REVIEW

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MEDICAL AND SOCIAL ASPECTS OF THE NEW CORONAVIRUS INFECTION

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The article presents the data of an analytical review of a new coronavirus infection at the present stage of the development of healthcare in the Kyrgyz Republic, actualizes the issues of quality of specialized medical care to the population, especially in the context of a pandemic and epidemic. The presented review article highlights current data related to issues of etiology, pathogenesis, clinical characteristics, as well as problems of sarcopenia, a condition characterized by loss of muscle mass, decreased strength, and epidemic characteristics of a new coranovirus infection. The etiology, morbidity, risk factors are considered, new possibilities of specific prevention of this infection are studied. The analysis of statistical results of indicators characterizing the epidemiological picture of COVID-19, including the dynamics of morbidity in the territory of the Kyrgyz Republic for the period 2020-2022 was carried out. Comprehensive studies in this aspect: providing consultative and diagnostic assistance to the population, as well as medical and social significance of the identification and early diagnosis of a new COVID-19 coronavirus infection from the beginning of the pandemic to the present. The availability of information on the mechanisms of the emergence of new viruses is considered, the clinical and epidemiological features of outbreaks of coronavirus infections are studied, the identification of factors contributing to the spread of infections has made it possible to identify the most significant measures to prevent the spread of dangerous infections. Carrying out anti-epidemic, including isolation–restrictive and disinfection measures, informing the population about ways to protect against infection, etc. – these measures are widely used in the world in the fight against epidemics. The COVID-19 epidemic has gone down in history as an emergency of international importance. Currently, there are practically no effective treatments so far. Cosmic changes in the lifestyle of people in the XXI century have already negatively affected the state of psychosomatic health of the population. The current COVID-19 pandemic has played the role of a trigger factor in the development of psychosocial stress with a sharp increase in somatic problems. The feeling of fear and uncertainty from the virus threat at the beginning of 2019- 2022 was replaced by the threat of social ill-being due to political and economic changes. How to minimize and prevent the negative effects of stress, how not to miss alarm signals, what treatment to prescribe remain relevant and important for practical application information is presented in this article.

Keywords: etiology, epidemiology, clinic, pathogenesis, COVID-19

Stages of epidemics and pandemics of coronavirus infection and their characteristics

Coronaviruses (lat. Coronaviridae) is a family of viruses comprising 43 species of RNA-containing viruses grouped into serogroups 229E and OS43. So far, 7 coronaviruses affecting humans are known. SARS-CoV-2 – Betacoronavirus B, identified in 2019, caused a pandemic of a new type of COVID-19, and by the spring of 2020 became a worldwide socio-economic problem, so emergency security measures were introduced (quarantine, strict isolation and) [1,2]. Among the 7 coronaviruses, three are dangerous nowdays: SARS-CoV, which causes atypical pneumonia; MERS-CoV, the causative agent of the so-called Middle East respiratory syndrome; SARS-CoV-2, which caused the pandemic that began at the end of 2019. Until 2002, coronaviruses were considered as pathogens of mild upper respiratory tract diseases, accounted for about 30% of all acute respiratory diseases with extremely severe fatal outcome, and were more often regarded as a banal cold [3-5].

In 2003, an epidemic of atypical pneumonia caused by SARS-CoV(SARS – Severe acute respiratory syndrome coronavirus; Russian SARS) was registered. The epidemic caused by SARS-CoV covered 37 countries involving over 8 thousand cases, of which 774 patients died (mortality rate 9.67%). Since 2004, the disease has not been registered anymore. CDC staff isolated the virus that causes SARS from the sputum of two patients with atypical pneumonia, established the similarity of the resulting isolate with viruses of the Coronaviridae family. Serological methods also confirmed the presence of antibodies to viruses of this group. However, the study of the virus genome showed that it is only remotely related to known coronaviruses (the nucleotide sequences are identical only in 50-60%) [4,5]. Comparative analysis of the nucleotide sequences of SARS-CoV and other coronaviruses indicates a high homology of the genome sites. At the same time, differences in the corresponding nucleotide sequences make it possible to draw a clear boundary between the SARS virus and other coronaviruses. In general, the data obtained allowed us to conclude that a new group has emerged as part of the genus of coronaviruses. SARS-CoV carries the features of the genus coronavirus, although it differs from all known representatives of this group. At the

same time, with the established nucleotide sequence of the genome of the SARS-CoV virus that caused the epidemic in 2003, the origin is still open and a potential precursor of this virus among animal coronaviruses has not yet been identified [6,7].

