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ENVIRONMENTAL CLASSIFICATION OF THE SOUTHERN ARAL REGION WITH POPULATION HEALTH FORECAST BASED ON CLUSTER ANALYSIS

Annotation

The article considers the ecological classification of the Southern Aral Sea region with the forecast of the health status of the population based on cluster analysis. The obtained information on morbidity and the ecological classification of morbidity areas makes it possible to assess the state of morbidity in the region.

Key words: *assessment, cluster, analysis, health, problem, disease.*

In the national health system of almost all countries of the world, diabetes mellitus is considered one of the problems of paramount importance. 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 incidence of the population, taking into account the environmental conditions of the territory, is of current importance.

An increase in the incidence of DM is observed regardless of the progress made in studying various aspects of the development of the disease, developing new diagnostic methods, and introducing modern methods of treatment. This, of course, is connected not only with the genetic predisposition to the disease among people of different nations, but also with environmental factors. In addition, recent modern medical and social studies confirm that the environment and anthropogenic factors have a special place in the occurrence and development of diabetes mellitus.

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 the collection and processing of environmental and hygienic information on the composition and severity of adverse environmental factors according to the laboratory of ecology of the Republican Center for Sanitary and Epidemiological Surveillance of the Ministry of Health of the Republic of Karakalpakstan. Atmospheric air quality was studied on the basis of data provided by the Main Hydrometeorological Center of the Republic of Karakalpakstan.

According to the territorial differentiation of the Republic of Karakalpakstan, we have identified: the northern regions - areas of environmental risk - Muynak, Takhtakupyr and Kungrad, Shumanai, Kanlykul; the central districts - of possible environmental risk - Nukus, Kegeyli, Chimbay, Karauzyak, Khodzheli, as well as the southern districts - areas with the most optimal environmental conditions - Amu Darya, Beruni, Ellikkala and Turtkul.

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

At the first stage of research, as a result of long-term environmental monitoring of the state of the environment and morbidity rates of the studied population groups, the features of the ecological situation in the South Aral Sea region were established, which include significant pollution of atmospheric air, drinking water, agricultural land, water objects with household and domestic wastewater.

To prove the quantitative impact of anthropogenic pollutants on the incidence of type 1 diabetes in adults and children, mathematical models were built with the calculation of the coefficient of determination (R2), which reflects the share of influence of each polluting factor.

The obtained information on morbidity and the ecological classification of morbidity areas makes it possible to assess the state of morbidity by territorial units, to conduct a comprehensive assessment of morbidity, taking into account the results of forecasting and classification, taking into account an integrated approach.

Analysis and verification of forecast models showed that the accuracy of forecasting 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.

Based on the modeling, the districts of the South Aral Sea region were ranked according to the incidence of type 1 diabetes. As a result of the cluster analysis, all districts of the region were divided into three classes according to type I DM. Statistical processing was carried out using the CSS biomedical software package, and the Euclidean distance was used as a proximity measure. The results of the classification of areas are shown in fig. 34. Cluster analysis made it possible to identify 3 classes, among which 1 is a class with a low level of diseases; 2 - class with an average level of diseases; 3 - class with a high level of diseases.

It should be noted that all the southern regions of the Aral Sea region - Amudarya, Beruni, Ellikkala and Turtkul - are allocated to class 1 with an expected low incidence of type 1 diabetes. Only Nukus, Kegeyli, Chimbay, Karauzyak districts are allocated to the second class with an average level of diseases from the central regions. And to the 3rd class with the expected high incidence of type 1 diabetes, the following northern districts were identified: Muynak, Takhtakupyr and Kungrad, Kanlykul, as well as from the central zone - Shumanai, Khodzheli districts. Thus, on the basis of the conducted studies, it was found that the share of the influence of unfavorable environmental factors on the epidemiological indicators of type 1 diabetes increases with the increase in the environmental load. The results of the 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, in environmentally conditionally favorable - in 10.15% of cases, in environmentally unfavorable - in 13.75 % of cases.

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