sectors that experience high levels of risk.

Accidents, as a rule, occur suddenly, and occupational diseases are the result of long-term exposure to various harmful industrial factors. Every year, 260 million new cases of occupational diseases are detected in the world (National Association of Extractive Industry of Ukraine, 2023). They require cost-reimbursed treatment and substantial payouts in the event of permanent disability or death. In developed countries, economic losses related to occupational diseases amount to about 4% of the national gross product. In Ukraine, expenses related to occupational diseases amount to over UAH 16.04 billion. or UAH 90.4 thousand per year for one case of occupational disease (National Association of Extractive Industry of Ukraine, 2023). Thus, reducing the level of occupational morbidity is an urgent task of every country and especially urgent for Ukraine in modern realities. In order to develop preventive measures and improve working conditions, at the first stage of the research, it is necessary to study statistical data on the state of occupational morbidity in the country in recent years. This approach allowed the authors of the works (Mezentseva, 2024; Kuzmenko, 2024) to propose measures to reduce industrial injuries. The presented study will allow us to clarify the state of occupational morbidity in Ukraine against the background of difficult economic, social and political changes in recent years.

The problem of occupational diseases was considered by both domestic (Berezovskyi, 2021; Liubchenko, 2016; Mezentseva, 2017; Piňosova et al., 2021; Yevtushenko et al, 2022) and foreign authors (Ruslan et al., 2020; Piňosova et al., 2021; Ayeleso et al., 2024). According to the Chief Sanitary Doctor of Ukraine in 2014–2016 Svyatoslav Protas (Protas, 2020), the number of accidents, occupational and general diseases among workers has increased in recent years in Ukraine against the background of a decrease in the level of production. According to the Information Letter (Protas, 2020) on the state of occupational morbidity among the working population of Ukraine for 2013–2019, every third worker works in conditions where the factors of the industrial environment exceed the maximum permissible concentrations and levels. The most traumatic sector of the economy in terms of the number of chronic occupational diseases remains the extractive industry and the development of quarries - 83.8% of the total number of victims (Berezovskyi, 2021; Protas, 2020). In the mining sector, almost 68% of all employed workers work in conditions that do not meet sanitary and hygienic requirements. In the processing sector, almost 30%.

The authors of the paper (Piňosova et al., 2021) note that occupational diseases also remain a public health problem with corresponding economic, social and legal consequences for enterprises in Slovakia. Occupational diseases that are not detected in time lead to a decrease in labor productivity, an increase in absenteeism, an increase in the number of injuries, cases of disability and diseases with temporary loss of working capacity, and an increase in staff turnover (Yevtushenko et al., 2022), affect the competitiveness of enterprises.

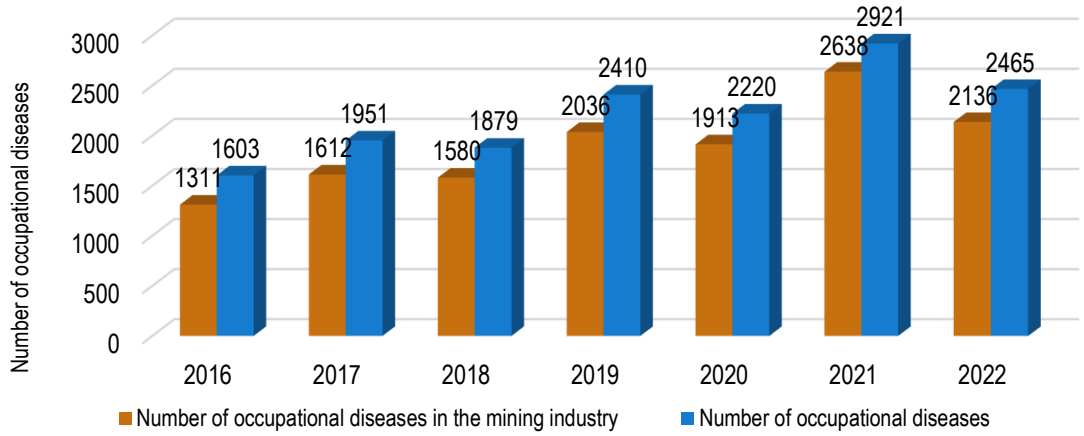
In works (National Association of Extractive Industry of Ukraine, 2023; Foulis, 2020; Mezentseva I. K., 2023; Protas, 2020) acute occupational diseases of certain categories of workers were attributed to COVID-19. The paper (Migriño, 2024) examined the lethal consequences of COVID-19 and indicated the need to improve the processing of epidemiological data to be able to take into account also the concomitant diseases of workers. Joint studies by Pakistani and Ukrainian scientists (Ali et al., 2024) examined the impact of limited anthropogenic activity, from the perspective of a national lockdown, on environmental pollution.

The authors of the work (Ayeleso et al., 2024) investigated the connection of such environmental problems as deforestation, desertification, floods, erosion, oil spills, air and water pollution, with working conditions and the health of workers at workplaces. It is also necessary to take into account electromagnetic radiation and a high radiation background, increased noise on the streets, etc. Urban heat islands contribute to the deterioration of the health of city dwellers (Sharma et al., 2023). They differ in higher population density and low level of greening. All these studies also show the impact of the environment on workers and the state of chronic occupational diseases. The purpose of the work is to analyze trends in occupational morbidity in Ukraine in recent years, identify the main diagnoses and causal factors, and propose preventive measures that can be taken to reduce the incidence of occupational diseases.

