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Quality of life and mental disorders in the post-COVID period (systematic review)

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ABSTRACT

The 2019 novel coronavirus infection (COVID-19) pandemic has been a great burden for all of humanity. Soon after it began, researchers noticed that elimination of the virus from the body and recovery are not the end of the disease, since many patients did not return to their previous state of health, continued to complain of pathologies of various organs and systems, could not work, and some of them developed mental disorders.

The aim of the review was to analyze and summarize published data on the quality of life and mental disorders in the post-COVID period. Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) recommendations, 7,374 scientific works were found, of which 176 English-language and 276 Russian-language relevant publications were selected for analysis. The review included 17 (including 2 Russian-language) articles relevant to the topic of this review. Complaints of decreased memory and attention, appearing no later than 6 months after recovery from COVID-19, were reported by 3.2–9.1% of patients. Asthenic symptoms during the first month after the elimination of the novel coronavirus infection occurred in 55–70% of patients, and six months later – in every fifth patient.

At the same time, post-viral fatigue more often affected women discharged from respiratory hospitals and persons with chronic bronchopulmonary pathology. Quite often, those who recovered from COVID-19 experienced insomnia and emotional disturbances, the frequency of which also correlated with the female sex and the severe course of the disease, which required hospitalization in the intensive care unit (ICU). In the post-COVID period, the development of depressive symptoms is not excluded, but sufficient evidence for this has not been obtained. The quality of life in these patients decreased. After discharge from the hospital, some patients remained unable to work, and some began to experience difficulties with self-care. However, over time, there is a trend toward restoration of the quality of life, which is especially evident in young people. In patients who have been in the ICU for more than 7 days, the rehabilitation potential is much lower. Psychopathological symptoms contribute to a decrease in the quality of life along with physical factors (persistent dyspnea, decreased exercise tolerance).

Keywords: novel coronavirus infection, prolonged COVID-19, post-COVID syndrome, quality of life, anxiety, depression, cognitive impairment

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Качество жизни и психические расстройства в постковидном периоде (систематический обзор)

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РЕЗЮМЕ

Большим бременем для всего человечества явилась пандемия новой коронавирусной инфекции 2019 г. (COVID-19), и в скором времени после ее начала исследователи обратили внимание, что элиминация вируса из организма и реконвалесценция не являются завершением болезни. Многие заболевшие не вернулись к прежнему состоянию здоровья и продолжали испытывать жалобы, отражающие патологию разных органов и систем, не могли работать, а некоторые из них столкнулись с психическими расстройствами.

Цель обзора заключалась в проведении анализа и обобщении опубликованных данных о качестве жизни и расстройствах психической сферы в постковидном периоде. Используя рекомендации «Предпочтительные элементы отчетности для систематических обзоров и метаанализов» (PRISMA) были обнаружены 7 374 научные работы, из которых анализу подлежали 176 англоязычных и 276 русскоязычных подходящих публикаций. В обзор включили 17 (в том числе 2 русскоязычные) статей, соответствующих теме данного обзора. Жалобы на снижение памяти и внимания, появляющиеся не позднее чем через 6 мес после выздоровления от COVID-19 предъявляли 3,2–9,1% пациентов. Астенические симптомы в течение 1-го мес после элиминации нового коронавируса встречались у 55–70% пациентов, а спустя 6 мес – у каждого 5-го.

При этом поствирусной астенией чаще страдали женщины, выписанные из респираторных госпиталей и лица с хронической бронхолегочной патологией. Нередко выздоровевшие от COVID-19 сталкивались с бессонницей и эмоциональными нарушениями, частота которых также коррелировала с женским полом и тяжелым течением заболевания, потребовавшим госпитализации в отделение реанимации и интенсивной терапии (ОРИТ). В постковидном периоде не исключено развитие депрессивной симптоматики, но достаточных доказательств этому не получено. Качество жизни у этих пациентов заметно снижается, после выписки из стационара часть больных оставалась нетрудоспособна, а у некоторых начались трудности с самообслуживанием. Однако с течением времени имеется тенденция к восстановлению качества жизни, что особенно прослеживается у лиц молодого возраста. У больных, пребывавших в ОРИТ более 7 сут, реабилитационный потенциал гораздо ниже. Психопатологическая симптоматика вносит вклад в снижение качества жизни наряду с физическим компонентом (персистирующее диспноэ, снижение толерантности к физической нагрузке).