Although SARS-CoV continues to be studied, its exceptional resistance to environmental factors compared to other coronaviruses has been established today.

The first epidemic of coronavirus infection, caused by SARS-CoV, lasted in the first focus from 16.11.2002 to 9.02.2003, 305 cases of the disease were registered, of which 5 were fatal. About 30% of the cases were medical workers. Further, the disease spread from the primary focus to Vietnam, Singapore, Thailand, Hong Kong, Canada, Taiwan, and the USA. The largest increase in the number of cases was registered in 29 countries, including Africa and South America in April 2003 – more than 4,000 new cases [2].

It is difficult to predict whether further epidemics caused by SARS-CoV with the SARS clinic are possible, but given the stability of the virus in the environment and the permissible possibility of its combination with the avian influenza virus – H5N1. In 2012, the coronavirus, called MERS-CoV (English MERS – Middle East respiratory syndrome, the causative agent of the Middle East respiratory syndrome), caused a local epidemic outbreak with 2,519 cases, of which 866 had a fatal outcome (mortality 34.4%), i.e. every 3rd case died [7,8] 2019. In December 2019 in Wuhan (China) has started an epidemic of a new coronavirus infection caused by the SARS-CoV-2 virus (originally named COVID-19), found on the wholesale seafood market (snakes, bats, etc.). SARS-COV-2 belongs to the order Nidovirales and has the largest RNA genome. It is known to be acquired from a zoonotic source and typically spreads through contact and droplet transmission. [8,9]. In early January 2020, China published a transcript of the virus genome: the SARS-CoV-2 genome is approximately 80% the same as the SARS-CoV genome that caused the outbreak of SARS in 2002-2003. On January 20, 2020, the fact of human-to-human transmission of the virus was published [10,11]. The conducted decoding of the SARS-CoV-2 genomes revealed its tendency to evolve. At the same time, the analysis made it possible to come to the conclusion: bats are the natural reservoir of the virus, there is a high probability that the virus was transmitted from animal to human only once (this is evidenced by the huge similarity of the studied genomes); the probable date of transmission of the virus to humans is the end of November or the beginning of December 2019 (this is indicated by the rate of mutations); transmission of the virus from a patient and a person, as well as a disease in the incubation period, is carried out by airborne droplets, in addition, the contact pathway is realized by transmission factors: water, food and objects contaminated with SARS-CoV-2; the risk of transmission from hands to the mucous membranes of the eyes, nasal and oral cavities has been proven. The accumulated experience of the first year of the pandemic has shown that about 80% of patients carry the infection in a mild form, but at the same time are able to transmit the virus to others [6-11].

The reproduction index for SARS-CoV-2 is 2-3, one infected person is able to infect another 2-3 people (for comparison, the reproduction index in influenza is 2.5, in measles – 12-18) [8,11]. In March 2020, WHO announced a pandemic of coronavirus infection, which is confirmed by data on its spread in the world over the past year. As of February 21, 2021, the state of the problem is characterized by data: a total of 111.43 million patients were registered during the pandemic, including 313.6 thousand during the last day; and 246 million died during the pandemic, including 5.88 thousand during the last day; 1 million 49 thousand were registered at most per day patients on December 8, 2020; the maximum number of deaths per day was 17.8 thousand on January 20, 2021. Russian scientists are considering several options for the further course of the SARS-Cov-2 epidemic process: active spread with the expansion of space and people involved, by analogy with virulent forms of influenza, following the example of the "Spanish Flu"; the extinction of the epidemic over the next few months; wave-like flow within specific infected territories; the development of the epidemic in Chinese, Italian, American scenarios; mixed models depending on territories, geographical, ethnic and other differences; abortive course following the example of coronavirus infections MERS and SARS [12,13].

