



UDC 504

ECOLOGICAL CLASSIFICATION OF THE SOUTHERN PRIARALIE WITH A FORECAST OF THE HEALTH STATE OF THE POPULATION BASED ON CLUSTER ANALYSIS

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ANNOTATION

The results of the analysis of the relationship between the data of long-term environmental monitoring of the state of the environment and the incidence rates of the population with type I diabetes are presented. The results of the conducted studies also made it possible to establish that, in ecologically favorable conditions of the territories of Karakalpakstan, the incidence of type I diabetes is dependent on environmental factors in 4.25% of cases, on ecologically conditionally favorable - in 10.15% of cases, on ecologically unfavorable - in 13.75 % of cases.

KEY WORDS: *population, territory, diseases, diagnostics, method, treatment.*

Diabetes mellitus is considered a priority problem in the national health care system in almost every country in the world. The emergence of the disease and its development is associated not only with medical and social, but also with environmental problems. Therefore, the identification of the morbidity of the population, taking into account the ecological conditions of the territory, is of current importance.

The increase in the incidence of diabetes is observed regardless of the success achieved in the study of various aspects of the development of the disease, the development of new diagnostic methods, and the introduction of modern treatment methods. This, of course, is due not only to a genetic predisposition to the disease among people of different nations, but also to environmental factors. In addition, the latest modern medical and social research confirms that the environment and anthropogenic factors have a special place in the onset and development of diabetes mellitus. In this regard, the identification of the quantitative relationship between the incidence rate and the state of the environment, as well as the development of environmental principles for predicting the incidence of diabetes in the population in the Aral

Sea region are of great scientific and practical importance.

After gaining independence, the republic carried out large-scale reforms in the medical and social sphere. In the Action Strategy for the further development of the Republic of Uzbekistan, "the implementation of systemic measures to mitigate the negative impact of the drying up of the Aral Sea on the livelihoods of the population" and "ensuring a decrease in morbidity and life expectancy among the population" are outlined as special tasks. Based on these tasks, the identification of the relationship between the ecological living conditions of the population of the Aral Sea region and the prevalence of type I diabetes mellitus and the organization of scientific research should be aimed at predicting the incidence of diabetes mellitus on the basis of comprehensive environmental analyzes.

The analysis of the habitat of children and adolescents born and living in the South Aral Sea region was carried out on the basis of collecting and processing environmental and hygienic information on the composition and severity of adverse environmental factors according to the laboratory of ecology of the Republican Center for State Sanitary and Epidemiological Surveillance of the Ministry of Health



of the Republic of Karakalpakstan. The air quality was studied on the basis of the data provided by the Glavhydrometeorological Center of the Republic of Karakalpakstan.

According to the territorial differentiation of the Republic of Karakalpakstan, we have identified: northern regions - areas of environmental risk - Muynaksky, Takhtakupyr and Kungradsky, Shumanaysky, Kanlykuly; central regions - of possible environmental risk - Nukus, Kegeili, Chimbay, Karauzyak, Khodzheli, as well as southern regions - areas with the most optimal ecological living conditions - Amu Darya, Beruniy, Ellikkala and Turtkul.

A total of 732 cases of type I diabetes in children, 463 and 269 cases of adolescents, were analyzed for the period from 2000 to 2015. Of these, there were 384 boys (52.3%), 348 girls (47.7%).

The research methodology is based on international principles of organizing and conducting medical and environmental research. To analyze the trend of incidence rates, the absolute increase and decrease, the rate of growth and decline were calculated. For a correct comparison of the incidence, standardized incidence rates were taken into account by the method of direct standardization, in which the incidence was considered for a standard human population. The ecological characteristics took into account the amount of various emissions of pollutants into the atmospheric air of the territories from stationary sources, the amount of pesticides introduced into the soil and the amount of pollutants in the composition of wastewater discharged into open water bodies, as well as the state of the quality of drinking water used by the population of Karakalpakstan.