METHODS

This study is a descriptive study aimed at analyzing and understanding the mechanisms for determining and investigating chronic occupational diseases in Ukraine. In the occupational health system in Ukraine, acute and chronic occupational diseases (poisoning) are distinguished based on the provisions established by the Cabinet of Ministers of Ukraine (2019). An acute occupational disease (poisoning) or death occurs after a single (during no more than one work shift) exposure of an employee to dangerous physical, biological, and chemical factors. They also include infectious, parasitic and allergic diseases. Acute occupational poisonings are investigated in Ukraine in the same way as accidents with the registration of an act on the form H-1/P (related to production) or H-1/NP (not related to production) (Cabinet of Ministers of Ukraine, 2019). This study is devoted to chronic occupational diseases, because acute occupational diseases in our country are classified as accidents. Accidents at work in Ukraine were considered by the authors in (Mezentseva, 2024). The analysis and investigation of accidents is carried out according to the procedure set out in the document (Cabinet of Ministers of Ukraine, 2019).

Figure 1
Dynamics of The Number of Cases of Chronic Occupational Diseases at Enterprises of Ukraine in 2016–2022



Chronic occupational disease (poisoning) occurs as a result of the professional activity of an employee under the influence of harmful factors of the production environment and work process. Different countries have introduced their own approaches to the procedure and criteria for establishing the diagnosis of "occupational disease". In Ukraine, according to the Procedure for the investigation and registration of accidents, occupational diseases and accidents at work (Cabinet of Ministers of Ukraine, 2019), the occupational nature of a chronic disease (poisoning) is confirmed by a medical opinion of a medical expert committee of a specialized occupational pathology health care institution. The medical opinion establishes a connection between the deterioration of the employee's health and the impact on him of possible factors of the labor process: the difficulty and intensity of work, harmful production factors, psycho-emotional reasons, or contraindications to work due to the state of health. The examination of working conditions is carried out by a doctor of occupational hygiene of the territorial body of the State Labor Service, who compiles a sanitary-hygienic description of the employee's workplace. The head doctor of a specialized occupational pathology health care institution sends a notification of a chronic occupational disease (poisoning) to the head of the territorial body of the State Labor Service in relation to each patient on the P-3 form. In the message, the doctor cites the main and accompanying diagnoses, as well as the factors of the industrial environment and work process that caused the chronic occupational disease (poisoning). The study used data from open sources of information for the period from 2016 to 2022. Data on chronic occupational diseases in our country are recorded by the Social Insurance Fund against Accidents and Occupational Diseases. Statistical and group methods were used to process data on chronic occupational diseases. A similar approach was used by the authors in (Mezentseva., 2024).

After receiving a notification on the P-3 form, the head of the territorial body of the State Service of Ukraine on Labor Issues forms a commission to investigate the causes of the occurrence of this chronic occupational disease (poisoning). The investigation commission assesses the working conditions of the sick worker based on the materials of the previously conducted attestation of workplaces, acts of periodic medical examinations, archival data of the enterprise (institution, organization), territorial body of State

Figure 2
Diagram of The Distribution of Chronic Occupational Diseases by Disease Diagnoses and Years