The pathogenesis of the new coronavirus infection has not been sufficiently studied. Nevertheless, it was found that SARS-CoV-2 entering the respiratory tract is adsorbed at the level of 7-8 generation of the bronchi, from where it reaches type 2 alveolates in a complex way, which, occupying 1/20 of the surface of the alveoli, but determine the balance of airiness and hydration of lung tissue. SARS-CoV-2 acquired the ability to infect cells due to the S-protein of the virus crown, which imitates angioten-

sin converting enzyme-2 (ACE-2) in structure, which allows it to bind to the receptors of this enzyme. The peculiarity of pathogenesis: a) the multi-tropicity of the lesion, since the receptor for SARS-CoV-2 angiotensin-converting enzyme-2 (ACE-2) is expressed on cells of the respiratory tract, cardiovascular system, liver, kidneys, nervous system (over 80% of ACE-2 are localized on epithelial endothelial cells of type II and endothelial cells of the cardiovascular system); b) virus-induced damage to epithelial cells causes the development of a severe systemic inflammatory reaction with excessive activation of immunocompetent cells, which leads to the production of a large number of pro-inflammatory cytokines IL2, IL7, IL10, TNF, etc. But SARS-CoV-2, unlike other pathogenic coronaviruses, initially does not cause clinical manifestations, and after a few days, changes in metabolic processes begin in the cell due to impaired functioning of the alveoli. Virus-infected cells are destroyed and die according to one of the apoptosis scenarios, lung tissue damage leads to the development of acute distress syndrome (ARDS) [14].

According to the Berlin ESICM – 2012 Consensus, there are three mutually exclusive forms of ARDS: mild; moderate; severe.

The estimated severity of ARDS is based on the degree of oxygenation disorder (hypoxemia): mild: 200 mmHg < PaO2/FiO2 ≤ 300 at MPC or CPAP ≥ 5 cm of water; moderate: 100 mmHg < PaO2/FiO2 ≤ 200 at MPC or CPAP ≥ 5 cm of water. severe: PaO2/FiO2 ≤ 100 at MPC or CPAP ≥ 5 cm of water [15]. The initial stage of ARDS development is the activation of alveolar macrophages with the release of pro-inflammatory components: a group of interleukins, including IL 6,8, tumor necrosis factor-alpha, a group of chemoattractants that stimulate the movement of monocytes and neutrophils from the blood through the endothelium and alveolar epithelium against the background of a systemic inflammatory reaction and increased vascular permeability [16,17].

The process, called the "cytokine storm" with T-cell lymphopenia, is associated with the severity of the disease, as it leads to the development of respiratory distress syndrome, multiple organ failure with the risk of death. It is characterized by the production of a large number of cytokines by immunocompetent cells, thereby causing an excessively rapid activation of inflammation and immune shifts [18]. The main tissue of the lesion in cytokine storm is the lungs in the form of inflammation, which increases thrombosis of small vessels with small hemorrhages in the lung tissue. But the heart, kidneys, intestines, spleen, and central nervous system may be involved in the process [4,18].

