

ПРОБЛЕМЫ КАЧЕСТВА ПИТЬЕВОЙ ВОДЫ И ЗНАЧЕНИЕ ЕГО МОНИТОРИНГА

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Аннотация: Глобализация и развитие науки и техники, сильное загрязнение источников водоснабжения и эколого-гигиеническая оценка качества воды являются одной из актуальных проблем. По данным ВОЗ, 3 миллиарда человек во всем мире потребляют некачественную воду. Проведен ретроспективный анализ санитарно-химических показателей питьевой воды, подаваемой населению за 2017-2019 годы, изучена заболеваемость населения в зависимости от качества воды.

Ключевые слова: глобализация, питьевая вода, заболеваемость, гигиенические нормы, брюшной тиф, гепатит, загрязнение, водные ресурсы.

ИЧИМЛИК СУВИ СИФАТ МУАММОЛАРИ ВА УНИНИНГ МОНИТОРИНГИ АҲАМИЯТИ

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Таянч сўзлар: глобализация, ичимлик суви, касалланиш, гигиеник меъёрлар, қорин тифи, гепатит, ифлосланиш, сув ресурслари.

QUALITY PROBLEMS OF DRINKING WATER AND THE IMPORTANCE OF ITS MONITORING

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Abstract: Globalization and the rapid development of science and technology, severe pollution of water supply sources and ecological and hygienic assessment of water quality are one of the current problems. According to the data of WHO 3 billion people on Earth use poor quality water. Retrospective analysis of sanitary and chemical indicators of drinking water, as well as the state of health related to drinking water quality has been conducted.

Key words: globalization, drinking water, morbidity, hygiene standards, typhoid, hepatitis, pollution, water resources.

The creation of new cities and working settlements, the reconstruction of existing settlements will lead to greater use of new water sources. Globalization and rapid development of science and technology lead to severe pollution of water supply sources and ecological-hygienic assessment of water quality is one of the urgent problems of today. This was even

shown in the speech of the President of the Republic of Uzbekistan Shavkat Mirziyoyev at the 72nd session of the United Nations General Assembly on September 19 [1.]. In particular, while talking about the problems related to ensuring security and stability in Central Asia, we cannot ignore the important issue of rational use of the common water resources of the region.

We support the UN Secretary General's position that "water, peace and security problems are closely related". At the same time, the consistent implementation of important programs and projects on the development of the drinking water supply system in the Republic of Uzbekistan makes it possible to fundamentally improve the situation of centralized water supply in cities and districts, including rural areas. Article 26 of the Law of the Republic of Uzbekistan "On Sanitary Epidemiological Peace of the Population" [3.] "Requirements for provision of household and drinking water". The annual volume of water resources of Central Asia is about 116 km³, and therefore 90 percent is formed by two large river systems: Amudarya and Syrdarya [4,5]. The volume of underground water in the region is about 43.49 km³. 80 percent of water resources are used in agriculture, almost 7-8 percent are used in industry, and the others are used in household, service sector and other purposes. It is well known what the ecological consequences of the indiscriminate use of water are in the region. The level of water supply of the population in the region will decrease from the existing 2500 m² to 1400 m² per year. In accordance with the decree of the President in September 25, 2020 "On measures to further improve the drinking water supply and wastewater system and increase the efficiency of investment projects in the field" [2.] a new mechanism was introduced. According to it, starting from 2021, projects for the construction of local drinking water supply systems in order to provide drinking water to rural settlements will be implemented on the basis of state social orders [2.]. 25 parameters were studied in the rural settlements that did not reach the centralized drinking water supply. As a result of correspondence and studies, a list of 1,273 rural settlements in 114 cities and districts that need to improve water supply and sanitary conditions was formed. Experts from the World Health Organization found that 80 percent of all diseases in the world are transmitted through contaminated water. Contamination of water with disease-causing microorganisms can cause the spread of a number of infectious diseases, such as typhoid, dysentery, cholera, and viral hepatitis A.

The spread of typhoid fever through water is mainly associated with bacterial contamination of open decentralized and centralized water networks.