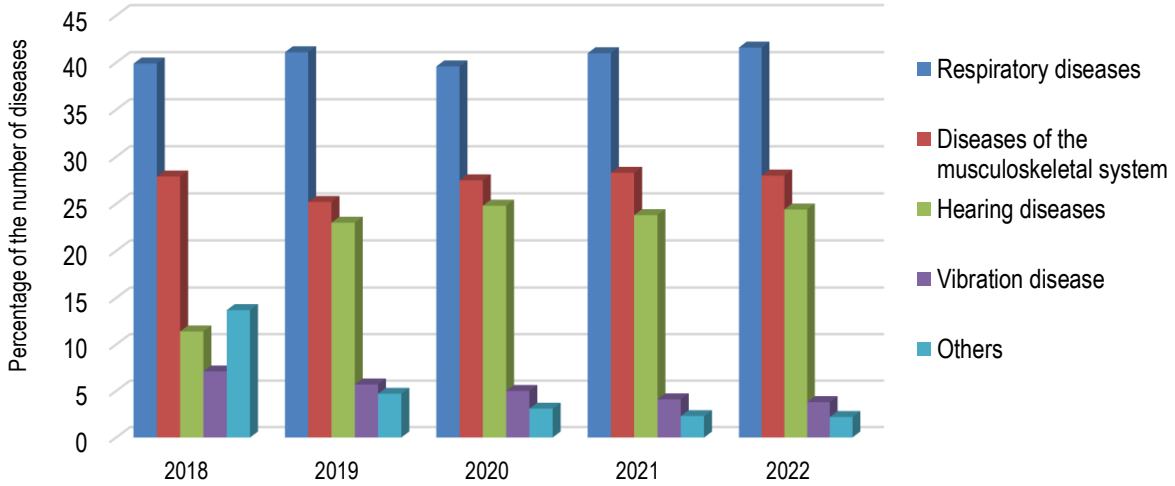
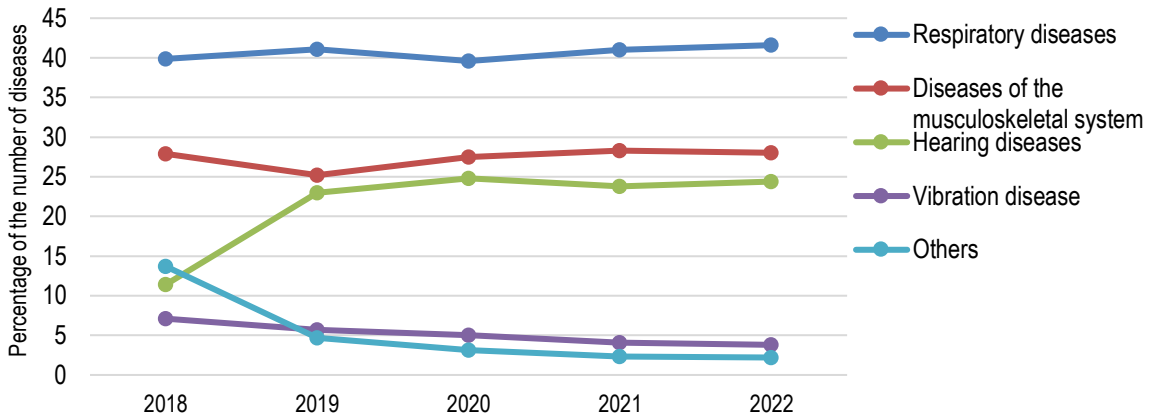


Figure 3
Schedule of Distribution of Chronic Occupational Diseases by Diagnoses in The Period from 2018 to 2022



Planning and other documents. Based on the results of the investigation, the commission draws up an act in the P-4 form (Cabinet of Ministers of Ukraine, 2019), which specifies the main conditions, circumstances and causes of the occurrence of a chronic occupational disease (poisoning), measures to prevent the development of a chronic occupational disease (poisoning) as well as persons who have not fulfilled the relevant requirements of the law are established.

Copies of acts in the forms H-1/P and P-4 are provided to the Social Insurance Fund against accidents and occupational diseases. On the basis of these acts, statistical data (Social Insurance Fund of Ukraine, 2023) on industrial injuries and COD are published. These data were used to analyze the state of COD in Ukraine. Information up to 2022 can be found in open sources. There are no data for 2023 and 2024. Perhaps this is related to the reorganization of the insurance system - from January 1, 2023, the Social Insurance Fund of Ukraine transferred its functions to the Pension Fund or to military actions on the territory of the country.

RESULTS

Data on the total number of workers who received chronic occupational diseases from 2016 to 2022 are shown in Figure 1. This figure also provides statistical data on the state of chronic occupational diseases in the mining industry and career development, which accounted for the majority of diseases in different years - from 84 to 90% of the total number of cases. As can be seen, the number of cases of diseases has been increasing over the years. The maximum number of COD is recorded in 2021. Compared to 2020, the total number of occupational diseases according to the P-4 acts increased in 2021 by 31.6%, or by 701 diseases. In 2022, the number of COD decreased slightly, but still remained higher than in 2019-2020. The procedure for establishing the diagnosis of COD is a painstaking and long process. The examination of the patient should be carried out only in the clinics of specialized research institutes or in the professional pathology departments of regional and city hospitals. Therefore, some decline in 2022 may be associated with military operations on the territory of Ukraine and the complexity of the procedure for establishing the connection of the disease with working conditions.

Figure 2 shows Social Insurance Fund of Ukraine data on the structure of the distribution of chronic occupational diseases by diagnosis. From the given data, it can be seen that in recent years in the structure of occupational diseases at Ukrainian enterprises, the first place belonged to diseases of the respiratory organs, the second place to diseases of the musculoskeletal system (radiculopathy, osteochondrosis, arthritis, arthrosis), the third place was left to hearing diseases, the fourth place to vibration disease. Since the majority of COD was observed in the