All this violates the harmonization of ventilation and perfusion processes with the accumulation of fluid in the alveoli. Leukocytes accumulating in the focus of inflammation are a source of leukotrienes, platelet aggregation factor, proteases, oxidants. This in turn causes fibrin loss in the alveoli, the formation of hyaline membranes, microthrombosis in the vascular bed of the lungs [19,20]. As metabolically active cells, type 2 alveolites are the most vulnerable to SARS-CoV-2, and as a result of infectious inflammation caused by the virus, acute respiratory distress syndrome (ARDS) develops – respiratory failure characterized by the rapid onset of a broad inflammatory process in the lungs with symptoms of shortness of breath, rapid breathing and bluish skin coloration. According to the American-European Conciliation Conference (1994), the development of ARDS is associated with increased permeability of the alveolar capillary membrane and associated with a complex of clinical, radiological and physiological disorders that cannot be explained by the presence of left atrial or pulmonary capillary hypertension, although they can coexist with it. In fact, this is a bilateral infiltration of lung tissue and hypoxemia. As a result of the defeat of type 2 alveolocytes, their functions suffer: the formation and metabolism of surfactant (the substance covering the inner surface of the alveoli protects the alveoli from overextension when inhaling, from decay when exhaling), transport of H2O and ions, synthesis of lysozyme and interferons, detoxification of oxidants (free radicals). During a period of at least 72 hours from the onset of the disease and for a period of no more than 7 days, ARDS develops as a consequence of a systemic inflammatory reaction in the lungs and associated with the damaging effects of cytokines and other biochemical and cellular mediators. The acute process ends with primary hypoxemia, a violation of the ventilation function and drainage of the bronchial tree, edema begins and a violation of the function of the atrial epithelium. The addition of a secondary bacterial infection contributes to the further progression of processes and the development of pneumonia favors polymorbid bacterial inflammation [17,20]. With the relief of pathological changes in the lungs, the risk of a serious complication in the form of organized pulmonary fibrosis remains [21,22].

Thus, in the pathogenesis of a new coronavirus infection, the most prognostically significant phase is hyperinflammation ("cytokine storm"), when massive tissue damage occurs, often in combination with gram-negative infection. Uncontrolled activation of macrophages (mononuclear phagocytes) develops, which leads to the synthesis of a large number of inflammatory mediators – cytokines, among which tumor necrosis factor alpha, interleukins 1, 6 and 8 are of the greatest importance, which stimulate the production of prostanoids, free radicals and nitric oxide [23].

Although the new coronavirus infection does not relate to diseases with intestinal infections, since there is no infection through the mouth, in the clinic, symptoms of damage to the digestive organs occur in some patients in the form of loss of taste and smell, anorexia, diarrhea, nausea/ vomiting, abdominal pain [24]. In a number of countries, patients with complaints of loss of taste and low perception of odors were observed in 2/3 of infected patients. Many clinicians indicate the presence of gastroenterological symptoms in hospitalized patients in 26-50.5% of cases, including diarrhea in a third of cases [25,26]. Moreover, in most patients, gastrointestinal symptoms are combined with bronchopulmonary or with fever. But only 3% of patients have abdominal pain at the beginning of the disease [26], which suggests that some patients have exacerbations of chronic diseases against the background of a coronavirus infection clinic, especially since clinically pronounced symptoms of the underlying disease are more common in the elderly, among whom it is difficult to find the absence of chronic pathologies of the digestive organs at the population level. Although the occurrence of gastrointestinal symptoms in patients with mild COVID-19 is not uncommon. Moreover, a quarter of patients have isolated symptoms from the gastrointestinal tract. There is also a combination of respiratory and gastroenterological symptoms with the same frequency, diarrhea is more common [26,27], and every fifth person has a coronavirus infection with diarrhea, diarrhea lasts from 1 to 13 days with a frequency of 4-6 defecations per day [28]. Diarrhea causes late diagnosis of coronavirus infection. Virological studies have revealed more frequent detection of SARS-CoV-2 RNA, it is epidemiologically important that the virus retains 2 weeks after the disappearance of respiratory symptoms. The control of recovery is assessed by the analysis of smears from the nose and nasopharynx. During the pandemic, the clinical picture of the new coronavirus infection was studied quite fully, which allowed clinicians to conclude that in most cases it differs little from the symptoms of other respiratory viral infections, although some patients have their own characteristics [22,29]. WHO emphasizes that the disease has no specific symptoms that can be distinguished from influenza and other acute respiratory infections. The incubation period for this disease is mainly 5 days, but can last from 2 to 14 days. Most often, the first symptoms appear on the fifth or sixth day of the disease [27,30]. The main clinical manifestations of the infectious process include: a high temperature of more than 38 ° C (90%); cough, dry or with a small amount of sputum (80%); shortness of breath with BPD > 22 per minute (55%); myalgia, fatigue, weakness (44%); sensations of congestion in the chest (>20%); confusion (9%); headaches (8%); hemoptysis (5%); gastrointestinal symptoms, which included anorexia (83.8% of cases), diarrhea (3 to 29% of cases), vomiting (0.8% of cases) and abdominal pain (0.4% of cases) [31]. The British Association of Otolaryngologists was the first to note that 15-30% of patients with a new coronavirus infection at the height of clinical manifestations completely lose their sense of smell (anosmia) for a while [32]. In comparison with other acute respiratory infections, patients are less likely to have headache, body aches, pain, dryness or sore throat, runny nose and nasal congestion, sore eyes, conjunctivitis [31-33].

