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Influence of Ecology on Population Anemicity in the Aral Sea Region

N. T. Abdizhaliev [1], M.K. Saytova [2], I. I. Nazhimov [3], Sh. P. Kaypova [4]

Abstract: Anemia-a disease accompanied by a decrease in the number of erythrocytes and hemoglobin in the blood and a change in its quality. They differ in age, sex, altitude, behavior, smoking and quantity at different terms of pregnancy. In the Aral Sea region there is environmental pollution by various chemicals. Studies have revealed changes in blood pressure, heart rate disorders, heart rate variability and its correlations with anthropometric parameters in adolescents and young people living in this region. However, scientific work on blood composition is limited. In the course of our study in schools located in Nukus, Muynak and Turtkul districts of the Republic of Karakalpakstan, we analyzed data on hemoglobin levels in 188 adolescents of different ages (12-15 years old). The unfavorable situation caused by the drying up of the Aral Sea negatively affects the hemoglobin level of schoolchildren living in the Aral Sea region, and a "mild" type of anemia was detected in them.

Keywords: anemia, hemoglobin, Aral Sea Region, pesticides.

Introduction.

Anemia is a condition in which the number of red blood cells (and therefore their ability to carry oxygen) is insufficient to meet the physiological needs of the body. Their number varies according to specific physiological needs: a person's age, gender, altitude, behavior, smoking and at different stages of pregnancy.

The most common cause of anemia worldwide is iron deficiency, but anemia can be caused by acute and chronic micronutrient deficiencies (folic acid, vitamin B12 and vitamin A), including other types that can lead to hemoglobin synthesis, red blood cell formation, congenital or acquired diseases. However, it is also necessary to measure hemoglobin concentrations; not all types of anemia are caused by iron deficiency. Anemia is considered an essential indicator of health, and it, along with other indicators of iron status, hemoglobin concentration can provide information about the degree of iron deficiency [14].

The overall estimates for anemia have remained unchanged since 1968 (except for the dissociation of the early age group of children). Establish a lower limit of 5 g/L for children aged 5-11 years, and this would show results among children. A hemoglobin limit of 110 g/L for pregnant women was first demonstrated in a 1968 report along with the results of the study above. In healthy women with iron deficiency, hemoglobin concentrations change dramatically during pregnancy to adapt to the blood and iron needs of the fetus [13]. Living above sea level and smoking are known to increase hemoglobin concentrations [15, 16]. For this reason, the prevalence of anemia, if applied, may be underestimated because of the standard limitations on anemia in people living at high altitude and among smokers.

Aral Sea Region is an area prone to environmental pollution by various chemical substances, the presence of dust and salt storms, atmospheric air pollution. Studies have revealed changes in blood pressure, heart rate disorders, heart rate variability and its correlation with anthropometric indices in adolescents and young people living in this region [2, 6, 8, 12]. However, scientific work on blood composition is limited [10, 11].

[1],[2,4] Department of General Biology and Physiology, Karakalpak State University named after Berdakh, Ch. Abdirov str, 1, Nukus, Republic of Karakalpakstan, Uzbekistan

[3] Interdepartmental Department of Physical Education, Karakalpak State University named after Berdakh, Ch. Abdirov str, 1, Nukus, Republic of Karakalpakstan, Uzbekistan

Material and methods.

In the course of our study in schools located in Nukus city, Muynak and Turtkul districts of the Republic of Karakalpakstan, we analyzed data on the level of hemoglobin in 188 adolescents of different ages (12-15 years old). During the study, blood values for hemoglobin levels were analyzed based on the data collected by the school nurse and laboratory staff. To diagnose anemia, hemoglobin count data (grams/liter) were interpreted based on the following table.

Table 1. Amount of hemoglobin (grams/liter) for diagnosis of anemia

Population	Norma	Anemia		
		Mild*	Moderate	Severe
6 -59 months	110 or higher	100-109	70-99	Under 70
5-11 years old	115 or higher	110-114	80-109	Under 80
12-14 years old	120 or higher	110-119	80-109	Under 80
>15 years old (Non-pregnant women)	120 or higher	110-119	80-109	Under 80
>15 years old (Pregnant women)	110 or higher	100-109	70-99	Under 70
>15 years old (men)	130 or higher	100-129	80-109	Under 80

All results were performed using the functions of the Excel program installed in the Microsoft Office 2010 application package; using the statistical data processing program MicroCAL Origin v.6.10.

The results obtained and their discussion.

