

nose ($p=0,504$), sore throat ($p=0,403$) and difficulty in nasal breathing ($p=0,960$) appeared as often in children with mild form of COVID-19 as in children with moderate form.

Fatigue (18,6% against 3,57%) and myalgia (16,28% against 4,76%) were presented more often in patients of the third group comparing to the second one (respectively, $p=0,005$ and $p=0,029$). Such symptoms as stomach ache and dizziness mainly appeared in single cases amongst participants with moderate form of COVID-19 (respectively, $p=0,027$ and $p=0,047$). The rate of other clinical symptoms has not differed between the groups ($p>0,05$).

In children of the third group paleness ($p=0,002$) and hyperemia of the oropharynx ($p<0,001$) were seen more often. The shortening of percussion sound and weakened breathing were presented only in children with moderate form of the disease (respectively, $p=0,005$ and $p=0,015$).

Conclusion. The main way of the transmission of SARS-CoV-2 was close contact with the people with confirmed or suspected COVID-19 infection. Only two patients had travelled abroad two weeks before the first symptoms of the disease appeared. Amongst all patients with 2019-nCoV only 16.48% were vaccinated against flu. COVID-19 infection was mainly found in senior school age children with the male gender prevalence and was characterized by asymptomatic form. Most of the cases of SARS-CoV-2 in children began with fever, were followed by cough and different catarrhal symptoms. Weakness, fatigue, myalgia, stomach ache and dizziness were noted for the moderate form of COVID-19.

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RESULTS OF THE SURVEY OF PATIENTS WHO UNDERWENT COVID-19

Sources indicate that being infected with COVID-19 leaves patients with undesirable symp-toms that form a new disease – post-covid syndrome. We examined the health status of 155 people who suffered a coronavirus infection. Informed consent to the study was obtained from all participants. They were interviewed, asked to fill out a series of questionnaires to assess symp-toms and quality of life, and underwent a medical examination.

Our results showed that after 8 months, people who have had COVID-19 complain about the symptoms of post-covid syndrome. At the same time, the most common clinical manifestations were sleep disorders (50.9%), hypertension (47.7%), weakness (33.5%), dizziness (32.9%), shortness of breath (27.7%), headaches (24.5%), gastrointestinal disorders (diarrhea, abdomi-nal pain) (18.7%). Our statistical analysis showed a significant dependence of increased blood pressure (1.7 times higher) with the degree of lung damage.

Keywords: COVID-19, SARS-CoV-2, post-covid syndrome, long-term clinical manifestations.

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Introduction. A new coronavirus infection caused by the SARS-CoV-2 virus was first detected in China in December 2019, in Wuhan. On March 11, 2020, the World Health Organization (WHO) declared a global emergency and announced a pandemic. More than two years have passed since the beginning of the pandemic, over the past period of time, the medical community has studied clinical manifestations and developed specific treatment regimens. The incubation period, manifestations, various forms of the disease in different age groups and possible complications are also known. However, there are very few studies researching the development of post-covid symptoms and their duration.

Sources indicate that people who have had a coronavirus infection often have undesirable symptoms (weakness, sleep disturbance, cough, headaches, dizziness, etc.), which are combined into a new disease – post-covid syndrome [12]. Post-covid syndrome is an officially recognized disease that has its own code in the International Classification of Diseases of the 10th revision (U09.9). Based on the data of many independent studies, it has been established that the symptoms of post-covid syndrome can be observed for a long time [4;6;9;10]. The data indicates a variable duration of residual symptoms - from a week and up to six months, however, we have not encountered articles describing symptoms with a longer time period (6<). The amount of research investigating the relationship between the severity of COVID-19 and the frequency of clinical manifestations in the post-covid period was especially lacking.

For a comprehensive and systematic identification of the symptoms, we used clinical databases and questionnaires of people who had a coronavirus infection 8 months after discharge from the hospital. This approach makes it possible to identify not only respiratory symptoms, but also nervous, digestive and cardiovascular ones. These results will help in treatment planning, rehabilitation, and the development of interdisciplinary strategic care to reduce chronic health loss among COVID-19 survivors.

Epidemiology: The SARS-CoV-2 virus differs from other respiratory infections by its rather high virulence and mortality. According to the COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU) on February 10, 2022, an outbreak of coronavirus disease caused by SARS-CoV-2 led to the death of more than 5,777,230 people and in-

fecting more than 403,224,427 worldwide. In Russia, 330,609 people died from this disease, 13,128,679 were infected.