In general, in 40% of cases, the disease occurs in mild form without pneumonia, in 40% of patients with moderate severity with symptoms of viral pneumonia, in 15% there is a severe course and in 5% of patients a critical course. In the dynamics of the disease, in 10-12% of cases, the initially mild course progresses to a severe degree, and in total in 15-20% of severe cases eventually became critical [34,35]. On average, the symptoms of the disease last 5-6 days, with a mild course, patients recover within 2 weeks, and patients with a severe course from 3 to 6 weeks. Coronavirus infection caused by SARS Cov-2 can progress rapidly with the development of life-threatening complications, therefore, in the presence of even one of the following symptoms, it is urgently necessary to seek medical help: shortness of breath, difficulty breathing; temperature above 38 °, which cannot be brought down with antipyretics; cyanotic coloration of the face and limbs; excessive lethargy, drowsiness, confusion [34,35].

This symptomatology indicates the beginning of a severe course of the disease, requiring

hospitalization, although not always for intensive care. So, with difficulty breathing, sometimes it is enough to conduct oxygen therapy. But on average, 5% of patients develop acute respiratory failure and the patient must be connected to a ventilator. Fatal outcomes are more often observed 2-8 weeks after the onset of symptoms of the disease [36,37].

The Centers for Disease Control and Prevention (CDC) – the National Institute of Public Health, a U.S. federal agency subordinate to the Department of Health and Human Services has provided recommendations for people who are at high risk of complications associated with COVID-19, including the elderly and people who have serious underlying diseases, including: oncopathology; chronic kidney disease; COPD (chronic obstructive pulmonary disease); heart disease (heart failure, coronary artery disease, cardiomyopathy); immunocompromising condition from solid organ transplantation; secondary immunodeficiency (AIDS); obesity (BMI from 30 to less than 40 kg/m2); pregnant women; smokers; type II diabetes mellitus.

These are the risk groups of severe course associated with SARS-CoV-2 mortality in China was mainly observed in patients over the age group of 60 years, in the USA mortality was most common in the group of patients over the age group of 85 years, namely among patients aged 55-64 years was 3-11%, the age group over 84 years – 10-27%. Postcovid syndrome, like most acute infectious diseases, coronavirus infection has a phase course: an acute period of up to 4 weeks with varying degrees of severity of the clinical picture from subclinical forms to extremely severe; a prolonged acute period with a duration of 4 to 12 weeks, occurs on average in 20% of patients; postcovid syndrome ("ill, but he did not recover"), whose symptoms appear during or after the acute phase, persist for more than 12 weeks, occurs in 10-20% of those who have been ill [35,38,39]. The last 2 phases are usually referred to as pre-COVID and long-term COVID, they are associated with the persistence of the virus. The main target organs of postcovid syndrome are the heart, brain, lungs, liver and kidneys. There are three groups of symptoms of postcovid syndrome: the first group of the most common and characteristic symptoms includes fatigue (sometimes pronounced); cough, chest pain, joint pain, shortness of breath; the second group of less common, but more severe symptoms: myocarditis, lung dysfunction, acute kidney damage, hair loss, skin rash, problems with smell and taste, sleep disorders, anxiety, depression, mood changes; asthenic syndrome often develops. Less common are: difficulty concentrating, headache, muscle pain, tearfulness, irritability, palpitations, periodic rise in body temperature [40]. According to some scientists, postcovid syndrome is more dangerous than the acute phase of the disease.