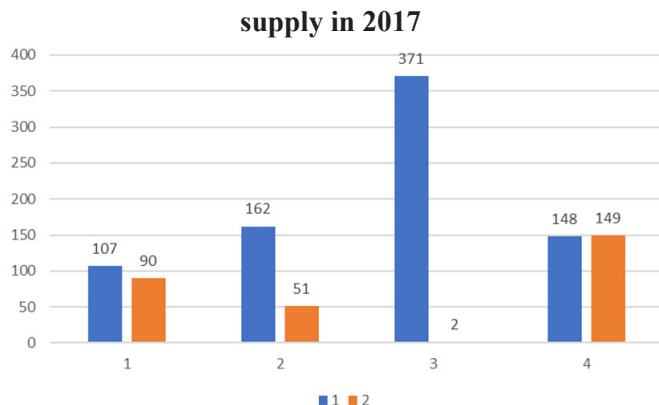
At the same time, drinking of water with poor quality leads to a sharp increase of infectious and non-infectious diseases among the population. According to WHO data, 3 billion inhabitants of the world consume unclean water. More than 2,000 types of diseases suffered by the inhabitants of the earth are related to drink contaminated water. For the same reason, 25% of the world's population suffers from various diseases due to the consumption of poor-quality water, every tenth of the world's population falls ill, and every year almost 4 million children and 18 million adults die from various diseases caused by the intake of unsafe water [8.].

It has been found that 20 to 35 out of 100 cancers are caused by drinking chlorinated drinking water. The origin of non-communicable diseases depends on the chemicals in the water, macronutrients (sodium, potassium, calcium, etc.) and micronutrients. Currently, 65 trace elements (iron, copper, zinc, fluorine, iodine, etc.) have been found in water. Water is important for the human body. Without water, not a single biochemical, physiological and physico-chemical process can proceed in the human body. Digestion of food, respiration, anabolism, catabolism, synthesis of proteins, fats, carbohydrates are not carried out. This importance of water is directly related to the fact that it is an ideal solvent. That is why water directly and indirectly participates in all vital processes, such as absorption, transport, decomposition, oxidation, hydrolysis, synthesis, osmosis, diffusion, resorption, filtration, separation. With the help of water, plastic substances, biologically active compounds enter the body. In the human body, substances are released substances that are formed as a result of metabolism. Water allows the living plasma to maintain its colloidal state.

Water and minerals dissolved in it maintain an important biological constant of the body - the osmotic pressure of tissues and blood. A large loss of water is accompanied by the release of a large amount of macro- and microelements, the loss of vitamins, in which an unfavorable situation arises and human life is in danger. Based on the foregoing, we set the task of environmental and hygienic assessment of the quality of drinking tap water. During the years 2017-2019, we retrospectively analyzed the extent to which the drinking water supplied to the residents of Takhtakopir district (Republic of Karakalpakstan) meets the sanitary

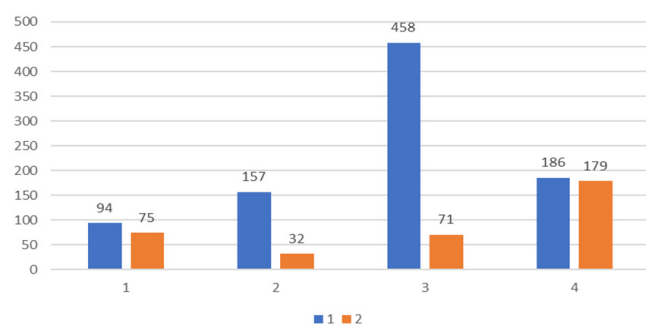
and chemical hygienic requirements and obtained the following results: in 2017, the total number of samples from the water supply source was 107, of which 90 were 84.1% did not meet the hygienic standards, the same analyzes were also taken from communal water pipes, 51 out of 162 samples, and the total number of samples taken from departmental water pipes was 371, of which 2 did not meet hygienic requirements. (Fig. 1)

Figure 1. General samples from the source of water supply in 2017



In 2018, the total number of samples from the water supply source was 94, of which 75, i.e. 79.7% did not meet hygienic standards, the same analyzes were taken from city water pipes, from 157 samples 32 (20.3%), from samples taken from departmental water pipes, the total number is 458, of which 71 (15.5%) from well water, and 179 out of 180 (99.4%) did not meet hygiene requirements (Fig 2).

