

# **OCCUPATIONAL DISEASES IN HEALTH CARE WORKERS**

***Methodical instructions  
for the 6<sup>th</sup> year students  
to the practical class***

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ**  
**Харківський національний медичний університет**

# **OCCUPATIONAL DISEASES IN HEALTH CARE WORKERS**

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for the 6<sup>th</sup> year students  
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# **ПРОФЕСІЙНІ ЗАХВОРЮВАННЯ МЕДИЧНИХ ПРАЦІВНИКІВ**

*Методичні вказівки  
до практичного заняття здобувачів вищої освіти  
VI року навчання*

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## Topic 10: Occupational diseases in health care workers

1. Hours: 3.5.

2. Importance of the topic

Healthcare workers are at high risk of developing diseases due to their daily exposure to biological, chemical and physical hazards. According to the World Health Organization, up to 40 % of healthcare workers are at risk of contracting pathogenic microorganisms every year. Special attention should be paid to the study of specific occupational pathologies, such as infectious diseases, allergic reactions, diseases of the musculoskeletal system and nervous system. For example, in Ukraine, about 30 % of healthcare workers suffer from chronic diseases caused by working conditions. Knowledge about the prevention, early diagnosis and effective treatment of these diseases helps to preserve the health and efficiency of healthcare workers, which is key to ensuring quality healthcare for the population. Taking into account modern research and developing new methodological approaches is necessary for training highly qualified specialists in the field of occupational pathology.

3. Aim of the studying

To acquire knowledge, skills and abilities regarding the conditions and nature of labor activity of healthcare workers; peculiarities of occurrence, clinic, course, diagnosis, treatment, prevention and examination of work capacity for occupational diseases in healthcare workers.

Specific objectives to be achieved after conducting the practical class –

• to know:

1. The main adverse occupational factors that affect healthcare workers.
2. The structure of occupational morbidity in health care workers.
3. Etiological and pathogenetic aspects of occupational diseases in health care workers.
4. Standards for the diagnosis of occupational diseases in health care workers.
5. Protocols for the treatment of occupational diseases in health care workers.

• to get practical skills in:

1. Identify the main unfavorable factors that can cause the development of an occupational disease in health care workers.
2. Evaluate the data on the sanitary and hygienic characteristics of the working conditions of health care workers in relation to existing standards.
3. Explain the relationship between working conditions and the level of occupational morbidity among healthcare workers.
4. Draw up a plan of diagnostic measures to identify occupational diseases in health care workers.
5. Draw up a plan of treatment measures to identify occupational diseases in health care workers.

- to know:
  - to get practical skills in:
6. Principles of prevention of occupational diseases in health care workers.
7. Criteria for the examination of health workers' ability to work.
6. To be able to form risk groups and develop individual measures for the prevention of occupational diseases in health care workers.
7. To carry out the examination of the working capacity of medical workers.

#### 4. Indicative syllabus

- Repetition of the material from previous classes with an assessment of the survival of knowledge;
- Epidemiological information on occupational diseases of healthcare workers;
- Etiopathological factors of occupational diseases of health care workers;
- Features of certain nosological forms of occupational diseases of health care workers;
- Principles of prevention of occupational diseases and examination of working capacity in health care workers;
- Consolidation of knowledge, skills and abilities.

#### 5. Material and methodological support

Visual aids, textbooks, manuals, guidelines, etc.

Online courses of the Department of Internal and Occupational Diseases of Kharkiv National Medical University:

<https://distance.knmu.edu.ua/course/index.php?categoryid=553>.

#### 6. Materials for practical classes:

Adverse working conditions, adverse labour environmental conditions and process of the health care workers include the impact of physical (ionizing and non-ionizing electromagnetic radiation), chemical (including allergenic, carcinogenic), biological (infections, toxins) factors, overstrain (analyzers; neuro-emotional, physical), and fixed body position etc. Development and application of new advanced methods of diagnosis and treatment are accompanied by working conditions with poorly studied character of the effect exerted on the workers.

The highest rate of the occupational diseases is observed in the nurses, and among the doctors - in pathologists, infectious disease specialists and dentists.

The level of the occupational morbidity among physicians is higher than in many workers of leading industries, ranging from 93.2 to 114.7 cases per 100,000 workers.

Among the diseases of the *toxicochemical etiology* in the structure of the occupational morbidity of the health care workers the most prevalent are the upper respiratory tract diseases, toxic hepatitis, blood diseases, and diseases of the nervous system. A large group of the occupational diseases is composed of the allergic diseases.

