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Influence Of Ecotoxicants From A Chemical Plant On The Dynamics Of Child Morbidity

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ABSTRACT

Today, when the increase rate of harmful effects of environmental factors and intensity of their influence is already beyond the biological adaptability of ecosystems to changes in the habitat and creates direct threat to life and health of the population, comprehensive study of ecotoxicants and development of measures to combat their spread and damaging effects are actual problems of worldwide importance.

KEYWORDS

Environmental pollution, ecotoxicants, ammophos production, morbidity, respiratory diseases, children, adolescents.

INTRODUCTION

Impact of economic activity, as well as scientific and technological progress on the environment is characterized by production of large amount of pollutants, waste and other factors that lead to changes in natural landscapes, pollution of the atmosphere and natural water resources. Continuous increase and expansion in industrial production of

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chemicals inevitably entail rise of their environmental load. Exceeding thresholds ecosystems' reliability under the influence of extreme anthropogenic factors can cause significant changes in conditions of existence and functioning of biogeocenoses. From the ecological point of view, any chemical pollution is an alien complex in the ecosystem, and it is customary to subdivide them into four hazard classes: I - extremely hazardous (superecotoxcants), II - highly hazardous (ecotoxicants), III - moderately hazardous (ecotoxicants) and IV - low hazardous (xenobiotics). Ecotoxicants are environmentally hazardous factors of chemical nature that can persist for a long time, migrate and accumulate in biotic and abiotic components. In concentrations exceeding natural level, ecotoxicants have a toxic effect both on the environment and on human health. Agricultural production facilities (bases of chemical agents, runways, mineral fertilizer depots, manure storage facilities, livestock complexes etc., where there is an increased concentration of nitrates and other ecotoxicants, including banned and worn-out pesticides). In recent years, these processes have acquired such proportions that led to emergence of a new scientific direction - ecotoxicology, dealing with study and protection of living organisms, including humans, from harmful effects of chemicals. Therefore, an in-depth study of the influence of atmospheric pollution on the state of health, genetic, and reproductive functions of a person is necessary.

OBJECTIVE

To study the effect of emissions from ammophos production on living conditions, well-being and health of children and adolescents, as well as to develop a set of health-improving and preventive measures in the zone of influence of a chemical plant. It has been proved that indicators of physical development, morbidity, prevalence of chronic pathology, the state of cardiorespiratory system and immune status of the body of children and adolescents is a criterion for assessing the impact of atmospheric pollution of ammophos production on the health of children and adolescents.

MATERIALS AND RESEARCH METHODS

Study of children morbidity was carried out according to children's polyclinic treatment records during 2017-2018. When examining morbidity structure differences in age, gender, social and living conditions of children in industrial and control areas were taken into account. The research was carried out in Samarkand, a large industrial city with developed chemical industry. Main object of observation and research were 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 it; the second group - children and adolescents living in an administrative district of the city at a distance of 25-30 km from the specified enterprise. To determine the effect of chemical plant ecotoxicants on children morbidity, the degree of homogeneity of living conditions, material, social, water and medical care in industrial and control areas. Water supply to the population of industrial and control areas was identical. Contingent of children in both industrial and control areas mainly consisted of working-class families (61.4% and 59.4% respectively), families of officers (33.3% and 29.6 %) and other groups (5.3% and 11,0%). It was also noted that living

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conditions of both surveyed areas were relatively same, i.e. the children of both districts mostly lived in equally comfortable apartments. The degree of homogeneity of socio-economic, housing and living conditions of the population both in the industrial and in the control areas did not differ significantly. There were no differences in healthcare of children in both regions.

RESULTS

Based on the studies carried out, it can be concluded that the compared areas were relatively of the same type. This made it possible to compare level of general children morbidity in them. Morbidity in terms of appealability in all age groups is significantly higher in the industrial area compared to the control one. It is especially high among children under the age of 7. However, the higher the age the lower the number of cases of diseases in both districts; the lowest number of cases observed in the age group of 12-15 ($p < 0.05$). When analyzing morbidity, not only intensive (frequency of diseases), but also extensive (structure of diseases) indicators were taken into account. Analysis of the latter is especially necessary for correct planning of hygienic and treatment-prophylactic measures in children's and adolescent institutions. The outcomes showed that in areas with high-level air pollution, the number of sick children increases mainly due to respiratory diseases. In a polluted (industrial) area, such respiratory diseases as SARS, pharyngitis, adenoids, tonsillitis were dominating, making up over the observation period was 1030.6 in industrial area and 428.4 in control zone per 1000 children. Diseases of the respiratory system in the age group under-3-years-old under amounted to 361.8 (206.3) cases per 1000 children, 4-7 years - 320.6 (94.4), 8-11-years old – 235.8 (87.2) and 12-15 years – 112.4 (40.5). Consequently, increase in morbidity of respiratory organs in our case directly depends on air pollution. All this gives grounds to believe that pathology of respiratory system in children and adolescents largely depends on the high chemical pollution of the atmospheric air with xenbiotics of ammophos production. Children and adolescents sufferred not only respiratory diseases, but also other infectious and parasitic diseases, as well as diseases of sense organs. Spread rates of infectious and parasitic diseases were for children aged 1-3 years – 31.6, (9.7); 4-7 years old – 27.1 (5.4); 8-11 years – 12.4 (5.4) 12-15 years – 8.3 (1.3). Diseases of skin and subcutaneous tissue for children were: 1-3 years – 18.2 (10.4); 4-7 years – 14.1 (5.8); 8-11 years old – 9.1 (5.4) and 12-15 years – 4.8 (1.7) ($p < 0.05$). Similar situation was revealed relating sense organs: up to three years – 14,8 (10.3); 4-7 years – 13.4 (4.4); 8-11 years old – 10.8 (4.2) and 12-15 years – 5.8 (3,6). Morbidity in terms of age aspect is largely formed due to respiratory system diseases, infectious and parasitic diseases, diseases of sense organs. In the industrial region, morbidity to diseases of genitourinary system in children and adolescents is 2.7 times, of circulatory system - 1.9 times, the digestive system - 1.7 times, the musculoskeletal system - 1.2 times higher than in the control area. Morbidity in terms of the entire contingent of children and adolescents, taking into account all classes of diseases in the industrial area, is 2.4 times higher than in the control one. Such difference can be seen throughout the entire observation period, and is apparently due to decrease of body's general reactivity of children and adolescents because of effect of ecotoxicants, causing high level of acute morbidity.

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CONCLUSIONS

The study of morbidity of children and adolescents based on the materials of primary referral made it possible to establish that morbidity rate for all nosological forms, in all age groups living in industrial area is higher than in control one. Consequently, the results obtained confirm the need to identify high-risk children from the very first years of life, living in the most contaminated areas in order to carry out a wide range of measures and correct organization of medical examination.

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