Taking into account the severity of damage to organs and systems in postcovid syndrome, a rehabilitation program is justified, which includes: respiratory gymnastics as a basis for recovery; lifestyle correction; formation of a rational and active attitude of the patient to the disease and motivation for recovery and adherence to treatment; rejection of bad habits; elimination of overloads and stressful situations; with severe asthenic syndrome rehabilitation in a sanatorium is necessary. Sarcopenia as a complication of coronavirus infection, the universally observed tendency to increase the life expectancy of the population is accompanied by a new planetary problem – the formation of sarcopenia, a condition characterized by loss of muscle mass, decreased strength and function of skeletal muscles [40,41].

The term was first introduced by the American doctor I. Rosenberg in 1989. Sarcopnia is based on involutive and neurodegenerative changes in muscle tissue associated with age. Due to the social significance of the problem (sarcopenia dramatically increases the frequency of limb fractures, especially the head of the hip joint), the European Working Group on Sarcopenia in Old People (EWGSOP) was established in 2009. The urgency of the problem is characterized by the fact that the prevalence of pathology is up to 30% among people 60 years of age and about 50% among the population over 80 years of age. Sarcopenia itself refers to severe diseases, leads to temporary or permanent disability and disability due to critical muscle weakness. With it, life-threatening conditions are formed due to the functional inferiority of the respiratory muscles, being realized in the form of aspiration pneumonia and respiratory insufficiency. The increasing frequency of complications in the form of fractures of long tubular bones is caused by constant falls in people suffering from sarcopenia. Three circumstances determine the special significance of sarcopenia in patients with a new coronavirus infection, unfortunately, today passing out of the field of view of doctors: unfavorable outcomes of coronavirus infection are growing in proportion to the increase in the age of patients, patients of the age group 65 years and older are particularly at risk; a long period of low physical activity of people over 65 years of age who

are in remote work mode with coronavirus as one of the options for ensuring safety during a pandemic will significantly increase the progression of sarcopenia that has already formed by this time; all patients, regardless of the type of pathology, who are in intensive care units, are at risk of sarcopenia, and the elderly – its progression and unfavorable outcome [41,42].

In elderly patients with coronavirus infection, there are difficulties in the prevention and treatment of sarcopenia, since the most effective role is given to regular physical exercises with preference to anaerobic endurance training, since they restore muscle strength better. Thus, it is difficult to predict the future of the results of epidemiological activation of the Coronaviridae family, although there is no doubt that humanity will cope with the SARS-Cov-2 pandemic, it is evident from the successes achieved in the issue of vaccination and anti-epidemic measures taken by all countries of the world. However, the price of the ongoing pandemic is almost 2.5 million lives and the final outcomes of 111.4 million people who have had the infection are not known. It is not yet known what will happen with the SARS-CoV, MERS-CoV and SARS-CoV-2 coronaviruses that have already overcome the biological barrier. Viruses mutate and it is unknown whether they will become more dangerous or turn into little harmful viruses in the structure of pathogens of seasonal SARS. The danger lies in the fact that viruses mutate and the spectrum of viruses that have reappeared with a high potential for pathogenicity is growing. Reassortment (mixing of the genetic material of a species, leading to the appearance of completely new combinations in daughter individuals; several processes contribute to reassortment, including chromosomal sorting and crossing–over) is one of the most important mechanisms for the formation of pandemic viruses. The genome of the influenza virus is represented by 8 separate RNA segments that are assembled into virions in the cells of an infected person. When a cell is infected simultaneously with two influenza viruses, the number of RNA segments is 16, which can be collected in 256 possible combinations. The influenza A(H1N1)pdm virus, which caused the 2009 pandemic, is a product of reassortment of human, pig and bird viruses. The problems of a new coronavirus infection in the Kyrgyz Republic cannot yet be considered a stratum that has not shown due attention to coronavirus infection in a timely manner, as evidenced by the measures taken by the country's leadership before the outbreak of the epidemic in the republic and their effectiveness. The Government of the country promptly responded to the epidemic of coronavirus infection (Government Decree of 3.2.2020) even before the announcement of the pandemic spread of the disease (11.3.2020), banning for 6 months the export of 32 medicines from the country, mainly used in providing medical care to patients with a new coronavirus infection (acetylsalicylic acid, paracetamol, ibuprofen, azithromycin, amoxicillin, ceftriaxone, clindamycin, dopamine, sodium chloride, injection syringes, medical and respiratory masks, protective suits or medical gowns, used for medicine, respiratory masks, medical safety glasses). The Government Decree of 28.02.2020 introduced restrictions on travel to countries with a high increase in the incidence of coronavirus infection. By the order of the Prime Minister of 5.03.2020, the Republican Headquarters for the implementation of economic measures aimed at minimizing the consequences of external shocks and stimulating economic development in connection with the epidemic of a new coronavirus infection was established in the country. On the 2nd day after the WHO announced the pandemic of a new coronavirus infection, a large-scale work on events was organized by the Government Decree "On the introduction of a temporary restriction on cultural, sports and other mass events" dated 12.03.2020. By Order of the Prime Minister of the Kyrgyz Republic dated 20.03.2020. An operational headquarters was established to combat the spread of coronavirus infection and eliminate its consequences on the territory of the Kyrgyz Republic, which is tasked with: rapid response to the situation and taking measures to prevent further spread of coronavirus infection on the territory of the Kyrgyz Republic; coordination of the forces and means of ministries, state committees, administrative departments, local state administrations, local self-government bodies (as agreed), other state bodies and organizations involved in ensuring measures to prevent the further spread of coronavirus infection on the territory of the Kyrgyz Republic. As of 21.03.2020, 14 patients with a new coronavirus infection were registered in the Kyrgyz Republic, 8 of them were patients from the Suzak district of Jalal-Abad region. According to the Presidential Decree of March 25, April 15, 2020, in connection with the registration of patients with coronavirus infection, a state of emergency is being introduced in the cities of Bishkek, Osh, Jalal-Abad, as well as in the Nookat, Kara-Sui districts of Osh region and Suzak district of Jalal-Abad region. The ongoing nationwide socio-political, economic