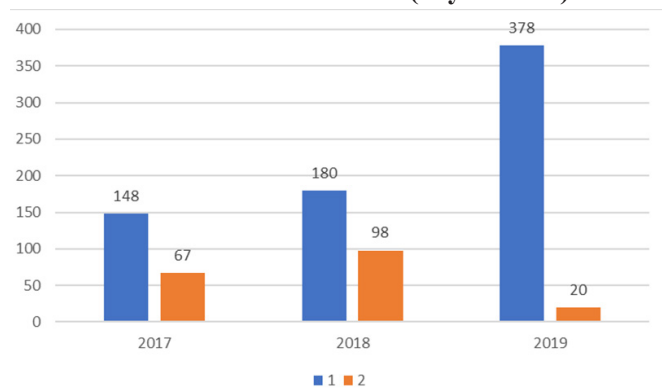
Figure 2. General samples from the source of water supply in 2018



We analyzed the minimum and maximum indicators of dry residue, chlorides, sulfates, total hardness in all samples taken over the years, and obtained the following results. Thus, we retrospectively analyzed the amount of dry residue in the water supplied to the residents of the area. and the results obtained by years and obtained the following results: 2017 dry, the total number of samples for residue testing is 640, of which 92 (14.3%), and in 2018 the total number of samples is 709, of which 69 (9.7%), in 2019 the total number of samples was 983, of which 68 (6.93%) did not meet hy-

giene requirements. We conducted a laboratory study of the hardness of drinking water and obtained the following results: in 2017, the total number of samples taken from tap water was 640, of which 48 (7.5%), in 2018 tap water was 709, of which 75 (10.5%) in 2019, the total number of tap water samples was 983, of which 68 (6.9%) did not meet the hygienic requirements for overall hardness. During 2017-2019, we retrospectively analyzed the degree of compliance of well water used by residents of the area with sanitary, chemical and hygienic requirements and obtained the following results: in 2017, the total number of samples for the study of dry residue was 148, of which 67 (45.2%). In 2018, the total number of samples was 180, of which 98 (54.4%), and in 2019 the total number of samples was 378, of which 20 (5.21%) did not meet hygienic requirements. (Fig 3)

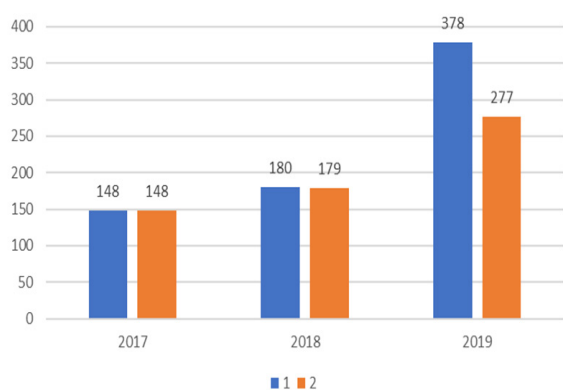
Figure 3. Results of sanitary-chemical inspection of well water in 2017-2019 (dry residue)



If the hardness of the water is higher than the norm, it causes an increase in kidney stone diseases among the population. At the same time, the hardness of water has a negative effect not only on health, but also on household conditions, especially when washing dirty clothes, sediments can form at the bottom of boiled water containers. Therefore, we conducted a laboratory test of the hardness of the drinking water supplied to the residents of the district and obtained the following results: the total number of well water samples taken in 2017 was 148, and 148 of them, i.e., in all samples, the total hardness was found to be above the norm. In 2018, the total number of well water samples was 180, and in 277 (73.2%) of them, the level of hardness did not meet hygienic requirements (Figure 4). Compared to open water supply sources, chlorides are stored in a somewhat larger amount in underground water. If the amount of chlorides in drinking water is higher than hygienic standards, then

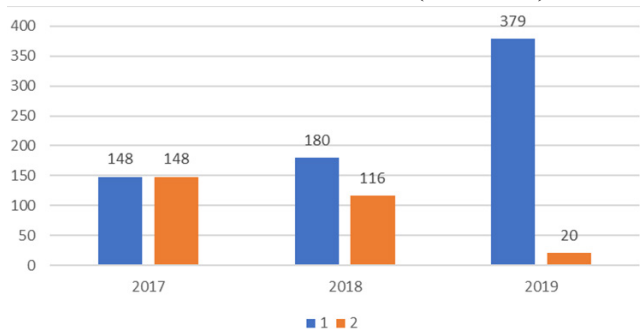
cardiovascular diseases will increase among the population, the number of hypertensive cases will increase, and the activity of blood vessels will increase in the human body. gallstones occur, the digestion process deteriorates and the kidneys are overburdened. At the same time, it has a negative effect on the development and growth of algae.

