

**ANNOTATION**  
**of the thesis for the PhD degree on the speciality**  
**6D110200 – “Public Health”**

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“Medical and Social Aspects of Occupational Morbidity in the Regions  
of Western Kazakhstan”

**Relevance of the topic**

The main priority in the implementation of the State Health Development Program of the Republic of Kazakhstan "Densaulyk" for 2020-2025 is to strengthen the health of the population to ensure sustainable socio-economic development of the country. The basis of the material and economic well-being of society is the labor force. According to official statistics, 50.3% of the population of the Republic of Kazakhstan is the country's labor force. Currently, the Republic is successfully implementing a program of industrialization of the country, which will lead to an even greater increase in the number of economically active population.

Long-term hygienic studies conducted by scientists of Kazakhstan in the framework of planned research and certification of working conditions of production facilities show that the production and environment of 80% of industrial enterprises of the Republic do not meet sanitary and hygienic standards (Satybaldieva, 2015; Mamyrbayev et al., 2013; Mamyrbayev, 2015). It has been established that more than 2 thousand industrial enterprises are environmental pollutants that contribute to the flow of tens of millions of tons of harmful impurities into the air basin annually (Nurmadiyeva et al., 2018). The weak economic potential of most enterprises does not provide the necessary level of organization of work on reconstruction and technical re-equipment of production facilities, high-quality and timely repair of machinery and equipment, sanitary facilities to combat dust, noise, vibration, normalization of microclimatic parameters in the workplace and other adverse factors of the working environment and the labor process.

Occupational morbidity is the main indicator of the health of the working population, as well as the most important criterion for assessing occupational risk in the workplace. In the region of Western Kazakhstan, the number of economically active population is slightly higher than the average for the Republic and is 66.3%. More than 150 thousand of them are employed in harmful and dangerous working conditions. However, occupational morbidity in the region is one of the lowest in the Republic. At the same time, large production complexes located in the region of oil and gas production, oil and gas processing, mining, petrochemical industry cluster, construction industry enterprises are considered harmful and dangerous by the degree of harmfulness of the production environment and the severity of production processes.

Over the past 10-15 years in Kazakhstan due to changes in the organizational and legal forms of ownership of most enterprises and organizations the system of

medical support at enterprises has been disrupted, which was one of the factors of increasing morbidity and mortality of the working population (mukhametzhanova S. E., 2011). The quality of the country's labor resources is determined not only by the number of workers, but also by their level of health. In recent years, there has been a tendency to reduce not only occupational morbidity, but also the incidence of temporary disability. According to many domestic and foreign occupational pathologists, both temporary disability and occupational morbidity currently do not reflect the real picture of the health of the working-age population (Izmerov et al, 2014; Levashov, 2011; Gubernot et al., 2014; Shengli Niu., 2010). It should be noted that occupational morbidity rates in Kazakhstan as in Russia are 30-45 times lower than in Western European countries and America (Dzhakupbekova et al, 2014). In the Russian Federation, from 7 to 10 thousand people are annually registered with occupational diseases.

The development of modern medicine is impossible without matching the material and technical base of health care to the growing demand of the population. However, the need of healthcare institutions for new medical equipment is currently met only by 30-40%. The system of management decisions in the Republic's healthcare sector has not developed a balance of supply and demand for medical equipment, has not formed a database on the technical condition of medical equipment and the real need of healthcare institutions for medical equipment, and there are no clear criteria and indicators for determining the amount of funding for the purchase of medical equipment and equipment (Tatarintsev, 2012).

In addition, most national health systems, including the Republic of Kazakhstan, face deep-rooted problems of human resource imbalances, which are amplified by demographic, political, socio-economic, technological, and epidemiological changes (Syzykova, 2013). In this regard, there is a need for continuous monitoring and analysis of health personnel resources (Birtanov, 2010).

Currently, there are problems in assessing the quality of periodic medical examinations, since the quality indicators used in the General medical network can only be partially applied (Prokopenko et al., 2012; Khoruzhaya, 2015). An indicator of the quality and effectiveness of medical examinations is the achievement of the main goal of periodic medical examinations-the identification of early signs and initial forms of occupational diseases. According to the legislation in our country, control over the completeness of coverage and timeliness of mandatory medical examinations is carried out by the state body in the field of sanitary and epidemiological welfare of the population. However, the assessment of the quality and effectiveness of this type of medical services is insufficient, since in the current conditions it is possible only with initiated inspections of medical institutions. At the same time, the country lacks clear criteria, algorithms and standards for evaluating the quality and effectiveness of mandatory medical examinations (Sabitova et al., 2019).

It should also be noted that changing the specifics of the course and manifestations of many occupational diseases, require perfection of methodology of examination of communication of disease with profession and social orientation of this pathology determines the need for standardization of processes provide

occupational therapeutic care that provides a unified approach to provision at all stages of care workers (Shalygina, 2013; Izmerov, 2013).