As for the epidemiology of post-covid syndrome, there is no statistically reliable data because of insufficient research of the topic. But there is a noticeable amount of long-term clinical manifestations with repeated hospitalization. So, according to the UK website, more than 1.1 million people who have had a coronavirus infection have come with symptoms that persist after four weeks from the moment of recovery. At the same time, 670 thousand patients reported that these symptoms negatively affected their quality of life, and 196 thousand people reported that their daily life became severely limited. Moreover, 13% of individuals continued to experience these symptoms for 3 months. Thus, a significant number of people who have had a coronavirus infection experience manifestations of the post-covid syndrome for many months, which leads to chronic loss of health.

Materials and methods. We studied the health status of 155 people who had a coronavirus infection and were discharged from the hospital in the period from August to September 2020. Informed consent to the study was obtained from all participants of the study (according to the protocol of the Ethics Committee of the YSC CMP No. 52 dated March 24, 2021, decision 1). Clinical indicators of the disease, such as the degree of lung damage assessed by computed

tomography, were taken from a medical record statement.

All participants were personally interviewed, they filled out a series of questionnaires to assess symptoms and quality of life, underwent a medical examination, and passed blood tests for biochemical and immunological research. The general characteristics of the examined patients are presented in Table 1.

Statistical processing of research results was carried out using the Microsoft Excel application software package and the IBM SPSS Statistics 24 statistical program. The relationship between the degree of lung damage and the risk of developing post-covid syndrome was assessed by the odds ratio (OR) with a 95% confidence interval (95% CI). When comparing the groups, the differences were considered statistically significant at $p < 0.05$.

Results. According to the data obtained, the most common late (8 months after recovery) clinical manifestations of COVID-19 were: sleep disturbance (50.9%), hypertension (47.7%), weakness (33.5%), dizziness (32.9%), shortness of breath (27.7%), headaches (24.5%), gastrointestinal disorders (18.7%). We examined the frequency of clinical manifestations depending on the degree of lung damage during the course of the disease. The analysis of clinical manifestations depending on the degree of lung damage showed reliable values only with: increased blood pressure (Table 2). In the study group of COVID-19

Table1

General characteristics of the examined patients who have had a coronavirus infection

Indicator:	Values:
Number of examined	155
Age, years (median):	53.00 (41.50-61.50)
Men / Women	59/102
BMI	28.03 (24.14-31.74)
Disease severity (CT degree):	Абс.число (%)
1	81 (52.2)
2	43 (27.7)
3	25 (16.1)
4	6 (4.0)
Subjective symptoms:	
Sleep disturbance	79 (50.9)
Increased blood pressure	74 (47.7)
Weakness	52 (33.5)
Dizziness	51 (32.9)
Shortness of breath	43 (27.7)
Headaches	38 (24.5)
Gastrointestinal disorders (diarrhea, abdominal pain)	29 (18.7)

Table 2

Subjective symptoms of the examined patients who have had a coronavirus infection, depending on the degree of lung damage

	Sleep disturbance+	Sleep disturbance-	χ^2	p	OR (95 CI)
CT1-2 n=124	63	61	0.006	0.936	0.968 (0.440-2.128)
CT3-4 n=31	16	15			
	Increased blood pressure+	Increased blood pressure-	χ^2	p	OR (95 CI)
CT1-2 n=124	52	72	8.374	0.004	0.295 (0.125-0.693)
CT3-4 n=31	22	9			
	Weakness +	Weakness-	χ^2	p	OR (95 CI)
CT1-2 n=124	42	82	0.028	0.865	1.075 (0.464-2.491)
CT3-4 n=31	10	21			
	Dizziness+	Dizziness-	χ^2	p	OR (95 CI)
CT1-2 n=124	43	81	0.785	0.377	1.490 (0.614-3.617)
CT3-4 n=31	8	23			
	Shortness of breath+	Shortness of breath-	χ^2	p	OR (95 CI)
CT1-2 n=124	34	90	0.032	0.858	0.923 (0.386-2.204)
CT3-4 n=31	9	22			
	Headaches+	Headaches-	χ^2	p	OR (95 CI)
CT1-2 n=124	27	97	2.502	0.113	0.506 (0.216-1.184)
CT3-4 n=31	11	20			
	Gastrointestinal disorders+	Gastrointestinal disorders-	χ^2	p	OR (95 CI)
CT1-2 n=124	21	103	1.275	0.258	0.586 (0.231-1.487)
CT3-4 n=31	8	23			

patients with more severe lung damage, the frequency of clinical manifestations of high blood pressure was 1.7 times higher, compared with those who had an infection with less severe lung damage.

Discussion. Since the first case of COVID-19 was registered two years ago, articles on the long-term clinical consequences of this disease are just beginning to appear. Due to the huge number of cases and the severity of the disease, many people experience long-term effects of COVID-19. Researchers indicate various durations of residual symptoms: a month [3], three months [1;4], six months [5;13], works describing symptoms with a longer duration (6<) have not been found.