Figure 4
Circumstances that Caused Occupational Diseases in 2018–2022

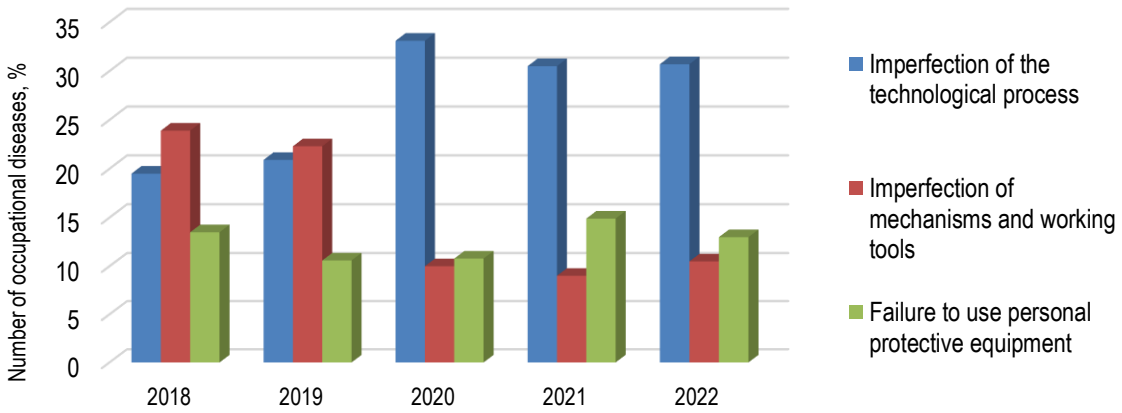
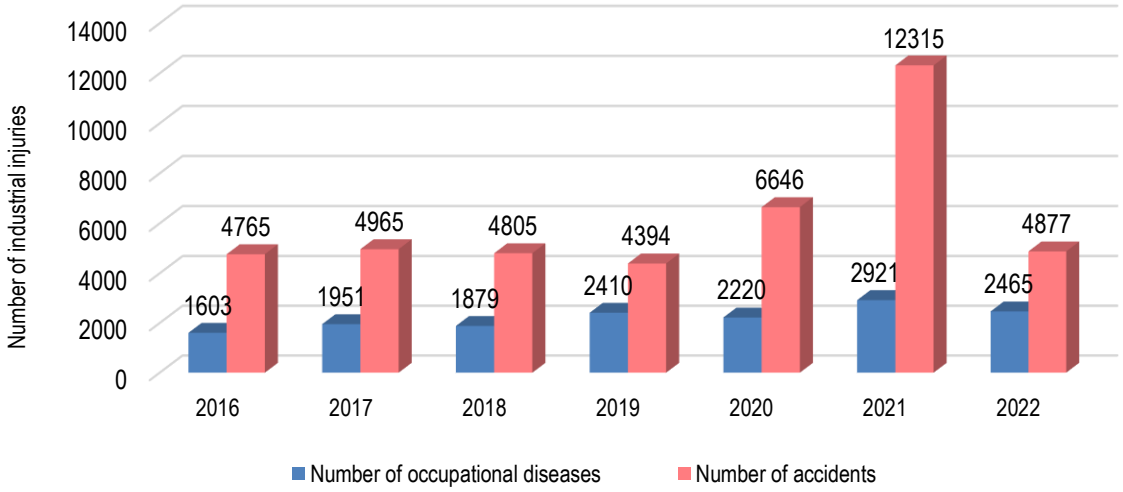


Figure 5
Comparative Data on The Number of Accidents and Occupational Diseases in 2016–2022



mining industry, the above diagnoses relate primarily to this field of activity. In Ukraine, underground mining works in mines and mines and open-pit mining work are classified as high-risk works (Cabinet of Ministers of Ukraine, 2019), where workers most often get respiratory diseases due to exposure to industrial dust in the form of aerosols of mainly fibro genic action (silicon dioxide or oxide, silicates and others). A large number of diseases of the musculoskeletal system are associated with difficult working conditions, and hearing loss is associated with industrial noise.

For clarity, the results of Figure 2 are presented in the form of graphs (Figure 3). With a general increase over the years in the total number of COD, the structure of the distribution of diseases of the respiratory organs and diseases of the musculoskeletal system changed slightly. Significant changes were recorded for problems with hearing organs, when the number of such diseases increased more than 2 times in 2019. Data for vibration sickness, on the contrary, in the period from 2018 to 2022. almost doubled. Since 2018, the number of other COD has decreased more than 6 times.

The main circumstances that caused chronic occupational diseases in the period from 2018 to 2022 (Figure 4), there were imperfection of the technological process (cause 1), imperfection of mechanisms and working tools (cause 2), failure to use personal protective equipment (cause 3). The percentage of cases from the total number of CODs that occurred due to the mentioned reasons varied during the specified years, but totaled from 54 to 57%, i.e., more than half of all diseases. The following fact draws attention. The percentage of cases for cause 1 increased by 50%, and for cause 3 decreased by about 50%. For reason 2, the number of cases changed slightly during this period and fluctuated in the range of 13±2%. But in sum, reasons 1 and 3 accounted for almost the same value - approximately 40–43%. Most likely, this is due to the fact that when determining the circumstances of COD, it was not always possible to distinguish between causes 1 and 3. "Other" circumstances of COD accounted for 40-43% of all diseases. The indicated figures also refer mainly to the extractive industry. As you can see, to reduce the number of diseases, first of all, it is necessary to improve technological processes and working mechanisms and tools used in the extraction of minerals.

Figure 5 shows comparative data on the number of occupational diseases and accidents (Mezentseva., 2024) during 2016–2022. The first thing to note is the fact that every year the number of accidents was several times higher than the number of accidents. But it should be taken into account that chronic pathology accumulates in the body for years and, as a rule, is incurable. Therefore, CODs detected in each year are added to the total number of diseases detected in previous years. In addition, chronic diseases can cause negative hereditary genetic consequences (in offspring). Therefore, despite the relatively low numbers of COD compared to the number of accidents, increased attention should be paid to the prevention of chronic diseases.

