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IRON DEPENDENCE OF THE POPULATION INDICATOR OF COVID-19 DISEASE

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Key words: wheat, biofortification, anemia, iron, "hidden hunger", viruses, Covid-19, trace elements, immunity, variety, vitamins.

According to world health statistics, many countries have been affected by the coronavirus pandemic. High fever, headache, body aches, diarrhea, dry cough and pneumonia are symptoms of SARS (Severe Acute Respiratory Syndrome) caused by the coronavirus. The word "corona" means "crown". The coronavirus has a small crown of visible spike protein. These spike proteins bind to ACE2 receptors in the cells of the respiratory system. Once inside the cell, the coronavirus injects the encoded viral RNA into our cells to produce more protein and virus. SARS-Cov-2, also known as Covid-19, is the cause of the current pandemic. It was identified in December 2019 in Wuhan, China. The virus had previously been found in a wild animal, most likely a bat, and was found in humans during tests during the Wuhan pneumonia outbreak. Then it spread throughout the world, and on March 15, 2020, the disease returned to Uzbekistan for the first time.

The virus can be airborne and cause breathing difficulties. Other symptoms may be mild or severe. Everyone is weakly protected against the unknown virus, but it most affects older people, those with cancer, obesity, cardiovascular disease, or similar comorbidities. Persons with immunodeficiency and similar individuals are susceptible, and those who recover from the first infection may be re-infected.

Patients with anemia are also more likely to develop other infectious diseases. Iron deficiency in the body leads to a decrease in the number of macrophages and granulocytes in the tissue, as well as to impaired antibody production. The main cause of immunodeficiency in iron deficiency is a decrease in the activity of iron-containing cell receptors, proteins and enzymes. IDA (Iron deficiency Anemia) contributes to disorders of the immune system (lysozyme, B-lysines, complement, decreased levels of certain immunoglobulins and decreased levels of T- and B-lymphocytes), high infectious disease and the emergence of secondary immunodeficiency. Iron in the excretion of harmful substances in the body, enzymes (cytochrome) is also involved in protective activity of the human body. Human tissues contain mainly two iron-containing enzymes, supperoxide dismutase and catalase, which protect the body's tissues from free radicals. Modern research shows that high levels of hemoglobin in erythrocytes are first and

foremost due to high levels of iron in brain cells. Iron levels in brain tissue are involved in the regeneration of synaptic nerve impulses, myelination of nerve fibers, and hypothalamic function. The activity and sensory ability of the brain depends on the amount of iron in the body [2].

Anemia is one of the most common pathologies in the world. According to WHO experts, the prevalence of anemia among the population for health reasons was studied in 3 groups: mild (5% -19.9%), moderate (20% -39.9%) and high (40% or more). In countries with a high prevalence of anemia, a medical approach alone is not enough to solve the problem, so decisions must be made at the state level.

In particular, in the concept of prevention of non-communicable diseases in 2019-2022, support of healthy lifestyles and increasing the level of physical activity of the population "… The level of micronutrient enrichment of wheat flour is 30% of all types of flour produced and imported" [6].

The loss of nutrients during the industrial production of food products leads to a decrease in the nutritional and biological value of products [7, 8, 9].

Today, one in three people in the world are deficient in micronutrients such as vitamin A, zinc and iron, which are essential for a healthy life. The essence of these substances is that they have specific properties in the field of action, are directly part of biologically active substances that regulate life processes. Therefore, such a deficiency of micronutrients can lead to a violation of any chemical changes that do not occur without the participation of enzymes or hormones. This condition is called "hidden hunger" and humanity suffers from it [11].

Although a person looks healthy with anemia caused by chronic malnutrition, actually has a higher risk of developing other infectious diseases. In extreme cases, latent starvation leads to blindness, growth and mental retardation in children, an increased risk of maternal death in women and childbirth, and a decrease in working capacity in adults [12].

Anemia is a disease characterized by a decrease in the amount of hemoglobin and (or) a decrease in the number of red blood cells per unit volume of blood. Anemia is more common in children and pregnant women. It is one of the most serious diseases due to its complications such as anemia, physical development, and impaired iron (Fe) metabolism. Iron deficiency anemia can also lead to other diseases. Anemia affects many organs and systems. The most striking symptom of anemia is constant fatigue and lethargy [12].

