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**PECULIARITIES OF THE WORKPLACE CHEMICAL FACTORS
INFLUENCE ON THE MEDICAL PERSONNEL HEALTH IN THE
DEPARTMENT OF ANESTHESIOLOGY AND INTENSIVE CARE**

***Abstract.** The risk of adverse reactions as well as allergic symptoms due to the use of chemicals in the workplace among employees of anesthesiology and intensive care units is very high. The majority of doctors, nurses and nursing assistants in such departments experience physical discomfort during work, and at least a quarter have symptoms of allergic diseases. To prevent the harmful effects of chemical factors on health, the medical staff of anesthesiology and intensive care departments should use all available protective equipment. Failure to comply with this rule can lead not only to an increase in discomfort during and after work, but also to the allergic diseases development.*

***Keywords:** chemicals, medical personnel, allergy, protective equipment*

Introduction. The relevance of the study of the chemical factors influence on the health of medical personnel is due to the significant number and variety of drugs, liquids and preparations that medical workers meet daily in the process of their professional activities performing. There is an opinion that the risk of occupational diseases developing in medical workers is comparable to that of workers in industrial enterprises [1]. Hundreds of thousands of health workers are employed in hazardous working conditions. A lot of innovations are being introduced into the

modern healthcare organization aimed at reducing the harmful effects of chemical factors, however, the incidence of occupational diseases associated with harmful working conditions in medical personnel remains high. [2,3,4]. It should also be noted that statistical data on the development of occupational diseases in health workers are significantly underestimated due to frequent cases of self-treatment [1,5].

Some authors especially highlight the danger of inhaled chemicals for medical personnel [2,4,6]. The respiratory protective equipment usage is an important preventive measure for exposure to substances such as aerosol medications, anticancer drugs, chemical sterilizers, high-level disinfectants, and surgical fumes [7]. Other authors also pay attention precisely to inhalation contact with chemicals, especially highlighting carcinogens, asthmagens, and ototoxic substances. The prevalence of exposure to at least one of the asthmagens, carcinogens, or ototoxic agents among medical workers in a study was 92.3%, 50.7%, and 44.6%, respectively. This exposure was highest among nurses and hospital attendants [2]. Another study also clarifies the preferential exposure to chemicals for nurses (61%) and nursing assistants (50.5%) [3]. It is even indicated that there is a significant increase in the risk of miscarriage in nurses who have occupational hazards, including sustained contact with chemicals [8].

Nowadays latex allergy remains relevant: its frequency among health workers is 9.4%, while in the general population it is only 4.3% [9]. The exclusion of contact with latex products is obligatory for etiological treatment. Therefore, in recent years, the use of low-allergenic gloves without powder has been actively introduced, and the frequency of use of other products containing latex in medicine is decreasing. [5].

Thus, modern literary sources indicate the prevailing importance of sensitization and allergic reactions, including asthma, as examples of the chemicals harmful effects on the health of medical personnel, without excluding, however, the importance of other mechanisms of their adverse effects. Most authors emphasize that the effect of chemicals on the body is diverse and consists, in addition to allergic reactions, also in toxic, carcinogenic, mutagenic and other actions [2,3,4,6,8]. Considering the rather rare appeal of medical workers for specialized care [5], the

questioning of medical personnel with the help of special questionnaires is of particular importance in the study of the prevalence and severity of illnesses and other states due to contact with chemicals in the workplace. Many authors consider the development and use of such questionnaires to be a very important factor in the diagnosis of pathological conditions associated with exposure to chemicals in hospitals [2,6,9].

Purpose of the work. to study the influence of workplace chemical factors on the occurrence of health disorders in medical workers of anesthesiology and intensive care departments.

Materials and Methods. We surveyed 40 employees working in the departments of anesthesiology and intensive care using specially designed questionnaires. Among the respondents, there were 13 doctors (32.5%), 19 nurses (47.5%), and 8 nursing assistants and hospital attendants (20%). It should be noted that the doctors agreed to the questioning most willingly, and the nursing assistants were the least willing. Work experience was 1-2 years for 35%, 3-5 years for 17.5%, 5-10 years for 7.5%, 10-20 years for 20%, and more than 20 years for 20 % of respondents. According to the gender composition of the female and male respondents, there were 77.5% and 22.5%, respectively.