Secondly, the maximum number of injuries was observed in 2020–2021, which was associated with the disease of Covid-19 (Mezentseva, 2024; Kuzmenko, 2024), which refers to acute occupational diseases (Cabinet of Ministers of Ukraine, 2019). When compared with the pre-quarantine period (2019), the number of insured accidents for 2021 increased by 2.8 times (from 4,394 to 12,315) (Kuzmenko, 2024). For chronic occupational diseases, an increase in the number of cases by approximately 32% was also observed in 2021, which is most likely due to the weakening of immunity in people during the pandemic and the acceleration of the development of occupational diseases.

DISCUSSION

The conducted studies showed a tendency towards an increase in the number of COD during 2016–2022 (Figure 1). This increase since 2018 is especially noticeable. It was at this time (2016) that the state sanitary-epidemiological service was liquidated in Ukraine, whose activities were aimed at the prevention of infectious diseases, occupational diseases, mass non-infectious diseases (poisoning), radiation damage to people, prevention of harmful effects on their health and life environmental factors. The public health system that was supposed to replace it never materialized. This issue is especially acute in the regions where extractive industry enterprises operate, which are among

the biggest polluters of atmospheric air and water bodies. And this additionally negatively affects the state of health of the population of these regions.

The majority (up to 90% of all cases) of chronic occupational diseases in Ukraine were observed in the mining industry with its difficult and dangerous working conditions, physically and technically outdated equipment, ineffective worker protection systems, etc. The introduction of new technologies and equipment requires large capital investments from employers. In Ukraine, underground mining operations in mines and open pit mining operations are classified as high-risk operations.

Information on the distribution of the main diagnoses of chronic occupational diseases and their causes concerns, first of all, the extractive industry. And measures to prevent occupational diseases were developed taking into account the specifics of work in this field of activity.

The main reasons for the occurrence of diseases of the respiratory organs (up to 42% of all diseases), musculoskeletal system (up to 28%) and hearing loss (up to 25%) were: imperfection of technological processes, machines and working mechanisms, and failure to use personal protective equipment. In the mining industry, respiratory diseases are primarily caused by exposure to industrial dust in the form of aerosols of mainly fibro genic action (silicon dioxide or oxide, silicates, and others). In order to reduce the concentration of industrial dust in the air, reduce the difficulty of the labor process, and reduce noise levels, it is necessary to improve and modernize technologies and equipment, implement complex mechanization, automation, and remote control of production processes. To protect the respiratory and hearing organs, it is necessary to develop and improve means of collective and individual protection, implement automatic alarm systems in the event of an emergency increase in the concentration of harmful substances in the air and blocking the operation of dangerous installations, increase the efficiency of ventilation systems, noise absorbers, etc. New developments must comply with the Rules of Safety in Coal Mines (Verkhovna Rada of Ukraine, 2010).

An important direction in reducing injuries and occupational morbidity in various sectors of the economy is the improvement of the labor protection management system (LPMS) at enterprises in order to implement management actions to create safe working conditions (Berezutskyi, 2021). The LPMS provides an analysis of working conditions and a risk-oriented approach with the identification of hazards and monitoring of the state of health of employees. During the planning and implementation of measures aimed at reducing occupational risks and improving working conditions, it is necessary to strive to eliminate or reduce the levels of dangerous and harmful factors of the working environment and work process to the maximum permissible values. It is important to control the technical condition of protective equipment, equipment, mechanisms, tools, buildings and structures and the employees' compliance with the requirements of regulatory and legal acts. The LPMS provides for the supervision of high-risk works and equipment, the organization of training and the verification of knowledge on labor protection issues and the conduct of briefings. In case of changes in working conditions, it is necessary to re-assess professional risks. The employer is obliged to warn the persons with whom he concludes an employment contract about professional risks and their possible negative impact on health.

For the sanitary and hygienic assessment of the levels of the factors of the production environment and the difficulty and tension of the labor process, every five years, employers must carry out a mandatory attestation of workplaces at their own expense (Verkhovna Rada of Ukraine, 1992b). In the process of attestation, the actual levels of the factors of the production environment and the labor process are established, compared with the normative ones, and the class of working conditions is determined. Based on the results of the certification, urgent measures to improve working conditions and safety are determined (Verkhovna Rada of Ukraine, 1992b).

Depending on the conclusions of the certification, the rights to benefits and compensation for work in unfavorable working conditions are determined (Gorbenko., 2023). If, based on the results of workplace attestation, it is established that employees work in conditions that do not meet the requirements of regulatory and technical documentation, then such workplaces and professions belong to Lists No. 1 or 2 (Ministry of Labor and Social Policy of Ukraine, 2005). Employees receive the right to early retirement, annual additional leave, reduced working day, other benefits and compensations. But more promising for workplaces with harmful working conditions will be the introduction of mechanization of heavy manual labor, automatic and remote control of production equipment, sealing of technological processes, etc., which will reduce the risks of exposure to such conditions on workers.