The SARS-CoV-2 virus damages lung cells in the lower respiratory tract (small bronchi and alveoli), provoking a strong inflammatory reaction. Lung CT is the main method of diagnosing the severity of the disease. Many researchers note the dependence of the severity and duration of symptoms of coronavirus infection with the degree of lung damage in the course of the disease [11;15;7].

Our results indicate that even after 8

months, people who have had COVID-19 complain about the symptoms of post-covid syndrome. At the same time, the most common clinical manifestations were sleep disorders (50.9%), hypertension (47.7%), weakness (33.5%), dizziness (32.9%), shortness of breath (27.7%), headaches (24.5%), gastrointestinal disorders (diarrhea, abdominal pain) (18.7%). Our statistical analysis showed a significant dependence of increased blood pressure (1.7 times higher) with the degree of lung damage. Dizziness, muscle weakness and sleep disorders were quite common, but we did not notice statistically significant differences depending on the degree of lung damage (Table 2).

According to Silvagno, an increase in blood pressure in COVID-19 is associated with the way the virus enters the human body. The SARS-CoV-2 virus enters the cell through interaction with the ACE2 protein (angiotensin converting enzyme 2). SARS-CoV-2 blocks ACE2 by internalizing it. The loss of ACE2 receptor activity leads to a rapid drop in the production of angiotensin-1-7 (Ang 1-7), and

consequently the accumulation of angiotensin II (Ang II). Imbalance between angiotensin II (hyperactivity) and angiotensin 1,7 (deficiency) may play a role in the occurrence of an acute increase in blood pressure [2;8;14].

In people who have had a coronavirus infection, there is a significant increase in blood pressure, depending on the degree of lung damage. Perhaps this is due to the fact that high blood pressure is, according to many authors, a concomitant risk factor for complications of COVID-19.

Thus, statistically significant differences between the degree of lung damage and an increase in blood pressure were found in persons who had a coronavirus infection 8 months after discharge from the hospital.

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POST-COVID STATE OF EXTERNAL RESPIRATORY FUNCTION IN HOSPITALIZED AND OUTPATIENT PATIENTS

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A one-time medical and biological examination of the health status of 161 residents of Yakutsk aged 20 to 72 years who recovered from COVID-19 3-12 months ago during the first wave of the pandemic was carried out. Changes in lung function were detected in 29.5% of 139 patients who underwent spirometry. Among them, 7.2% of the surveyed revealed extremely severe changes. The appearance of symptoms and disturbances in the function of external respiration in the post-covid period did not have significant differences in hospitalized and outpatients, and were not associated with the post-covid period, the severity of lung damage in the acute period of the disease, smoking, and the presence of chronic diseases of the respiratory system. The obstructive and restrictive type of disorder was more often observed in women treated on an outpatient basis, which indicates a protracted recovery that requires the same rehabilitation measures that are carried out for hospitalized patients in order to eliminate multiple organ post-COVID complications.

Keywords: COVID-19, pneumonia, spirometry, external respiration.

Material and research methods. The study involved a total of 161 people who had been ill for 3-12 months ago with a new coronavirus infection - COVID-19 at the age of 20 to 72 years. Of these, women - 101 (62.7%), men - 60 (37.3%). The average age of all examined was

Me=51.1 years (41.5; 61.5), men – Me=50.9 years (40.0; 61.7), women – Me=53.7 years (42.0; 61.5).

According to the protocol of computed tomography (CT) from the anamnesis in the acute period of the disease, the subjects were divided according to the severity of lung damage into 5 groups: CT0 (zero) - no signs of viral pneumonia; CT1 (mild) - the presence of a ground-glass compaction zone, involvement of less than 25% of the lung volume; CT2 (moderate) - damage to the lungs from 25 to 50%; CT3 (severe) - damage to the lungs from 50 to 75%; CT4 (critical) - lung damage more than 75% (Table 2). According to the post-COVID period, they are divided into 4 groups: up to 3, up to 6, up to 9, up to 12 months ago (Table 1).

The study used a questionnaire that included questions about the presence of chronic diseases, complaints after suffering from COVID-19, and a questionnaire on the Hospital Anxiety and Depression Scale (HADS). The biomedical study included an appointment with a cardiologist, neurologist, rheumatologist, therapist, determination of hematological, biochemical and immunological parameters, ECG, anthropometry, spirometry. Spirometry was performed in 139 participants of the study using the diagnostic system "Valenta": 88 women (63.3%), the average age was Me - 50.9 (42.0; 61.0) and 51 men (36.7%), the average age - Me - 50.0 (40.0; 61.0). 22 participants were excluded due to contraindications and rejection of the study.

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