The tests showed that the quantitative indicators of erythrocytes (hemoglobin and erythrocyte count) in all the examined children differed significantly depending on where the children lived.

For example, boys 12-14 years old living in Muynak and Nukus districts had a "mild" type of anemia. Boys 12-14 years old residing in the Turtkulsky District had normal hemoglobin levels. The 15-year-old boys living in all the studied areas (Muynak, Nukus and Turtkul) were found to have a "mild" type of anemia (Figure 1).

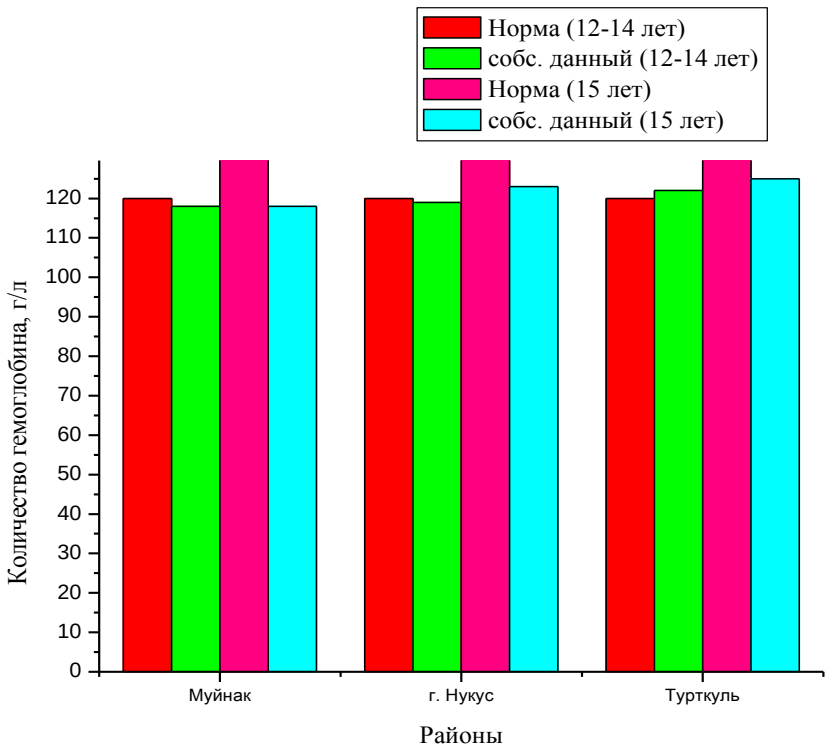

Figure 1. Comparison of hemoglobin levels in schoolchildren (boys) of Muynak-Nukus-Turtkul district of the Republic of Karakalpakstan with the norm

Girls 12-14 years old living in Nukus and Muynak districts had hemoglobin levels below the norm. That is, a "mild" type of anemia was detected. Girls living in Turtkul district of the same age had a normal hemoglobin level. It was found that non-pregnant 15-year-old girls living in the districts studied (Muynak, Nukus City, and Turtkul) had a hemoglobin level below the norm (Fig.2).

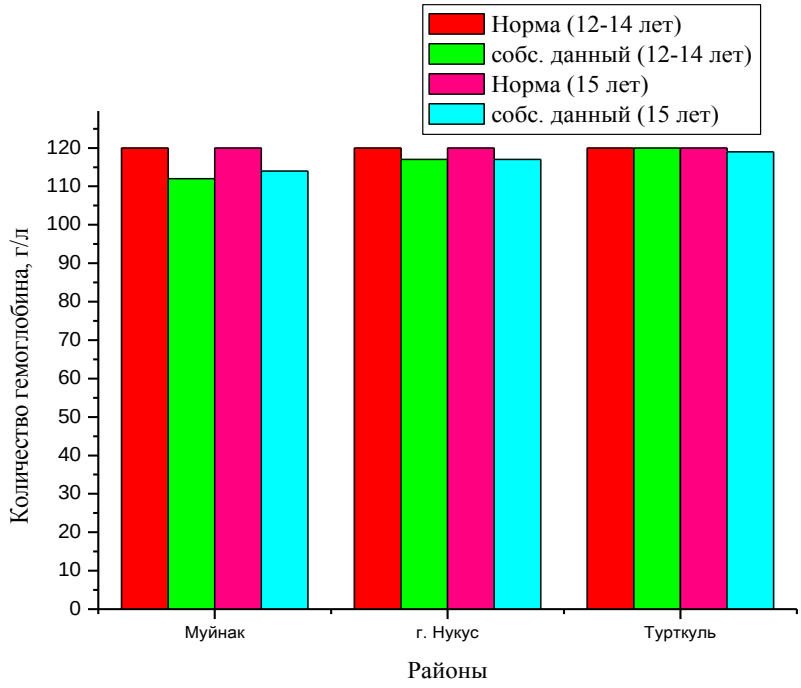

Figure 2. Comparison of hemoglobin levels in schoolchildren (girls) of Muynak-Nukus-Turtkul district of the Republic of Karakalpakstan with the norm