anti-epidemic and health measures were not allowed the severe condition that was observed in economically developed countries such as the United States, Italy, Germany and others. Nevertheless, as of 02/24/2021, 86,025 patients were registered, 1,498 patients died, the mortality rate was 1.74%, the total infection rate was 1.32% (for comparison, 2.86% of the population was infected in Russia, the mortality rate is 2.01%). But the dynamics of the disease in Russia attracts attention: the maximum daily incidence in the spring rise of the epidemic in 2021 is 11.8 thousand on May 9, 29.9 thousand per day on December 24 and 11.7 thousand on February 24, while in our country the maximum daily number of newly diagnosed patients was 21.02.2021 – 113 people. Recalculations for the population of the Kyrgyz Republic and Russia – 113 x 22.5 = 2542. Consequently, the intensity of the lesion in the Kyrgyz Republic is 4.6 times lower than in Russia. The reason we see is that in Russia the proportion of the urban population is 74.7%, while in the Kyrgyz Republic 33.7%.

Thus, in modern infectology, against the background of an unstoppable population growth (it took 123 years to increase residents by 1 billion since 1800, and 7 billion – 11 years), urbanization, the growth of harmful environmental factors, including those leading to the suppression of the immune system function and factors of nonspecific protection, drug pressure on the body (tons of chemotherapy drugs consumed by mankind), viral diseases are growing at the planetary level, new infectious diseases appear and old ones return, infections with pandemic potential of spread appear (HIV infection, herpes simplex, new coronavirus infection). Reassortment is becoming a powerful means of forming viral pathogens with the potential to cause a multi-year pandemic. The potential threat of the possibility of the avian influenza virus breaking through the biological barrier is growing, which, according to virologists, is able to destroy three-quarters of the world's population [37,43]. As a rule, for such widespread pathogens of viral infections as HIV infection, hepatitis B, coronavirus infection, herpes simplex, and for all newly emerging ones, humanity does not have direct-acting antiviral drugs, a number of insufficiently studied posed questions arise in the problem of a new coronavirus infection, including: the ability to influence the increase in the resistance of the human body without the use of drugs, often with a dubious effect of the type of immunostimulating agents [44,45]; to introduce modern nutraceuticals as a mandatory component of patient therapy, including targeted action (medicine should not be food, but food can become medicine) [46-48]; tactics of health authorities regarding compliance with the calendar of immunoprophylaxis of infectious diseases against the background of an ongoing pandemic [49,50].