Damage of the upper respiratory tract caused by chemical substances of irritating action manifests with non-specific inflammatory process in the mucosa, in the case of prolonged exposure – subtrophic and atrophic changes.

The toxic and toxicoallergic hepatitis may develop in the health care workers due to effect of anesthetics and antibacterial drugs.

The work of the nurses, pharmacists, pharmacologists who are in contact with aromatic hydrocarbons (during laboratory research), medicines (non-steroid anti-inflammatory drugs, cytostatics) etc. is characterized by a risk of developing the occupational cardiovascular diseases of the toxicoallergic origin.

Intoxication with the ototoxic drugs (aminoglycosides, cytostatics, analgesics, antiarrhythmic agents, tricyclic antidepressants, and loop diuretics) can lead to the sensorineural hearing loss.

Different types of allergosis are possible among the health care practitioners. The polyvalent sensitization often occurs. The ground for it is the fact that about a third of the doctors and nursing staff are sensitized to the major groups of medications (antibacterial, anti-inflammatory, local anesthetics etc.). In addition, immunopathological processes can be caused by substances used as reagents in laboratories, anesthetic agents, disinfectants, detergents; medicinal herbs and laboratory animals epidermal allergens in vivaria; biological agents (enzymes, vaccines, serum and other blood products), and latex.

Nosological structure of the occupational allergosis in the health care workers mainly includes asthma, rhinopharyngolaryngitis, allergic dermatosis, anaphylactic shock, and toxicoallergic hepatitis.

The latex nasal allergy in the health care workers in 32.5 % of cases runs according to immediate type hypersensitivity and manifests with asthma, allergic rhinitis, urticaria, including 6 % of cases with the severe allergic reactions (angioedema, anaphylactic shock). In 67 % of cases the allergic reactions caused by the natural latex occur according to the delayed-type hypersensitivity and manifest with the contact dermatitis.

Among **physical** hazards the causal factors of the occupational diseases occurrence in the health care workers are different types of ionizing and non-ionizing radiation, which could cause the radiation sickness, local radiation damage, vegetative-vascular dystonia, asthenia, asthenoautonomic, and hypothalamic syndromes.

Radiologists are exposed to the greatest influence of ionizing radiation (more than 5mSv/h).

The laser radiation causes the local skin lesions, sensoriautonomic polyneuropathy of the arms, cataract, and neoplasms.

Each year more and more significance is attached to the impact on the health care staff of high, ultra, ultra-high frequencies of electromagnetic waves of the radio-frequency range. Ultrahigh frequency radiation adversely affects the blood (S-band and mmW-band), the cardiovascular system (millimeter

wave band walls), the central nervous system, causing in particular amnesic effect (decimeter band wave), and the peripheral nervous system.

Noise and vibration under the condition of prolonged exposure (for example, working with the drilling tool in dentistry) may cause damage of the coil receptors and lead to the sensorineural hearing loss. High-frequency sounds that arise during the work of dental equipment lead to non-specific manifestations of noise impact with damage to the nervous system.

Physical **overload** and **overstrain** of separate organs and systems may induce the cervicobrachial radiculopathy and scapulohumeral periarthrosis, varicose veins, progressive myopia, and neuroses.

Awkward position of the trunk leads to relatively rapid development of functional failure of the musculoskeletal system manifested by the fatigue and pain. The first signs of fatigue (e.g. arm muscles of otorhinolaryngologist or dentist) occur already within 1.5–2 hours of work. In the case of prolonged fixed body position due to work (otorhinolaryngologists, surgeons, dentists) disruptions become persistent and lead to formation of certain diseases of the musculoskeletal, nervous and cardiovascular systems – radiculopathies, varicose veins of the lower extremities, and diseases of the spine.

The gynecologists with the long professional experience upon the conditions of frequently repeated movements of fingers (forearm) of the same type may develop such occupational diseases as vegetomyofasciitis or the chronic forearm myofibrosis.

The cervicobrachial radiculopathy among the health care workers may primarily occur in the surgeons, whose work is related to the local stress mainly of muscles of the arm and shoulder girdle, with a fixed body position.

The humeroscapular periarthrosis develops in the health care workers quite often. Its occurrence is related to performance of works involving prolonged withdrawal and lifting of the working hand, rotation of the shoulder. Often the humeroscapular periarthrosis is combined with the neck and shoulder radiculopathy; it is common among dentists.

In general, occupational diseases of the musculoskeletal system are characterized by the gradual onset, absence of inflammatory process manifestations, damage unilateralism (depending on the characteristics of the occupational activity), association between the clinical symptoms and the work done.