At the first stage of research, as a result of long-term environmental monitoring of the

environment and morbidity indicators of the studied population groups, the features of the environmental situation in the Southern Aral Sea region were established, which include significant pollution of atmospheric air, drinking water, agricultural land, water bodies with industrial and domestic wastewater [3,10].

To prove the quantitative effect of anthropogenic pollutants on the incidence of type I diabetes in adults and children, mathematical models were built with the calculation of the coefficient of determination (R^2), reflecting the share of the influence of each polluting factor [1].

The obtained information on morbidity and the ecological classification of morbidity areas allows assessing the state of morbidity by territorial units to carry out a comprehensive assessment of the incidence, taking into account the results of forecasting and classification taking into account an integrated approach. Analysis and verification of forecast models showed that the forecasting accuracy is quite high, the results obtained are acceptable for making managerial decisions in the procedure for choosing preventive measures and rehabilitation measures in the formation of target complex programs.

On the basis of modeling, the ranking of the districts of the South Aral Sea region by the incidence of type I diabetes was carried out. As a result of the cluster analysis, all areas of the region were allocated into three classes for type I diabetes. Statistical processing was carried out using the CSS package of biomedical programs, and Euclidean distance was used as a measure of proximity. The results of the classification of areas are shown in Fig. 34. Cluster analysis made it possible to distinguish 3 classes, including 1 class with a low level of diseases; 2 - class with an average level of diseases; 3 - class with a high level of diseases [3,10].

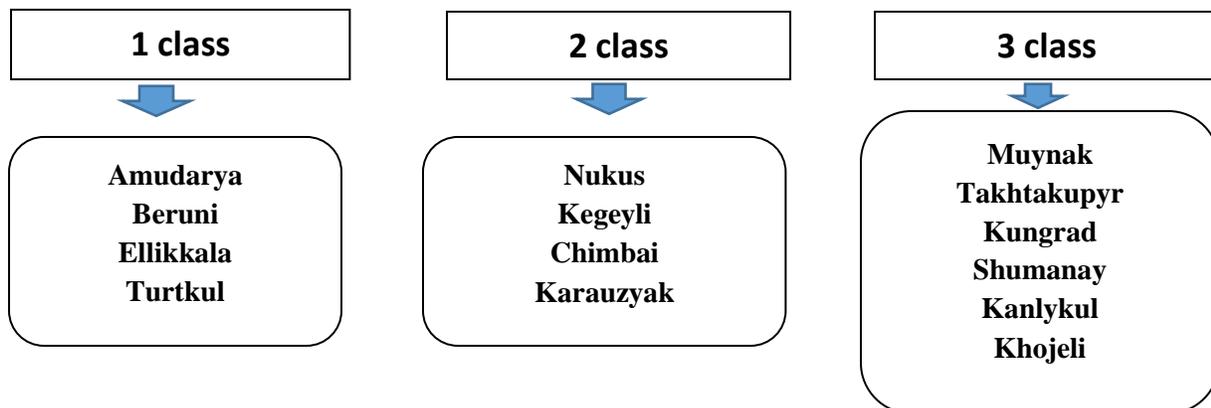


Fig. 1 Classification of the regions of the South Aral Sea region based on cluster analysis



Note that all the southern regions of the Aral Sea region - Amudarya, Beruniy, Ellikkalinsky and Turtkulsky - are assigned to class 1 with the expected low incidence of type I diabetes. Only Nukus, Kegeili, Chimbay, Karauzyak districts were allocated to the second class with an average level of diseases. And the following northern regions were identified as class 3 with an expected high incidence of type 1 diabetes: Muynak, Takhtakupyr and Kungrad, Kanlykul, as well as from the central zone - Shumanai, Khojeli districts.

Thus, on the basis of the studies carried out, it has been established that the proportion of the influence of unfavorable environmental factors on the epidemiological indicators of type I diabetes increases as the environmental load increases. The results of the studies carried out also made it possible to establish that in ecologically favorable conditions of the territories of Karakalpakstan, the incidence of type I diabetes is dependent on environmental factors in 4.25% of cases, on ecologically conditionally favorable - in 10.15% of cases, on ecologically unfavorable - in 13.75 % of cases.

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