The above determines the relevance and necessity of studying the main factors that determine the level of occupational morbidity in Western Kazakhstan and measures to improve the efficiency of medical care for workers employed in harmful and dangerous working conditions.

### **Aim of study**

Study the factors affecting the level of occupational morbidity in the regions of Western Kazakhstan and justify the criteria for the quality and effectiveness of mandatory medical examinations of employees employed in harmful and dangerous working conditions.

### **Research objectives**

1. Study the number of people employed in harmful and dangerous working conditions and occupational morbidity in the regions of Western Kazakhstan for the period from 2013 to 2017.

2. Study the indicators of occupational risk in the workplace and the degree of presenteeism of employees engaged in harmful and dangerous working conditions.

3. Evaluate the information content of sanitary and epidemiological characteristics of working conditions when examining the relationship of diseases with the profession.

4. Calculate the effectiveness and evaluate the quality of periodic medical examinations of employees engaged in harmful and dangerous working conditions.

5. Analyze the material, technical and human resources of medical institutions that conduct periodic medical examinations of the working population with an assessment of their impact on the detection of diseases.

6. Develop evaluation criteria and a checklist in the field of state quality control of medical services in relation to medical organizations that conduct mandatory medical examinations of employees engaged in harmful and dangerous working conditions.

### **Scientific novelty**

- The most significant factors affecting the level of occupational morbidity in the regions of Western Kazakhstan have been identified and proven.

- For the first time, methodological approaches were developed to determine the levels of regional occupational morbidity, based on the use of the detection coefficient, the coefficient of compliance of the results of mandatory medical examinations during the primary examination of occupational diseases.

- For the first time, the prevalence of presenteeism was calculated among workers employed in industries with harmful and dangerous working conditions.

- Science-based indicators for assessing the quality of early diagnosis of occupational diseases, allowed us to develop criteria for evaluating the activities of medical institutions that conduct mandatory medical examinations of employees engaged in harmful and dangerous working conditions.

### **Practical outcome of the study**

- Establishing the levels of significance of the influence of medical and social factors on regional occupational morbidity, including material and technical, human

resources and the degree of presenteeism, will allow organizations of practical health care to make optimal management decisions on the organization of preventive and health measures for the working population.

- The developed checklists and criteria for evaluating the activities of medical institutions that conduct mandatory medical examinations of the working contingent will allow authorized bodies to conduct systematic monitoring of their activities.

- The revealed low information content of sanitary and epidemiological characteristics of working conditions will allow occupational pathology centers to justify the need to review methodological approaches in the diagnosis of occupational diseases and adapt international standards of occupational medicine in the Republic of Kazakhstan based on scientific assessment of occupational risk.

- The developed set of practical recommendations has been implemented in the departments of health and quality control and safety Of goods and services in the regions of Western Kazakhstan.

### **Main provisions**

1. The level of occupational morbidity in the regions of Western Kazakhstan depends to a greater extent on the material, technical and human resources of medical institutions conducting medical examinations, the quality of mandatory medical examinations, the quality and information content of sanitary and epidemiological characteristics of working conditions.

2. For the majority of workers in enterprises with harmful and dangerous working conditions, the main place among social priorities is the preservation of the workplace, rather than the preservation of health, as indicated by the high prevalence of presenteeism among them.

3. The coefficient of effectiveness of medical examinations, including the coefficient of detection of occupational diseases and the coefficient of compliance with the results of mandatory medical examinations, can be recommended for evaluating the quality and effectiveness of periodic medical examinations.

### **Approbation**

The main results, provisions, and conclusions of the study were discussed and reported on:

- Meeting of the Problem Committee on the approbation of the PhD doctoral candidates' dissertations (Protocol 3);

- Actual problems of the occupational pathology service in Western Kazakhstan Scientific and Practical International Conference dedicated to the 60th anniversary of Marat Ospanov WKSMU "Integration, Partnership, Innovation in Medical Education and Science". October 5-6 (Aktobe 2017);

- The quality of staffing of outpatient clinics conducting medical examinations of the population in the West Kazakhstan region. VII Annual International Scientific and Practical Conference "Actual Issues of Medicine" and "Satellite Forum on Public Health and Public Health Policy." May 2-3 (Baku, Azerbaijan 2018);

- Status of material and technical security of outpatient-and-polyclinic institutions in Atyrau region Western Kazakhstan. The 22nd WONCA World Conference. October (Seoul, 2018);

- Scientific-practical international conference "Actual issues of occupational medicine in Kazakhstan: Chrysotile and Health". Medicine and ecology. November 1-2 (Karaganda, 2018);

- Prevalence of presenteeism among industrial workers. The III International scientific and educational conference "The internationalization of continuing medical education. Prospection". Minerva medica, April 25-26 (Aktobe, Kazakhstan 2019).

### **Publications**

On the topic of dissertation research 11 scientific papers were published: 2 article in an international scientific journal indexed in the Scopus database; 3 articles in publications recommended by the Committee for Control in the Sphere of Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan; 5 - in proceedings of the conferences; 1 methodical recommendation.