The varicose veins of the lower limbs is possible in the health care workers who spend a lot of time in a standing position. Among the significant occupational factors that influence its development is the physical overload, prolonged static load in individuals doing their work standing, such as the surgeons.

The work of certain categories of the medical specialists is characterized by strain of visual analyzer – in microsurgery, dentistry, otorhinolaryngology (small size of objects for distinction), laboratory work, operating microscopes, in other words, their work belongs to a category of visual works of the highest accuracy. The eye strain is determined by a large difference between brightness

of surrounding objects and background, as well as a high load on the eye accommodation during image focusing. Negative factors of work of this category of health workers lead to deterioration of the visual functions, manifested with disorders of accommodation, reduction in the visual acuity, light sensitivity and distinguishing colours stability.

The occupational neurosis may develop in prolonged direct service of the mentally ill people – the work of the medical staff in psychiatric facilities; and the work of ambulance crews, the surgical staff with high psychological strain etc.

A large group of the occupational diseases of the health care workers induced by exposure to the **biological factors** include infectious and parasitic diseases, homogeneous with the infection, with which the workers contacting during their work: tuberculosis, the viral hepatitis, HIV infection, toxoplasmosis, fungal infections of the skin, and syphilis. Dysbacteriosis, candida mycosis of the skin and mucous membranes, the visceral candidiasis develop with the contact of the medical staff in their working process with infectious patients or infected materials, fungi-producers, antibiotics (work in outpatient and inpatient health care facilities, pharmacies, bacteriological laboratories etc.).

Among the most common infectious diseases among the health workers is hepatitis B or C. Infection of the medical staff occurs during the transfusion of blood and its derivatives, the parenteral administration of drugs, carrying out resuscitation, through the damaged skin and mucous membranes. The most at risk to hepatitis infection are the surgeons, anesthetists, resuscitation specialists, obstetricians-gynecologists, laboratory technicians, and medical nurses. The special features of the viral hepatitis in the health care workers include more frequent development of the mixed form (B+C), which aggravates the clinical course of the disease and its prognosis; development of the viral hepatitis on the background of the toxicallergic liver damage; existence of certain resistance to the drug therapy; more frequent development of complications of hepatitis is the liver failure, cirrhosis, and the liver cancer.

The occupational character of hepatitis is identified by a medical-expert committee with participation of the infectious disease doctor and epidemiologist. For relating hepatitis with work, there should be an indication for the fact of infection itself, for example, damage of the gloves should be described, the skin integument etc. when making manipulation, providing the name of the patient with positive markers of the viral hepatitis, for which that manipulation was made.

Prevention of the occupational hepatitis consists in conducting antiepidemic measures, which suggest provision of the health care workers with full and objective information concerning epidemiological situation in the region, the degree of the occupational risk depending on the character of the work, clinical manifestations and consequences of hepatitis. It is necessary to take individual preventive measures. They are: use of personal protective equipment, proper handling of sharp instruments, disinfection and sterilization of reusable medical

instruments according to applicable regulations, use of safe tools; conducting preventive hepatitis B vaccination.

### **Occupational tuberculosis**

Adverse epidemiological status of tuberculosis in its turn caused increase of its incidence among the health care workers. Infection with tuberculosis in the health care workers is possible both in tuberculosis dispensaries (clinics, hospitals, and sanatoria) and institutions of general medical profile – departments of the thoracic surgery, bacteriological laboratories, in other words, where a contact with the tuberculosis patients or contaminated material is possible.

As a rule, tuberculosis in the health care workers usually occurs in “small forms” – the focal, infiltrative tuberculosis, tuberculoma of the upper lobes of the lung, the tuberculous pleurisy. The nurse practitioners and paramedics suffer from tuberculosis more often than physicians. According to the level of risk of the tuberculosis infection the health care practitioners are distributed in the following way: the first place is occupied by the staff of bacteriological laboratories (they contact with a patient with tuberculosis and the living pathogenic culture). Then they are followed by the employees of the tuberculosis dispensaries inpatient departments (they often get infected with strains resistant to the main chemical drugs, which confirms that it is a nosocomial infection). Another risk group is represented by employees of the tuberculosis dispensaries outpatient departments, staff of the pathology and morphology departments: the morbidity among them is 6-8 times higher than the population mean. The staff of the internal medicine departments of large hospitals, ambulance and pharmacy may also become infected with tuberculosis. In particular cases of the *occupational cutaneous tuberculosis* may be diagnosed in the pathologists on the skin of fingers and on the back of the hand.

The occupational origin of tuberculosis can be established after investigation of cases, when infection was conducted by the epidemiologist himself, when he providing the appropriate documents to the occupational pathology inpatient department.