Statistical processing of the obtained data was carried out using the Microsoft Excel software package. We also calculated the relative risk (RR) of pathological reactions and occupational diseases associated with the use of chemicals in the workplace. The difference was considered significant if the confidence interval was at least 95% ($p < 0.05$).

Results. All respondents indicated that they had contact with disinfectants and antiseptics in the workplace. In addition, 50% of the respondents noted the fact of contact with antibiotics, 25% - with inhalation anesthetics, and 5% - with chemical reagents.

The majority of respondents (77.5%) when asked whether they regularly use protective equipment, answered unequivocally “yes”. Answers “no” or “almost” were given by 22.5%. We noted the fact that it were doctors who used protective equipment irregularly most often. Among the protective equipment, all respondents

used masks and gloves (100%), 30% in addition use goggles and / or protective screens, 20% - special aprons. The use of protective suits and respirators was noted by 25% of those surveyed; these were employees who had experience of working with coronavirus patients. In all departments where the respondents worked, protective equipment was available; only one person (2.5%) noted the lack of it.

We have calculated the risk of adverse reactions or occupational diseases developing among health workers who did not use protective equipment regularly when in contact with chemicals, in comparison with those who always used it. It was found that among respondents who regularly used protective equipment, periodic discomfort during working occurred in 61%, and the development of allergic diseases symptoms was observed in 24%. Among those who noted the irregular use of protective equipment, discomfort occurred in 89%, and the allergic diseases symptoms were present in 67%. Thus, the relative risk of complaints or transient health problems at or after work was significantly higher in the case of irregular usage: $RR = 1.4503$, $p < 0.05$. The risk of allergic diseases developing in this group of respondents was also significantly higher: $RR = 2.5833$, $p < 0.05$. Thus, the regular use of protective equipment while working with chemicals significantly reduced the risk of both discomfort and the allergic pathology development.

In general, 27 employees of the departments of anesthesiology and intensive care complained about the development of physical discomfort during or after work, which amounted to 67.5% of the respondents. The most common complaints were dry skin of the hands (37.5%), dermatitis (22.5%), itchy skin (12.5%), runny nose or sneezing (12.5%), cough (10%), feeling of itching and irritation in the nose and throat (7.5%), hyperemia of the eyes (5%). Two or more different types of complaints, for example, symptoms from both the skin and the respiratory tract, were noted in 25% of the respondents.

To manage these symptoms, most of the surveyed medical workers used moisturizing creams (30%), as well as oral antihistamines (15%), ointments with corticosteroids (7.5%), moisturizing the skin and mucous membranes using saline solutions (5%), bronchodilators (5%) and nasal corticosteroids (2.5%). Based on the comparison of complaints and the use of medications, it can be concluded that

about half of the respondents used treatment without consulting specialists, which confirms the data from literary sources about the frequency of self-treatment among health workers [1,5].

Allergic diseases (allergic rhinitis, dermatitis and / or bronchial asthma) were observed in 25% of the respondents. Among them, only two people consider allergic pathology to be an occupational disease (5%). One respondent (2.5%) noted the presence of asthma as an occupational disease.

Among doctors, 61.4% of respondents complained of discomfort, while 38% had one or more symptoms of allergic pathology. When interviewing nurses, 74% of respondents had complaints, 31.5% had allergies or its symptoms. As for nursing assistants, 62.5% had complaints, and some symptoms of allergic diseases were in 25%. In the study of the RR of the allergic pathology development depending on the occupational function, we did not find significant differences in different groups of medical personnel comparison.

Conclusions.

1. The risk of adverse reactions as well as allergic symptoms due to the use of chemicals in the workplace among employees of anesthesiology and intensive care units is very high. The overwhelming majority of doctors, nurses and nursing assistants in such departments experience physical discomfort during work, and at least a quarter have symptoms of allergic diseases and require the supervision of specialists and adequate therapy choosing.

2. To prevent the harmful effects of chemical factors on health, the medical staff of anesthesiology and intensive care departments should use all available protective equipment, but at least masks and gloves. Failure to comply with this rule can lead not only to an increase in discomfort during and after work, but also to the allergic diseases development.

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