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HYGIENIC ASSESSMENT OF ENVIRONMENTAL CONDITIONS IN TASHKENT TAKING INTO ACCOUNT THE LEVEL OF ATMOSPHERIC AIR POLLUTION WITH NITROGEN COMPOUNDS AND COMMUNICATION WITH THE POPULATION SUFFERING FROM CARDIOVASCULAR DISEASES

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Abstract

Purpose: to study the health status of the population suffering from cardiovascular diseases, taking into account the degree of atmospheric air pollution with nitrogen compounds, to develop preventive measures (on the example of Tashkent). To achieve this goal, 4 interrelated tasks were solved.

Object and subject of research: During the scientific research, the atmospheric air and the health of the population of the city of Tashkent were chosen as the object. The subject of the study was the levels of atmospheric air pollution with nitrogen compounds and cardiovascular diseases of the population (on the example of Tashkent).

Research methodology and methods: The methodological basis was based on analytical, mathematical and statistical approaches.

Results: For the first time, data were obtained that gave an objective description of the state of atmospheric air, the importance of atmospheric air pollution with nitrogen compounds for the urban population suffering from diseases of the cardiovascular system, and allowed us to develop recommendations for improving preventive work.

Conclusions: The research carried out in the course of this work allowed us to scientifically substantiate a set of measures to preserve the health of the population.

Keywords: Atmospheric pollution, atmospheric air, environment, nitrogen compounds, monitoring, cardiovascular diseases, population, health, mortality among the population, prevention.

Introduction

Relevance of the problem. At present, most of humanity simply treats the generous gifts of nature as consumers, destroying what the planet has been saving for millions of years. Studies of recent years allow us to assert that the polluted environment is one of the important factors determining changes in the health of the urban population. It has been established that all types of pathology are much more common in ecologically polluted areas, out of 19 classes of diseases, 53% of nosological forms of diseases in the population have a significant relationship with the content of pollutants in the environment, in particular in the atmospheric air (Kireev G.V. et al., 2008). Among the diseases associated with atmospheric air pollution, most researchers distinguish

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diseases of the respiratory system (34.4-35.8%), the nervous system (9.5-10.8%), and the hematopoietic system (8.3-9.5%). Atmospheric air pollution with suspended solids alone can cause up to 21 thousand cases of additional deaths per year from respiratory and circulatory diseases (Ponomareva L.A. et al., 2009, 2010, 2011).

Pollutants entering the atmosphere from stationary and mobile sources can create high concentrations not only at the site of emission (the territory of an industrial site, the location of large motor transport hubs and highways, etc.), but also spread outside the territory of the sanitary protection zone, including the territory of residential areas. The content of the main pollutants in the air basin of the city depends not only on the size of the settlement and its industrial potential, but also on the physical and geographical features of the territory (relief, meteorological conditions, etc.), as well as the layout of settlements.

All of the above largely applies to the city of Tashkent, which is not only the capital of the Republic of Uzbekistan, but also the largest administrative city of the republic with a population of more than 2.5 million people.

In connection with atmospheric air pollution, the frequency of chronic non-specific diseases of the broncho-pulmonary system increases, cardiovascular diseases become more severe.

Nitrogen oxides and especially nitrogen dioxide are among the main components of urban air pollution. Nitric oxide (II) is formed mainly during the combustion of fossil fuels at high temperatures (above 1000 °C) and then transformed into NO2 in the atmosphere. A significant amount of nitrogen oxides is produced by thermal power plants, metallurgical enterprises, large and small boiler houses and vehicles. The typical content of nitrogen dioxide in the air of cities is 20-90 μg/m3 (average annual concentrations); Hourly concentrations can reach 240-850 μg/m3. Very high concentrations are observed near factories producing nitric acid, explosives or near thermal power plants (CHP). Nitrogen dioxide is part of a group of gaseous air pollutants produced by road traffic and other fossil fuel combustion processes.

The purpose of the study:

To study the state of health of the population suffering from cardiovascular diseases, taking into account the degree of atmospheric air pollution with nitrogen compounds, to develop preventive measures (on the example of the city of Tashkent).

To achieve this goal, the following tasks were solved**:**

1. To give a comprehensive hygienic assessment of environmental conditions in Tashkent over the past 3 years, taking into account the levels of atmospheric air pollution with nitrogen compounds.
2. To analyze the level and dynamics of the incidence of diseases of the cardiovascular system in Tashkent over the past 3 years.
3. Conducting a correlation analysis to assess the dependence of health indicators and the demand for medical care of the population with diseases of the cardiovascular

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system on the level of atmospheric air pollution with nitrogen compounds in Tashkent over the past 3 years.

4. To give recommendations on the development of preventive measures aimed at reducing the incidence of the urban population based on taking into account environmental factors.

Materials and methods of research.

Analytical methods for studying the content of nitrogen compounds in atmospheric air. The volume of research and the choice of methods were due to the need to characterize the effect of nitrogen compounds that pollute the environment on the health of the population suffering from cardiovascular diseases.

The studies were conducted during 2021-2023. on the basis of the Department of Ecology and Environmental Protection of the city of Tashkent, the Scientific Research Institute of Public Health and the organization of health care of the department of Tashkent. Based on the data obtained, the relationship between diseases of the cardiovascular system and the degree of atmospheric air pollution with nitrogen oxides was analyzed.