### **Implementation of research results**

1. Methodical recommendations based on the results of scientific research on the topic: "Assessment of the quality of medical examinations of workers employed in hazardous working conditions".

2. The act on the implementation of the results of scientific research in practical health care on the topic: "Assessment of the quality of medical examinations of workers employed in hazardous working conditions".

2.1. Agreed with the department of quality control and safety of goods and services in the Aktobe region, approved by ZKMU named after M. Ospanov. Commissioning certificate No. 18 (02.07.2019);

2.2. Agreed with the health department of Aktobe region, approved by Ospanov ZKMU. Commissioning certificate No. 19 (02.07.2019);

2.3. Agreed with the Department of Quality Control and Safety of Goods and Services in WKO, approved by Ospanov ZKMU. Commissioning certificate No. 20 (07/05/2019);

2.4. Agreed with the Department of Health of the WKO, approved by the Ospanov ZKMU. Commissioning certificate No. 21 (07/05/2019);

2.5. Agreed with the department of quality control and safety of goods and services in the Atyrau region, approved by Ospanov ZKMU. Commissioning certificate No. 22 (10.07.2019);

2.6. Agreed with the health department of the Atyrau region, approved by Ospanov ZKMU. Commissioning certificate No. 23 (10.07.2019);

2.7. Agreed with the Department of Quality Control and Safety of Goods and Services in Mangistau Region, approved by Ospanov ZKMU. Commissioning certificate No. 24 (22.07.2019);

2.8. Agreed with the Department of Health of the Mangistau region, approved by the Ospanov ZKMU. Commissioning certificate No. 25 (22.07.2019).

### **Personal contribution of the author**

The author's personal contribution is to develop a theoretical and methodological research program, to formulate research goals and objectives, to organize and conduct research, to engage in all stages of research work, statistical data processing, to write dissertation sections, interpret and discuss the results, to

formulate provisions, submitted to the defense, as well as conclusions and practical recommendations.

### **Volume and structure of the dissertation**

The dissertation consists of introduction, 6 chapters, conclusion, findings, practical recommendations, list of 190 references.

The dissertation is presented on 113 pages of typewritten text, illustrated with 12 tables, 36 figures, containing 11 applications.

### **Findings**

1. In the regions of Western Kazakhstan for the period from 2013 to 2017, a low level of occupational morbidity was registered, which is significantly lower than the average in the Republic ( $p < 0.05$ ). In Atyrau, West Kazakhstan and Mangistau regions, despite the annual increase in the number of people employed in harmful and dangerous working conditions, the indicator of occupational morbidity is close to zero. Correlation analysis showed a statistically significant dependence of the primary identification of somatic pathology on the medical examinations of the total number of workers, particularly expressed in Mangystau ( $r = 0.9$ ) and Atyrau regions ( $r = 0.8$ ).

2. Among the workers of enterprises with harmful and dangerous working conditions revealed a high (61%), the prevalence of presenteeism, and the degree of protection against occupational risks is considered satisfactory, respectively 55%, 58,7%, 61,5%, 73,7% workers in Mangystau, Atyrau, Aktobe and West Kazakhstan regions.

3. Results of laboratory and instrumental studies at 74.5% sanitary-hygienic characteristics of working conditions do not reflect the real working conditions of workers with long working that significantly reduces the value of sanitary-epidemiological characteristics of working conditions, as the basic document in establishing the diagnosis of occupational disease. At the same time, in 11% of cases, in the sanitary and epidemiological characteristics of working conditions, the results of laboratory and instrumental studies were absent at all, and there was no information on the severity and intensity of the labor process.

4. The calculation of the coefficient of detection of occupational diseases and coefficient of conformity of the results of mandatory medical examinations and initial examination of occupational diseases has shown the possibility of their use as a criterion for the effectiveness of medical examinations of the working contingent, which in all the studied regions except Aktobe region, was zero. In the Aktobe region, the coefficient of compliance of the results of mandatory medical examinations and primary examination of occupational diseases in 2013, 2014, 2015, and 2016 was respectively 1,5%, 3,8%, 0,95%, 2,6%, and in 2017, it was zero.

5. In all regions of Western Kazakhstan, with the exception of Aktobe region ( $p < 0.05$ ), medical institutions conducting medical examinations of workers employed in harmful and dangerous working conditions, inadequate equipment and low manpower, which is the main reason for the low detection of somatic diseases in Atyrau ( $r = 0.8$ ;  $r = 0.8$ ), West Kazakhstan ( $r = 0,6$ ;  $r = 0.6$ ), Mangistau ( $r = 0.8$ ;  $r = 0.9$ ).

6. The results of the study allowed us to develop evaluation criteria and a checklist in the field of state quality control of medical services in relation to medical

organizations that conduct mandatory medical examinations of employees engaged in harmful and dangerous working conditions for licensing and post-licensing monitoring of their activities.