Along with other countries of Central Asia, the incidence of iron deficiency anemia in Uzbekistan is very high. According to S.M.Bakhramov, in particular, the

incidence of iron deficiency anemia among women of childbearing age is 60% [10].

Usually foods for humans, including wheat flour, are enriched with minerals and vitamins. However, this is not the case for people in many developing countries [11, 13]. In addition, artificial food fortification certainly requires additional costs and labor. Therefore, it is important to focus on increasing the amount of minerals and vitamins in the grain of new crops, including wheat.

Wheat (*Triticum spp*.) is one of the staple foods consumed by one third of the world's population. While Central Asia ranks first in the world in terms of average annual consumption of flour and bakery products, Uzbekistan and Tajikistan rank first in the region in this indicator [15,16,17].

The main purpose of this study is to investigate the interaction of iron (*Fe*) in some varieties of wheat grown in the grain fields of an anemic country, based on surveys and laboratory analyses.

Conducting survey. The survey was conducted in 2021 in the Kashkadarya region, conditionally divided into 3 study regions. At the same time, the cities of Karshi and Shakhrisabz are the first (central) district; the second (mountain-foothill) territory of Dekhkanabad, Yakkabag, Shakhrisabz, Kitab regions; and Guzar, Kamashi, Karshi, Kasan, Mirishkor, Mubarek, Nishan, Kasbi, Chirakchi regions were divided into the third (desert) zone.

Research results. First of all, for this study, data were obtained on the sown areas of selected varieties for the period 2019-2021. According to the data on the sown area for 3 years, the “Krasnodar-99” variety was sown on 23.9 thousand hectares less than the sown area, and the “Gozgon” variety - 93.9” thousand hectares - is dominant. Of the four selected varieties “Grom” and “Yaksart” were planted on 50.2 thousand and 67.7 thousand hectares, respectively.

In the next part of the study, a special survey was conducted to examine the significance of micronutrients in wheat for public health based on the links between the incidence of anemia and iron deficiency. As mentioned above, the survey was conducted in 2021 in the Kashkadarya region, conditionally divided into 3 regions. 747 respondents took part in the survey. In terms of regions, they were: Central district - 259; mountainous region - 200; and desert area - 288. The survey involved 127 people under the age of 20 (17%), 129 people aged 20-29 (17.3%), 165 people aged 30-39 (22.1%), 150 people aged 40-49 (20.1%).) and 176 (23.6%) respondents aged 50 and older (Fig. 1). 29% (216 people) of the respondents had a higher education and 71% (531 people) had a secondary education.

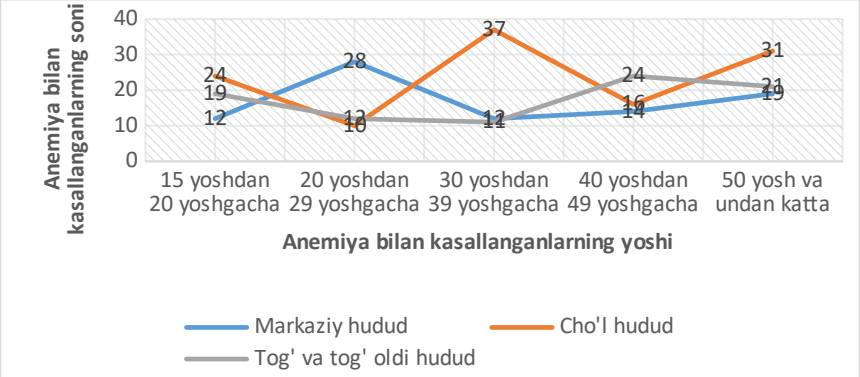

Figure 1. Anemia rate of respondents surveyed in Kashkadarya region

When analyzing the health status of respondents with anemia, it is known that only 39.1% (292 people) suffer from this disease, and 60.9% (455 people) are healthy, i.e. there was no anemia. And 399 of them were found to have consumed wheat grown in the country's grain fields and on their own farms. (Figure 2)