Without attestation, the enterprise cannot go through the procedure of approving the lists in the State Labor Service of Ukraine and conduct preliminary (at the time of hiring) and periodic (during employment) medical examinations. Medical examinations are carried out for workers engaged in heavy work, work with harmful or dangerous working conditions or those where there is a need for professional selection (Ministry of Health of Ukraine, 1994). Professional selection must be carried out for all types of underground works. According to the current legislation, medical examinations are carried out at the expense of the employer. Employees who have experienced a deterioration in their health as a result of the impact of working conditions have the right to emergency medical examinations. Based on the results of medical examinations, a medical opinion is issued, which contains information about the employee's state of health, recommendations for the safe performance of work duties, and measures that should be taken to ensure the safety and health of the employee. According to the results of periodic medical examinations, if necessary, the employer must ensure the implementation of appropriate health measures.

The procedure for conducting medical examinations (Ministry of Health of Ukraine, 2007) establishes certain terms between periodic examinations. For example, in the conditions of work with dust in the form of aerosols of mainly fibro genic action, as a rule, it is required to conduct medical examinations in health care institutions with a periodicity of once a year. When working in industrial noise conditions up to 100 dBA - once every 2 years; in case of physical overload - once a year. But in the conditions of

constantly increasing levels of occupational morbidity, with the aim of earlier diagnosis, it should be recommended to reduce the time between periodic examinations. Detection of occupational diseases in the early stages of their development can reduce employers' costs for subsequent treatment and rehabilitation of victims. In order to improve the labor protection management system between certifications, it is recommended to implement constant monitoring of harmful factors of the production environment with certain time intervals for each factor (Kruzhilko et al., 2020).

In the works (Kuzmenko, 2024; Mezentseva., 2024), one of the reasons for the increase in the level of injuries in recent years was the cancellation of disciplines that teach labor protection issues for master's degrees in higher educational institutions of Ukraine. This leads to a decrease in the level of awareness and culture in matters of occupational safety among specialists with higher education. They become heads of structural divisions at enterprises, institutions or organizations and are responsible for training their subordinates in the safe conduct of work. Employers are interested in training specialists who are well-versed not only in modern production processes and technologies, but also in matters of reducing potential risks and managing occupational health and safety. Therefore, during the formation of professional standards of the second master's level, they should include competences in the field of safety and health of employees. These issues should be considered at all stages of postgraduate education, retraining and/or professional development courses, etc. (Vambol et al., 2023).

According to the Law of Ukraine "On Occupational Safety" of 1992 (with amendments) (Verkhovna Rada of Ukraine, 1992a), regulatory legal acts on occupational safety must be revised as scientific and technical achievements are implemented, contributing to the improvement of safety, occupational hygiene and the industrial environment, but at least once every ten years. This is not always done. For example, documents (Verkhovna Rada of Ukraine, 2010; Ministry of Health of Ukraine, 2007) were adopted more than 10 years ago. All regulatory documents, including occupational health and safety instructions (Mezentsev, 2024), which are in effect at the workplace, must be reviewed in a timely manner.

The prevention and management of occupational diseases align with fundamental Islamic principles that emphasize the sanctity of human life and the obligation to protect it. Islam advocates for justice (*'adl*) and the well-being of individuals (*maslahah*), which includes the right to a safe working environment. The Qur'an Surah Al-Baqarah/2:195 states:

> *"And spend in the way of Allah and do not throw [yourselves] with your [own] hands into destruction [by refraining]. And do good; indeed, Allah loves the doers of good".*

This verse underscores the importance of taking proactive measures to prevent harm, including occupational hazards. Employers and policymakers bear the responsibility to ensure that work environments do not endanger workers' health. The Prophet Muhammad (peace be upon him) also emphasized the responsibility of leaders toward their subordinates in Sahih al-Bukhari, Hadith No. 893, stating:

> *"Each of you is a shepherd, and each of you is responsible for his flock."*

This hadith highlights the duty of employers and authorities to ensure workers' safety and well-being. Industrial reforms aimed at reducing chronic occupational diseases should be viewed not only as a legal obligation but also as a religious and ethical duty. Islam encourages knowledge-seeking and innovation to improve societal welfare, including technological advancements that reduce occupational health risks. Furthermore, Islamic teachings on mutual assistance (*ta'awun*) encourage collaborative efforts among governments, businesses, and workers to establish safer working conditions.

Addressing occupational morbidity through enhanced workplace safety measures, regular medical examinations, and improved labor policies aligns with both scientific and Islamic principles. The integration of ethical, legal, and religious perspectives reinforces the need for comprehensive strategies to protect workers from occupational hazards, ultimately ensuring justice, fairness, and public welfare.

The advantages of the study are that such an analysis has not been conducted in Ukraine to date. The identified patterns and reasons for the increase in chronic occupational diseases make it possible to provide recommendations for reducing the number of occupational diseases. The limitation of this study is that since 2022 there has been no freely available information on the number of chronic occupational diseases. This is due to the elimination of the Social Insurance Fund. Currently, the issue of accounting for occupational diseases is assigned to the Pension Fund of Ukraine, which in turn has led to the impossibility of finding relevant data in the public domain.

