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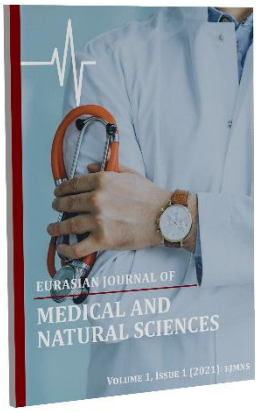

INFLUENCE OF XENOBIOTICS ON THE FUNCTIONAL STATUS OF THE CARDIORESPIRATORY SYSTEM IN CHILDREN AND ADOLESCENTS

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ABSTRACT

The study of the state of health of children and adolescents under the influence of the environment is the leading direction of modern hygienic research.This is caused, on the one hand, by the increasing anthropogenic impact on nature and the associated deterioration of the ecological situation, on the other hand, by the emergence of a complex of new, mainly technogenic environmental factors - xenobiotics that can have a significant effect on humans, especially in the early stages of development of body systems. The most sensitive to the effects of both negative and positive environmental factors are children and adolescents.

Among the chemical pollutants of the environment, a considerable share belongs to xenobiotics - substances of non-natural origin (xenos -alien, biotos — life; Greek). Xenobiotics are environmental pollutants from any class of chemical compounds that are not found in natural ecosystems. The total number of xenobiotics is unknown; according to various estimates, a person uses about 60 thousand chemicals in his life, most of which are purposefully created and are alien to the natural environment. Chemical agents – xenobiotics, which are in industrial emissions in an open atmosphere, even in low concentrations, have toxicity and allergenicity, cause nonspecific changes in a living organism, contributing to an increase in the overall reactivity of the body, the possibility of a negative effect of ammophos dust on the health of children and adolescents is not excluded, due to its constant entry into the body through environmental objects: air, water and food. Therefore, an in–depth study of the effect of ammophosic pollutants -xenobiotics on the state of the cardiorespiratory system, the state of health of children and adolescents is necessary.

Objective

To study the effects of xenobiotic emissions of ammophos production on the functional state of the cardiorespiratory system, as well as to develop a set of health and preventive measures in the zone of exposure to a chemical plant.

Material and methods of research

The main object of observations and research were healthy organized children and adolescents in 2 districts of the city, located at different distances from the

chemical plant of mineral fertilizers. The first group – children and adolescents living in an industrial area, directly in the sanitary zone, and at a distance of 3 km from a chemical plant; the second group – children and adolescents living in the administrative district of the city at a distance of 25-30 km from the specified enterprise. We conducted in-depth medical examinations of preschoolers and schoolchildren. The medical examination was carried out by doctors of the medical team and students of the 6th year of the pediatric faculty of SamSMU. Of all the examined children, 1940 belonged to health groups I and II (921-control). Of these, 639 are preschoolers, the remaining 1,301 are schoolchildren. The main attention was paid to the study of the functional state of the circulatory and respiratory organs, i.e. those systems that suffered more often when exposed to chemical pollutants. The assessment of the circulatory organs was carried out by heart rate, systolic, diastolic and pulse blood pressure, and the state of the respiratory system -by the vital capacity of the lungs, respiratory rate-data obtained during the examination.

Results

Functional indicators of the cardiovascular system of preschoolers: the average values of the pulse rate of preschoolers in the industrial area (A) differs from the corresponding data of children from the control area (B). Accordingly: the data in the age groups from 3 to 6 years in the "A" area is 6.1-7.7 beats per minute more than in the "B" area ($p < 0.001$). With age, this indicator decreases slightly. The decrease in heart rate by 5-6 years indicates the optimization and improvement of the function of the cardiovascular system in all children. This pattern is observed in schoolchildren of industrial and control districts. The heart rate (6.0-8.0 beats per minute) in schoolchildren of the industrial district was lower than in children of the control district ($p < 0.001$). The majority of children and adolescents in industrial (79.8%) and non-industrial (89.3%) districts had normal pulse rates of M+ I GR in all age groups. The pulse value within M + 2 GR and above was considered as a decrease and increase, that is, a violation of the function of the cardiovascular system (10.0%; 3.6 in the "B" area) ($p < 0.05$). The data of spirometric indicators in the industrial area for all ages were on average 60-96 m3 lower than in children of the control area ($p < 0.05$). In schoolchildren of the industrial area, with increasing age, the increase in vital capacity of the lungs is not the same, as in children and adolescents in the control area. This indicator in the industrial area was 36-116 mm3 less. Than in the control groups ($p < 0.001$). The noted changes in children living in an industrial area occur due to the long-term effect of atmospheric pollution and due to the constant shallow breathing of children, which is a protective reaction to the breathing of toxic substances-xenobiotics. As is known, a compensatory protective reaction to a decrease in the vital capacity of the lungs is tachycardia.

Conclusion

Consequently, in children of the industrial district, unlike children of the control district, there are some deviations in the functional state of the cardiorespiratory system, which are manifested by vegetative-vascular lability (decrease and increase in pulse rate), an increase and decrease in pressure, hypotension and tachycardia, a decrease in vital capacity, lungs and a delayed reaction of adaptation of the cardiovascular system, which is associated

with exposure to toxic factors-xenobiotics of chemical production.

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