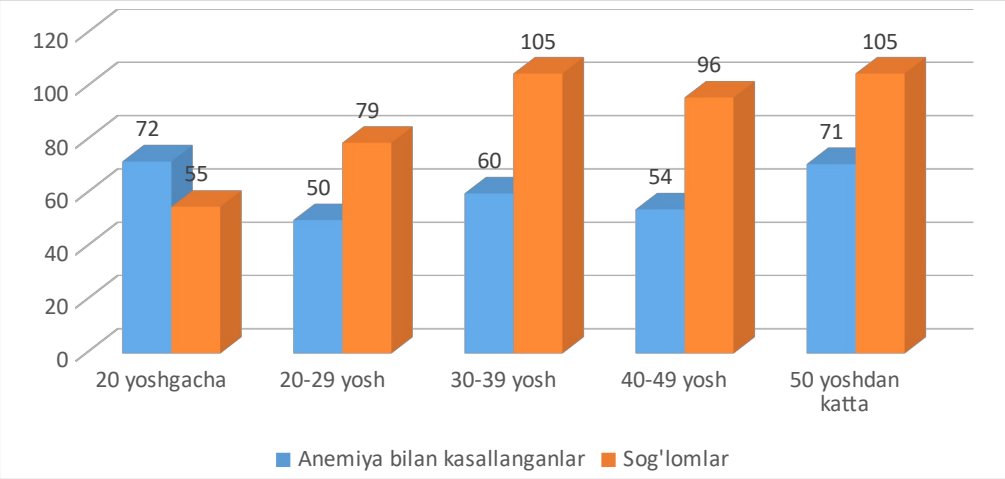

Figure 2. The number of respondents with anemia and healthy in Kashkadarya region

When analyzing this indicator by age, anemia was more common in the mountain population aged 20-29 years (54.5%), and among the urban population aged 30-39 years, the majority of respondents who did not have the disease were (79.3%).).

The frequency of anemia in the central region is 32.4% at the age of 20 years, 40.6% at 20-29 years old, 20.7% at 30-39 years old, 31.1% at 40-49 years old, 50 years and older 38%. In the central region, a high degree of anemia was 38% and 40.6% higher in 20-29-year-olds and 50-year-olds, respectively. The overall incidence of anemia was 32.9%.

In the desert zone - 48% under 20 years old, 26.3% of 20-29 year olds, 49.3% of 30-39 year olds, 30.8% of 40-49 year olds and 42.5% of people aged 50 and older formed. Among the age groups, the age group under 20 years old, 30-39

years old, 50 years and older was 48%, 49.3% and 42.5% higher than the other groups. The overall incidence of anemia was 39.4%.

47.5% of the population under the age of 20, 54.5% of the population aged 20-29, 34.4% of the population aged 30-39, 45.3% of the population aged 40-49 live in the mountains and foothills years, 50 years and older, while 39.6% were found to be anemic in all age groups in the region. The overall incidence of anemia was 44.3%.

According to these indicators, 32.9% of patients with anemia in the central urban area live in the desert, 38.4% in the mountainous foothills and 44.3%.

By regions in the central, desert, mountainous and foothill regions, the share of the population under the age of 20 is 32.4% in the central region, and in the desert, mountainous and foothill regions this figure is higher by 48.0%. It turned out that 47.5%.

In the age group of 20-29 years in the desert area 26.3%, and in the central, mountainous and foothill regions 40.6%, 54.5%, and in the desert zone these figures are relatively low, the central city showed that it is high in mountains and foothills.

In the age group of 30-39 years in the central region it was 20.7%, in the desert - 49.3%, in the mountainous foothills - 34.4%. High rates of anemia have been found in desert, mountainous and foothill regions.

In the central region, anemia was detected in 31.1% of people aged 40-49 years, in desert regions - 30.8%, in mountainous and foothill regions - 45.3%, with the highest rates noted in mountainous and foothill regions . 38% of the population of the central region aged 50 years and over, 42.5% in the desert region and 39.6% in the mountainous and foothill regions had high rates of anemia in all regions.