Figure 4. Results of sanitary-chemical inspection of well water in 2017-2019 (hardness)



Chlorides not only have a negative effect on the human body, but also have a negative effect on sanitary living conditions: that is, the intensity of corrosion of pipes increases, household appliances have an aggressive effect on equipment. The results of the 2017 monitoring revealed the following: 148 samples were taken from chloride wells, all of them, and the following were revealed in the 2018 monitoring results: 116 (64.4%) of 180 samples from the chloride wells did not meet hygienic requirements. In 2019, 379 samples were taken, 20 of them (51.2%) did not meet hygienic requirements. (Fig 5)

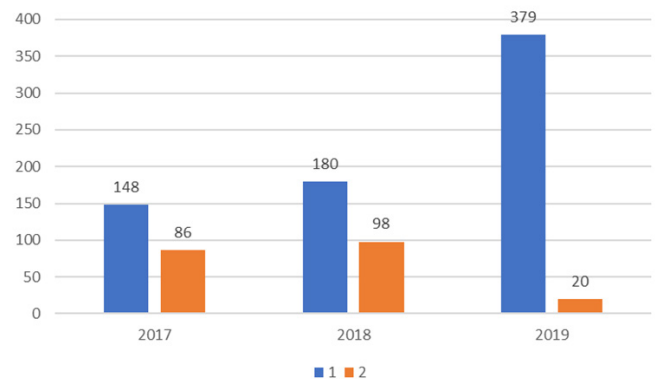
Figure 5. Results of sanitary-chemical inspection of well water in 2017-2019 (chlorides)



If there are more than 1-2 grams of sulfates in drinking water, it has a relaxing effect on the human body. Sulfates and chlorides occur simultaneously in drinking water, so they have a combined effect on the taste receptors of the body, therefore we determined the amount of sulfates in the water supplied to the population and obtained the following results: in 2017, 148 samples

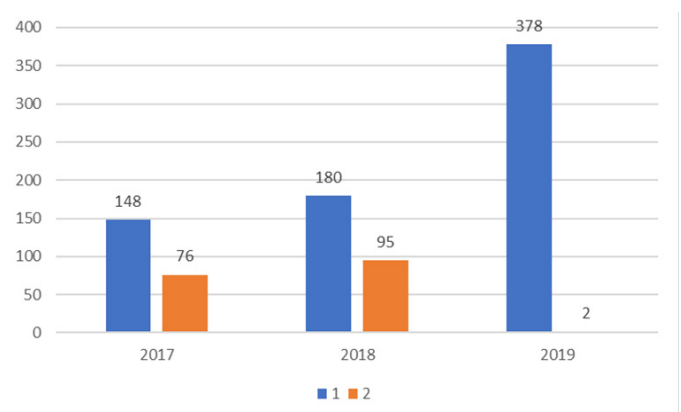
of sulfate water were taken, 86 of them (58, 1%), and in 2018, 180 water samples were taken, 98 of them (54.4%), in 2019, 378 samples were taken, and 20 of them (5.2%) did not meet hygienic requirements (Fig 6).

Figure 6. Results of sanitary-chemical inspection of well water in 2017-2019 (sulfates)



The color of water is known through the organoleptic properties of the human senses, therefore, any person will not consume water of a different color and will not be able to satisfy his thirst. We analyzed the color of well water retrospectively and obtained the following results: in 2017, 148 well water samples were taken for water color, 76 of them (51.3%), and in 2018, 180 well water samples were taken, 95 of them (52.7%), in 2019, 378 well water samples were taken, 2 of them (0.5%) did not meet hygienic requirements (Fig 7).

Figure 7. Results of sanitary-chemical inspection of well water in 2017-2019 (color)



The turbidity of well water is somewhat better than that of open water sources. The turbidity of water indicates its contamination with organic and inorganic substances. At the same time, the turbidity of water is an indicator that determines the efficiency of water treatment facilities. In 2017, 148 well water samples were taken for water color, 76 of them (51.9%), and in 2018, 180 well water samples were taken, 84 of them (46.0%), in 2019, 378

well water samples were taken. 2 of them (0.5%) did not meet the hygienic requirements. Based on the results obtained above, the following conclusions can be drawn: the amount of sulfates and chlorides in the household drinking water provided to the residents of the district according to the requirements of "Uzstandart", dated 02.02.2011 - № 950:2011 "Drinking water" does not meet the hygienic requirements. The analysis of the obtained results plays an important role in maintaining the health of the population, which depends on the quality of water, and is the scientific basis for the development of preventive measures.

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