CONCLUSIONS

Based on statistical data, the dynamics of chronic occupational diseases in Ukraine from 2016 to 2022 was analyzed. The study showed that from 2016 to 2022, there has been an increase in the number of chronic occupational diseases, especially since 2018. Apparently, this is primarily due to the liquidation of the state sanitary and epidemiological service, whose activities were aimed at the prevention of infectious diseases, occupational diseases, mass non-communicable diseases, etc. The largest number (up to 90% of all cases) of chronic occupational diseases in Ukraine were observed in the mining industry. Among chronic occupational diseases, diseases of the respiratory system, musculoskeletal system, and hearing loss dominate. Circumstances that led to chronic occupational diseases: imperfection of technological processes, machines and working mechanisms, and non-use of personal protective equipment.

To reduce occupational morbidity, it is essential to certify workplaces with harmful conditions, improve medical examinations, and increase their frequency for high-risk mining workers. Higher education institutions should reintegrate labor protection studies at the master's level to enhance occupational safety training. Modernizing technologies, mechanizing heavy labor, automating processes, and improving protective measures can help reduce dust and noise exposure. Continuous monitoring

of working conditions and employee health is necessary to assess risks and implement timely interventions. A strong safety culture should be fostered, prioritizing workers' health over economic goals. Regulatory frameworks must be updated to reflect technological advancements, and a public health system should monitor environmental hazards. Re-establishing a state occupational safety service is crucial, with a focus on mining and comprehensive safety education at all levels.

To implement these recommendations, it would be appropriate to create an alternative service to replace the liquidated state sanitary and epidemiological service. There should be a heightened focus on occupational safety across all sectors of the economy, especially in the mining industry, and occupational safety training should be integrated at all educational levels. Lastly, addressing chronic occupational diseases becomes particularly significant during states of war or emergency, such as pandemics. Therefore, further research should explore this critical issue.

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Iryna Mezentseva developed the research and formulated the concept. Sergij Vambol methodology of research and conclution. Olena Kuzmenko analysis and processing of research results. Serhii Mezentsev and Vladyslava Vambol analysis and preparation initial data.

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COMPETING INTERESTS
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REFERENCES

Ali, N., Kausar, A., Vambol, S., Kozub, P., & Kozub, S. (2024). Environmental retrieval during COVID-19 lockdown in the megacity Karachi, Pakistan. *Ecological Questions, 35*(3), 1-16. http://dx.doi.org/10.12775/EQ.2024.032

Ayeleso, A. O., Alqahtani, F. M., & Aroh, C. O. (2024). Empirical Evidence from Nigeria on Environmental Health and Occupational Safety at Work. *Trends in Ecological and Indoor Environmental Engineering*. https://dx.doi.org/10.62622/TEIEE.024.2.1.11-17

Berezovskyi, A. T. (2021). Analysis of occupational diseases at work in Ukraine. *Ukrainian Black Sea Region Agrarian Science*, 92-100. https://doi.org/10.31521/2313-092X/2021-3(111)-11

Berezutskyi, V. (2021). *Occupational safety management.* Kharkiv: NTU "KhPI". Retrieved from https://repository.kpi.kharkov.ua/handle/KhPI-Press/54108

Cabinet of Ministers of Ukraine. (2019). *The procedure for investigating and recording accidents, occupational diseases and accidents at work*. (2019, April 17). Retrieved from https://zakon.rada.gov.ua/laws/show/337-2019-п#Text

Foulis, M. (2020). *Canadian Occupational Safety*. Retrieved from 7 most common occupational diseases: https://www.thesafetymag.com/ca/topics/occupational-hygiene/7-most-common-occupational-diseases/236947

Gorbenko V. V., K. O. (2023). *Practical course "Assessment of compliance with working conditions of the workplace"*. Kharkiv: NTU "KhPI". Retrieved from https://repository.kpi.kharkov.ua/handle/KhPI-Press/64911

Kruzhilko, O., Polukarov, O., Vambol, S., Vambol, V., Khan, N. A., Maystrenko, V., & Khan, A. H. (2020). Control of the workplace environment by physical factors and SMART monitoring. *Archives of Materials Science and Engineering, 103*(1). http://dx.doi.org/10.5604/01.3001.0014.1770

Kuzmenko, O. I. (2024). Reduction of Occupational Injuries As a Way to Solve the Problem of the Shortage of Personnel to Reduce Risks in the Energy Industry. *Bulletin of the National Technical University "KhPI"*(1 (8)), 55-63. https://doi.org/10.20998/2224-0349.2024.01.04

Liubchenko, I. M. (2016). Analysis of occupational diseases in recent years. *Bezpeka liudyny v suchasnykh umovakh: zb nauk. st. ta materialiv 8-yi mizhnar. nauk.-metod. konf. ta 115-yi mizhnar. konf. EAS, 8–9 hrudnia 2016 r.* (pp. 622-624). Kharkiv: HO "SFBZhDL". Retrieved from https://repository.kpi.kharkov.ua/handle/KhPI-Press/44170

Mezentsev, S. K. (2024). Implementation of system control and development of new instructions on labor protection. *Modern technologies in industrial production* (pp. 83-84). Sumy: Sumy State University. Retrieved from https://repository.kpi.kharkov.ua/handle/KhPI-Press/77755