In the region, 40.4% of people aged 50 years and older were diagnosed with anemia. According to B.B.Gopodeskiy, there is an increase in the incidence of anemia among the adult population of the Russian Federation. This is due to a lack of iron, vitamins and other trace elements in the diet, which affects the absorption of iron in the body. Pregnant women are a special risk group - folic acid deficiency occurs in 30-50% of women. A special group is the elderly, where about 50% of older people suffer from iron deficiency and about 15% from folic acid deficiency. Vegetarians are also at risk of lacking animal feed in their diets[12].

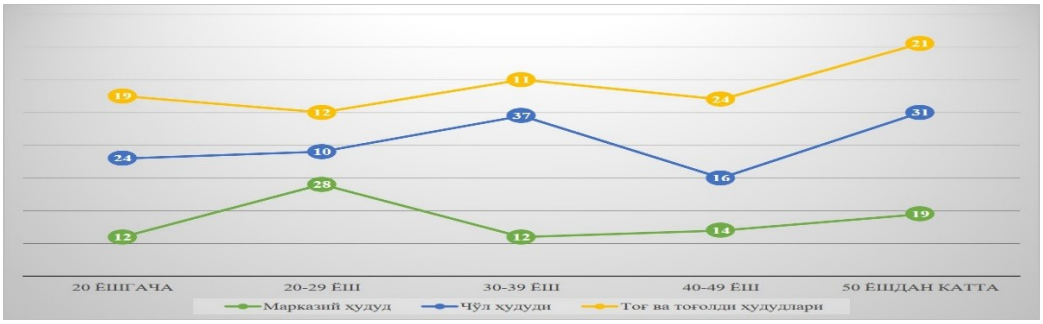

Figure 3. Regional anemia rate.

In all regions, anemia was observed in 32.9% of the total number of respondents in the central city, and 9.6% of the population consumed a mixture of mill and factory flour. Flour products consumed by 90.4% of respondents turned out to be factory-made flour.

In the desert region, anemia was found to be 38.4% of the total respondents. It was found that 38.2% of the flour products consumed by the respondents were mixed with mill and factory flour.

Anemia was observed in 44.3% of respondents surveyed in mountainous and foothill areas. The flour products consumed were mostly grown on private farms in 9% of respondents, while 51% were found to consume a mixture of mill and factory flour.

Table 1

The amount of iron (Fe) in ancient local wheat and wheat cultivated in the region.

T/r	Name of Varieties	Taken place	*Fe* mg/kg			
			x	min	max	V %
1	“Kizil Shark”	Dekhkanabad region Beshbulok vil.	81,46±11,40	58,9	95,6	24,24
2	“Kizil Shalola”	Kamashi region	78,63±5,79	67,8	87,6	12,75
3	“Yaksart”	Kasan region Korabayir vil.	58,85±4,21	50,46	63,8	12,41
4	“Krasnodar-99”	Kasbi region Misit vil.	48,44±1,96	45,3	52,07	7,04
5	“Gozgon”	Kamashi region Okrabod vil.	79,03±8,82	64,14	94,68	19,33
6	“Grom”	Kamashi region	52,79±6,46	43,2	65,09	21,19

Wheat varieties “Kizil Shark” and “Kizil Shalola” were brought from Dekhkanabad, Kamashi district, Kashkadarya region, and the Fe element was tested on them. Variety “Kizil Shark” had the *Fe* element content of 81.46 mg/kg, while the coefficient of variation was 24.24%. In the “Kyzyl Shalola” variety, the content of this element was 78.63 mg/kg, which is 12.75%. 58.85 mg/kg variety “Yaksart”, 48.44 mg/kg “Krasnodar-99”, 79.03 mg/kg varieties “Gozgon” and “Grom” grown in the grain fields of the region 52.79 mg/kg. The maximum content of the *Fe* element was 79.03 mg/kg in the “Gozgon” variety with a variation coefficient of 19.33%.