During the research work, the object was chosen the atmospheric air and health of the population of the city of Tashkent. The subject of the study was the levels of atmospheric air pollution with nitrogen compounds (NO2 and NO) and cardiovascular diseases of the population (on the example of the city of Tashkent).

The methodological basis was made up of analytical, mathematical and statistical approaches.

When deciding on the choice of territories for observations, it is necessary to proceed from the fact that they should differ in the nature and degree or only in the degree of atmospheric air pollution and should not differ in the level of provision of medical care to the population, its specialization and organization, as well as in the main socio-economic indicators. The total number of such territories depends on the nature of the settlement in which the study is carried out.

In the organization and conduct of hygienic studies, the results obtained were statistically processed using the principles of evidence-based medicine. In the study of the level of atmospheric air pollution with nitrogen compounds (NO_2 and NO), a longitudinal, prospective study was used, which made it possible to obtain a hygienic characteristic, including an assessment of the average concentration (in mg/m3) of these chemical factors, as well as to determine them maximum and minimum exposure levels from 2021 to 2023 At the same time, permissible values (MPC) were determined in accordance with SanPiN RUZ No 0350-17 "Sanitary Norms and Rules for the Protection of Atmospheric Air in Populated Areas of the Republic of Uzbekistan" (2017) and SanPiN RUz No 0293-11 "Hygienic Standards, List of Maximum Permissible Concentrations of Pollutants in the Air of Populated Areas on the Territory of the Republic of Uzbekistan" (2011).

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Methods for studying the health status of the population suffering from cardiovascular diseases. Taking into account the fact that data on the state of health of the population can be obtained on the scale of at least one polyclinic, the size of such an area should be close to the size of the territory served by this medical institution. To select areas of observation, it is necessary to conduct a preliminary sanitary survey of territories to fully account for the sources of atmospheric air pollution.

When choosing contingents, the entire population can be taken for observation, but the minimum number of persons in the group must be at least 25 thousand, otherwise the data taking into account gender and age characteristics will be unreliable. If the observation is carried out over a large area where a large number of people live, then a sample population (contingent of observations) is formed, the health of which will be studied. To determine the number of sample groups, the sample size is established, which ensures the reliability and reliability of the results based on the use of formulas known in sanitary statistics to determine the permissible error of the indicator. The advantage of the sampling method in comparison with the continuous method is the rapid receipt of sufficiently reliable results.

Data on the morbidity of the population are also an objective indicator of the level and changes in the state of health and one of the main criteria for assessing the reaction of the population to the adverse effects of atmospheric air pollution. The morbidity of the population makes it possible to study both the long-term (chronic) and short-term (acute) effects of atmospheric pollution. The morbidity of the population is studied by copying all cases of diseases of adults and children, both on the basis of materials seeking medical care and on the basis of the results of medical examinations. In other words, the observation of selected contingents is carried out according to the type of statistical or epidemiological study.

Epidemiological research allows for an in-depth study of the causes and factors affecting the health indicators of the population. The cross-sectional epidemiological method of research is used to establish the prevalence of the disease at the time of examination and to detect a statistical relationship between the spread of the disease and potentially dangerous etiological factors. Data on the action (cause) and effect (disease) refer to one point in time. The longitudinal epidemiological method is used if it is necessary to observe a certain group of the population in dynamics. At the same time, a connection is established between the action of etiological risk factors and the occurrence of diseases even when they are separated by a significant period of time.

In prospective studies, groups of exposed and unexposed (cohorted) individuals are observed. Retrospective studies are carried out by comparing the distribution of etiological factors in patients (experimental group) and healthy (control group). At the same time, scientific research is carried out in the direction from effect to cause.

The analysis of the results of studies of the state of health of the population is based on the use of mathematical and statistical methods that take into account the method of formation of contingents, the possibilities of computer processing, mathematical modeling and forecasting. Modern mathematical and statistical methods of analysis

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make it possible not only to establish the fact of the existence of a relationship between changes in the state of health and atmospheric air pollution, but also to determine the quantitative dependence of this relationship with the allocation of the importance of individual pollutants affecting health.

Taking into account the above, for this purpose, we copied the case histories of patients with cardiovascular pathology in Tashkent over the past 3 years, studied the dependence of the frequency of patients on the season and the degree of atmospheric air pollution with nitrogen oxides. On the basis of the data obtained, a correlation-regression analysis of the relationship between diseases of the cardiovascular system (per 10,000 population) and the degree of atmospheric air pollution with nitrogen oxides was carried out.

The development of data on morbidity was carried out on the basis of the existing "International Classification of Diseases, Injuries and Causes of Death, Tenth Revision" (1995). The data obtained were statistically processed with the determination of average values.

Conclusion

To date, it is important to identify quantitative dependencies of the general morbidity of the population of large cities on various levels of atmospheric air pollution, which can be a pathogenetic mechanism for the development and progression of general diseases, including cardiovascular diseases.

In the structure of the considered environmental pollutants, emissions of nitrogen oxides play an important role. The modern mathematical and statistical methods of analysis used in this study make it possible not only to establish the fact of the existence of a relationship between changes in health and atmospheric air pollution, but also to determine the quantitative dependence of this relationship with the allocation of the importance of individual pollutants affecting health.

The established relationship between various degrees of nitrogen oxide pollution and the pathology under consideration will be used by specialists in the development of measures to protect the environment in the region and preserve public health.

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