Mezentseva, I. K. (2023). Features of acute occupational diseases among workers in hazardous industries in recent years. *Metrolohichni aspekty pryiniattia rishen v umovakh roboty na tekhnohenno nebezpechnykh obiektakh* (pp. 149-153). Kharkiv: materialy Vseukr. nauk.-prakt. Internet-konf. Retrieved from https://repository.kpi.kharkov.ua/handle/KhPI-Press/70881

Mezentseva, I. L. (2017). Survey of occupational diseases at machine-building enterprises. *Human security in modern conditions* (pp. 98-100). Kharkiv: NTU "KhPI". Retrieved from https://repository.kpi.kharkov.ua/handle/KhPI-Press/59530

Mezentseva, I. V. (2024). Problems of Occupational Injuries and Ways of Its Reduction on Example of Ukraine. *Diversity: Disease Preventive of Research Integrity*, 54-62. https://doi.org/10.24252/diversity.v4i2.42873

Migriño, J. R. (2024). COVID-19 Infection Wave Mortality from Surveillance Data in The Philippines Using Machine Learning. *Diversity: Disease Preventive of Research Integrity*, 10-21. https://doi.org/10.24252/diversity.v5i1.49508

Ministry of Health of Ukraine. (1994). *List of works where there is a need for professional selection.* (1994, September 23). Retrieved from https://zakon.rada.gov.ua/go/z0018-95

Ministry of Health of Ukraine. (2007). *On approval of the Procedure for conducting medical examinations of employees of certain categories*. (2007, May 21). Retrieved from https://zakon.rada.gov.ua/laws/show/z0846-07#Text

Ministry of Labor and Social Policy of Ukraine (2005). *On approval of the Procedure for applying Lists No. 1 and No. 2 of industries, works, professions, positions and indicators when calculating the length of service that gives the right to an old-age pension on preferential terms.* (2005, November 18). Retrieved from https://zakon.rada.gov.ua/go/z1451-05

Nagorna, A. M. (2022). Occupational morbidity in Ukraine during the covid-19 pandemic: an epidemiological analysis. *Ukrainian Journal of Occupational Health*. *18*(1), 12-21. https://doi.org/10.33573/ujoh2022.01.012

National Association of Extractive Industry of Ukraine. (2023). *Occupational diseases of workers in the extractive industry: types and ways of minimization.* (2023, February 16). Retrieved from https://neiau.com.ua/profesijni-zahvoryuvannya-praczivnikiv-dobuvnoï-galuzi-vidi-ta-shlyahi-minimizacziï/

Piňosová, M., Andrejiova, M., Badida, M., & Moravec, M. (2021). Occupational disease as the bane of workers' lives: A chronological review of the literature and study of its development in slovakia. part 1. *International journal of environmental research and public health, 18*(11), 5910. https://doi.org/10.3390/ijerph18115910

Protas, S. (2020). *The level of occupational diseases must be reduced immediately.* Retrieved from Ukrainian Union of Industrialists and Entrepreneurs: https://uspp.ua/inicziativi/position/riven-profesiinykh-zakhvoriuvan-treba-nehaino-znyzhuvat y

Ruslan, K., Inshyn, M., Dmytro, S., Yelena, T., & Olena, A. (2020). Occupational safety and health of factory workers in European countries in the nineteenth century: historical and legal analysis. Labor History, 61(3-4), 388-400. https://doi.org/10.1080/0023656X.2020.1775796

Sharma, R., Rahman, K. A., Tyshchenko, V., Illiash, O., & Mezentseva, I. (2023). Analysis of a City's Heat Island Effect on the Micro-Climate Parameters within Cities. Proceedings of the Pakistan Academy of Sciences: A. *Physical and Computational Sciences, 60*(2), 7-16. https://doi.org/10.53560/PPASA(60-2)827

Social Insurance Fund of Ukraine. (2023). *Social Insurance Fund of Ukraine*. (2023). Retrieved from Industrial Injuries in Ukraine: http://www.fssu.gov.ua/fse/control/main/uk/index

Vambol, S. O., Mezentseva, I. O., & Yujun, L. (2023). Educational component as a way of improving status of labor safety of mechanical building industry of Ukraine. Retrieved from https://repository.kpi.kharkov.ua/handle/KhPI-Press/71337

Verkhovna Rada of Ukraine (1992a). *Law of Ukraine on Labor Protection.* (1992, October 14). Retrieved from https://zakon.rada.gov.ua/laws/show/2694-12#Text

Verkhovna Rada of Ukraine. (1992b). *On the procedure for conducting certification of workplaces according to working conditions.* (1992, September 1). Retrieved from https://zakon.rada.gov.ua/go/442-92-%D0%BF

Verkhovna Rada of Ukraine. (2010). *On the approval of safety rules in coal mines*. (2010, march 22). Retrieved from https://zakon.rada.gov.ua/laws/show/z0398-10#Text

Yevtushenko, N. S., Ponomarenko, O. I., Tverdokhliebova, N. Y., Mezentseva, I. O., Semenov, Y. O., & Yevtushenko, S. D. (2022). Ensuring safe working conditions for the prevention of occupational diseases of metallurgical and foundry workers. *Metal and Casting of Ukraine*, 117-125. https://doi.org/10.15407/steelcast2022.03.116