We believe that the reason for obtaining such statistics may be not only environmental factors, but, in addition, the chemicals used for 16 years (from 1980 to 1995). In Karakalpakstan in 1980-1995, 32,000 tons (100% in relation to the active substance) were extracted in a total of 55 to 69 tons [4, 7, 11] of pesticides with different names first place is taken by magnesium chlorate (14,000 tons).

The amount of pesticides applied from 1986 to 1991 increased by 304 tons compared to 1980-1985. From 1992 to 1995, pesticide use decreased in all counties. In terms of chemical composition, pesticides with inorganic metal-preserving compounds (43.9%) lead among the pesticides used for 16 years. The 2nd place is occupied by anilides of carboxylic acids with halide inclusion (15.2%), the 3rd place by pesticides of organophosphorus class (14.5%), while introduction of magnesium chlorate increased from year to year [4].

Based on the data presented, we can see not only adverse effects of pesticides on abiotic factors, but also harmful effects on all other living organisms. Feed of plant and animal origin is damaged not only by pesticides, but also by metabolites negatively affecting human health. Humans now receive 85% of pesticides through feed. A small amount of pesticides entering the body causes negative consequences, causing various manifestations of developing diseases [4]. Analysis of a number of authors shows that an increase in the amount of pesticides in the external environment has a negative impact on public health. Most foreign and national researchers study the amount of residual pesticides left in the external environment and the composition of nutrients. They found an increase in the amount of pesticides in most cases in the studied objects [4].

Egov E.A. and other researchers (1986) believe that pesticides accumulate in large amounts in all organs, mainly in adipose tissue. In the liver, organochlorine and organophosphorus compounds accumulate unchanged. Nikolaev A.I., Katsenovich L.A., etc. T. Dadabaev (1988), analyzing data in the literature, warns that sufficiently high amounts accumulate in the fetus, causing embryotic effects, which then enter the child's body through breast milk in the postpartum period, causing morphological and functional changes in organs (especially in the liver). Numerous experimental and clinical studies show the harmful effects of pesticides on the body [4].

It has been established that exposure of the body to pesticides (in acute and chronic poisonings) can be one of the main etiological factors in the development of pathology, provoking and aggravating many nonspecific diseases, including respiratory, cardiovascular, digestive, nervous system and gynecological pathologies [3]. Many authors suggest that organochlorine compounds (DDT, aldrin), organophosphorus compounds (chlorophos, Metaphos, phosphamide), carbamate (Sevin) pesticides can cause cardiovascular pathologies (experimental pituitary coronary insufficiency, adrenocaffeine myocarditis, cholesterol atherosclerosis) and the liver (carbon tetrachloride-induced toxic hepatitis) negatively affect the occurrence and course [3].

Another study examined 200 greenhouse workers who had a continuous production relationship with low levels of pesticides. It examined the characteristics of red blood parameters and found that the severity of cases of anemia correlated with the intensity of exposure to pesticides. It was found that the erythron system has an increased sensitivity to pesticide exposure, which can serve as one of the criteria for early diagnosis of chronic pesticide intoxication [9].

Even "minor" exposure of people to toxic substances in pesticide production plants can cause a decrease in hemoglobin levels, a decrease in the number of erythrocytes, the development of anemic status in most men and in 80% of women. However, in another study, subjects with acute pesticide intoxication were found to have decreased hemoglobin content in red blood cells [1].

In mechan mechanics in contact with pesticides there were signs of anemia, leading to changes in the morphofunctional parameters of leukocytes, neutropenia, lymphocytosis, eosinophilia and a decrease in stored energy substrates (glycogen and lipids) in neutrophils [5].

Conclusion. From the results we can assume that the unfavorable situation caused by the drying up of the Aral Sea negatively affects the level of hemoglobin in schoolchildren living in the Aral Sea region, and a "mild" type of anemia was detected in them.

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