During the treatment the fact, that the course of tuberculosis and its outcome among the health care workers are influenced by aggravating factors, should be taken into account. Those factors are the primary resistance of *Mycobacterium tuberculosis* to major chemotherapy agents, poor tolerance to the chemotherapy agents and reduced resistance to the tuberculosis infection.

### **Prevention of the occupational diseases in health care workers**

It complies with the general principles of prevention of the occupational diseases. It should be noted that often there is a poor quality or even absence of preventive medical examinations among health care professionals. This is due to the fact that health care workers are often engaged in self-medication and the required objective examination is not conducted due to self-reliance of the health care providers; there are cases of falsification of investigation findings.

So, it leads to the conclusion that only about 10 % of the occupational diseases are recorded during the periodic medical examination; for comparison, in various industries, this number exceeds 50 %. Therefore, the immediate challenge is to improve the effectiveness of preventive medical examinations of the health care workers. An important aspect of the occupational diseases prevention in the health care workers is the occupational selection, which allows the rational use of the medical staff according to their physiological characteristics, health status and the nature of work.

7. Practical skills:

1. Conduct a clinical examination of the patient to identify occupational diseases;
2. Distinguish between the signs of various occupational diseases in health care workers;
3. Carry out differential diagnosis of occupational diseases in health care workers;
4. Provide medical care in cases of emergency conditions of occupational etiology in health care workers.

8. Questions for control of knowledge

1. Conditions and nature of labor activity of employees in the medical field;
2. Features of the development of occupational diseases in health care workers;
3. Features of clinical manifestations of occupational diseases in health care workers;
4. Features of diagnosis of occupational diseases in health care workers;
5. Features of treatment of occupational diseases in health care workers;
6. Features of prevention of occupational diseases in health care workers;
7. Features of the examination of the ability to work of medical workers with occupational diseases.

9. Tests for self-assessment (one answer is correct):

1. Which of the following diseases is most common among health care workers who work with chemicals?  
A. *Allergies.*                      C. *Skin cancer.*                      E. *Stroke.*  
B. *Scarlet fever.*                      D. *Myocardial infarction.*
2. Which factor is the main cause of allergic reactions in health care workers?  
A. *Biological agents.*                      C. *Chemical agents.*                      E. *Radiation exposure.*  
B. *Physical overload.*                      D. *Psycho-emotional stress.*
3. Which disease is an occupational risk for health care workers who come into contact with infected patients?  
A. *Tuberculosis.*                      C. *Hypertension.*                      E. *Osteoporosis.*  
B. *Arthritis.*                      D. *Diabetes mellitus.*

4. Which method of prevention is the most effective for the prevention of occupationally transmitted infectious diseases among health care workers?
  - A. *Use of protective clothing.*
  - B. *Regular hand washing.*
  - C. *Immunization.*
  - D. *Use of antiseptics.*
  - E. *Medical examinations.*
5. Which of the following factors most often causes the development of occupational diseases in health care workers?
  - A. *Work with a computer.*
  - B. *Prolonged standing.*
  - C. *Lifting heavy objects.*
  - D. *Allergens.*
  - E. *Vibration.*
6. Which nervous system disease is most common among health care workers?
  - A. *Sciatica.*
  - B. *Neuralgia.*
  - C. *Neurosensory hearing loss.*
  - D. *Neurosis.*
  - E. *Epilepsy.*
7. Which of the following measures is mandatory to reduce the risk of infectious occupational diseases in health care workers?
  - A. *Reduction of working hours.*
  - B. *Ensuring regular rest.*
  - C. *Use of personal protective equipment.*
  - D. *Medical insurance.*
  - E. *Salary increase.*
8. Which skin disease is most common among health care workers?
  - A. *Psoriasis.*
  - B. *Contact dermatitis.*
  - C. *Eczema.*
  - D. *Allergic rhinitis.*
  - E. *Melanoma.*
9. Which occupational disease is associated with excessive noise?
  - A. *Neurosensory hearing loss.*
  - B. *Carpal tunnel syndrome.*
  - C. *Vibration sickness.*
  - D. *Hypertension.*
  - E. *Skin cancer.*
10. Which of the following factors most often leads to emotional burnout among health care workers?
  - A. *Low level of salary.*
  - B. *Lack of career development.*
  - C. *High level of stress.*
  - D. *Long night shifts.*
  - E. *Inappropriate working conditions.*

Answers: **1. A;** **2. C;** **3. A;** **4. C;** **5. D;** **6. D;** **7. C;** **8. B;** **9. A;** **10. B.**

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*Навчальне видання*

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