Thus, the results of the study showed that, in the context of regions, the incidence of anemia was higher than the average in the central urban and rural areas, and higher in mountainous and foothill areas. The ancient local wheat varieties “Kizil Shark” and “Kizil Shalola”, as well as the “Gozgon” variety grown in the fields of our region, are distinguished by a high content of iron. However, ancient local varieties are rarely cultivated and consumed by the population. It is important to use economically feasible forms of iron that are safe, effective, and popular with all segments of the population to combat anemia, using ancient local varieties for biofortification.

The incidence of Covid-19. More than half of the participants (51.1%) reported being infected with Covid-19, and the remaining 365 respondents (48.9%) were not infected with the virus. When analyzing this indicator by age groups of participants, the largest number of patients was in the group of participants over 50 years old and 40-49 years old, and the smallest number of patients was in the group of respondents younger than 20 years old. was found (Fig. 4).

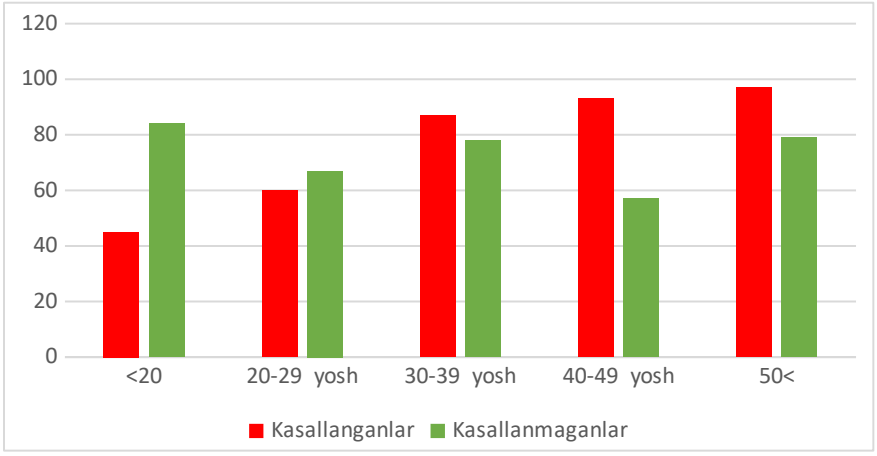

Figure 4. Distribution of Covid-19 patients by age group

When considering the proportion of patients in the group in the total number of respondents, it was found that the highest rate was in groups 3-4-5, and the lowest - in group 1 (under 20 years).

Conclusion. It was revealed that wheat is the most consumed by the population, and the population living in remote areas consumes this product less than fortified foods. This, in turn, requires the selection of natural foods high in *Fe* element. The increase in the incidence of anemia in group 5, that is, in the adult population, in mountainous and foothill areas with the highest overall incidence of anemia, was studied, and a correlation was found between this condition and the incidence of Covid-19.

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AHOLI COVID-19 BILAN KASALLANISH KO'RSATKICHINING TEMIR MODDASIGA BOG'LIQLILIGI

Yumshoq bug'doy biofortifikasiyasi maqsadida ba'zi navlar don tarkibidagi ayrim mikroelementlar va oqsil miqdori atom-absorbsion spektrofotometr uskunasi yordamida tahlil qilindi. Qashqadaryo viloyati hududlarida aholi o'rtasida anemiya ko'rsatkichining Covid-19 bilan bog'liqliligi o'rganildi.

ЖЕЛЕЗОЗАВИСИМОСТЬ НАСЕЛЕНИЯ ПОКАЗАТЕЛЬ ЗАБОЛЕВАНИЯ COVID-19

С целью биофортификации мягкой пшеницы с помощью атомно-абсорбционного спектрофотометра анализировали содержание микроэлементов и белка в некоторых сортах зерна. В Кашкадарьинской области изучена ассоциация анемии у населения с Covid-19.

IRON DEPENDENCE OF THE POPULATION INDICATOR OF COVID-19 DISEASE

For the purpose of biofortification of soft wheat, the content of trace elements and protein in some grain varieties was analyzed using an atomic absorption spectrophotometer. In the Kashkadarya region, the association of anemia in the