The last three problems became the objectives of our research in solving the goal: optimizing the management of patients with coronavirus infection.

Modern possibilities and problems of immunoprophylaxis of infectious diseases against the background of a pandemic of a new coronavirus infection. The role of immunoprophylaxis in the fight against infectious diseases is difficult to overestimate. The world's first vaccination was carried out by E. Jenner on May 14, 1976 against smallpox (in 165-180 AD, approximately 5 million people died from the smallpox epidemic in Europe), and 40 years ago (1980), thanks to vaccination, smallpox was officially declared eliminated in the world. According to the CDC's estimate for the 100-year period 1900-2000. Life expectancy in the USA has been increased by 300 years, including 25 years due to vaccination of infectious diseases. In the Kyrgyz Republic, in order to implement the Law "On Immunoprophylaxis of Infectious Diseases" No. 56 of June 26, 2001, in order to maintain a high level of coverage of the population with preventive vaccinations, reduce morbidity and mortality from dangerous vaccine-controlled infections, the Ministry of Health approved by Order No. 1131 of December 23, 2019. a calendar of preventive vaccinations for children and adults, the observance of which ensures the greatest safety and protection from infections of the child, family and society. According to this calendar of preventive vaccinations, 12 names of vaccines are used against 13 vaccine-controlled infections. Everyone has the right to receive the vaccine free of charge (BCG, hepatitis B, polio, measles, mumps, rubella, diphtheria, rotavirus infection, pneumococcal infection, Penta vaccine: whooping cough, diphtheria, tetanus, hepatitis B, hemophilic infection) according to the calendar of preventive vaccinations at the place of actual residence, including without registration and not having postscript to the medical institution. The vaccines used in the country comply with national requirements and WHO recommendations and international GMP standards (Good Manufacturing Practices) and have passed WHO pre-qualification procedures. In the conditions of a pandemic and the epidemic spread of SARS-CoV-2 in the

autumn-spring periods of the year, it is necessary to solve the following problems: is it necessary to carry out routine vaccination of newborns against decreed infections; is it necessary to implement a vaccination program against pneumococcus, influenza or whooping cough for the elderly and people with concomitant diseases, especially among people at high risk of severe disease, such as the elderly; should routine school-based vaccination be continued during the SARS-CoV-2 pandemic, primarily against measles and rubella, human papillomavirus, meningococcal infection, conjugated typhoid vaccine, in addition to revaccination against tetanus and diphtheria; the possibility of a person with confirmed or suspected coronavirus infection to be vaccinated; whether to vaccinate if a person is in contact with an infected SARS-CoV-2. According to WHO, strategic planning of round vaccination activities should begin during the suspension of immunization activities, and not in anticipation of their resumption. The review of vaccine registries, lists of people who have not been immunized, and tracking of newborns should be constantly updated during the suspension or reduction of immunization activities and used for planning round vaccination. Tactics can be based on the local epidemiological situation with diseases prevented by vaccination, such as measles and polio, diphtheria and whooping cough, meningococcal infection and yellow fever. The Ministries of Health need to define a policy regarding the expansion of age norms, the minimum interval between vaccinations. It is necessary to restore people's confidence in vaccination and the health care system as a whole. All changes in the work of immunization services in connection with the pandemic of a new coronavirus infection should be brought to the attention of medical professionals and the public.

Thus, the assessment of the driving factors of the spread of SARS-CoV-2 in the specific conditions of the Kyrgyz Republic, the analysis of clinical variants of the course of the disease, risk groups of morbidity and unfavorable prognosis of the outcome of the disease, the development of currently absent tactics of nutritional support for groups at increased risk of morbidity and non-smooth course of the disease and tactics of immunoprophylaxis of diseases, are currently being prevented by the vaccine actual problems, the solution of which is real without serious economic costs.

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