Ключевые слова: новая коронавирусная инфекция, длительный COVID-19, постковидный синдром, качество жизни, тревога, депрессия, когнитивные нарушения

Конфликт интересов. Авторы декларируют отсутствие явных и потенциальных конфликтов интересов, связанных с публикацией настоящей статьи.

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INTRODUCTION

There have been 765 million confirmed cases and more than 6.9 million deaths during the New Coronavirus Infection 2019 (COVID-19) pandemic. Overall, the mortality rate for COVID-19 was 0.9% (according to WHO data as of May 4, 2023) [1]. According to the report of the Ministry of Health of the Russian Federation [2], during the period of circulation of SARS-CoV-2 strains associated with the greatest severity and mortality, 34% of patients required hospitalization, of which 11% needed intensive care in the intensive care unit (ICU). Morbidity and mortality rates changed in waves and maintained an upward trend for a prolonged period. Temporary guidelines for the treatment of COVID-19, including diagnostic and therapeutic innovations aimed at reducing mortality and disability, have been updated with sufficient frequency [3].

It is known that tissue damage is not limited to the respiratory tract in this infectious disease. Antigenic structures of the virus and characteristic pathomorphological changes are found in the gastrointestinal tract, genitourinary system, vascular endothelium, nervous tissue, and kidney tissue. Non-respiratory symptoms of COVID-19 include enterocolitis, vasculitis, skin lesions, delirium, and an increased risk of thrombosis, cardiac arrhythmias, myocardial infarction, and stroke have been noted [4]. At the same time, the problem of COVID-19 is not confined to the acute period of the disease lasting 3-6 weeks; its consequences can also be observed in a more delayed period, which is currently challenging to estimate in terms of duration [5].

A small number of studies conducted on COVID-19 survivors have shown that only 10.8% of patients remain asymptomatic after their illness. The most common symptom in the post-COVID period is fatigue (72.8%). Other manifestations were also noted: anxiety (38%), joint pain (31.4%), persistent headache (28.9%), chest pain (28.9%), dementia (28.6%), depression (28.6%), and dyspnea (28.2%). At the same time, 32.4% of those examined in the post-COVID period had persistent (long-term) disorders that significantly affected the quality of life (QoL) and the state of health [6].

It should be noted that only a limited number of studies have focused on mental disorders in COVID-19. However, all researchers pay attention to the frequent detection of significant depressive disorder, anxiety spectrum disorders, and cognitive changes not only during hospitalization but also in the delayed period after discharge. There are concerns about an increase in suicidal tendencies among survivors of COVID-19. Thus, as a comparison, it is often mentioned that in a study of people who suffered SARS-CoV infection in 2003, more than half of the survivors had mental disorders [7].

It has been established that after a SARS-CoV-2 infection, elderly people often experience a decrease in functional activity and the ability to self-care [8]. Also noteworthy is the long period of disability in a number of patients after COVID-19 [9].

Currently, the mechanisms of development of mental disorders in COVID-19 and their impact on the course and outcome of the disease, both in acute and post-COVID periods, are still completely unknown. These changes significantly worsen the quality of life of patients and require further research to develop comprehensive algorithms for rehabilitation care aimed at both treating organic pathology associated with COVID-19 and correcting mental status.

The aim of this systematic review was to analyze and summarize published data regarding the study of quality of life and mental disorders in the post-COVID period.

MATERIALS AND METHODS

Using the electronic search system PubMed and the scientific electronic library eLIBRARY, a search was conducted for original studies regarding the decline in quality of life in various areas, as well as the detection of mental disorders after COVID-19. The review includes original articles published between February 1, 2020, and October 6, 2022, in English and Russian. All PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were adhered to when identifying potential studies [10]. The analysis was carried out using an algorithm comprising four stages (Fig. 1).

Stage 1. A primary search for publications dedicated to the study of quality of life and psychopathological symptoms in patients who have had COVID-19. Logical operators were used to combine the following keywords: ((long COVID) OR (post-COVID) OR (post-acute COVID-19) OR (prolonged COVID) OR (COVID-19 survivor) OR

(survivors of COVID-19)) AND ((quality of life) OR (mood disorder) OR (affective disorder) OR (depressive disorder) OR (depression) OR (anxiety) OR (cognitive disorder) OR (cognitive impairment) OR (asthenia) OR (sleep disturbance) OR (suicide) OR (physical activity) OR (psychiatric outcomes) OR (fatigue) OR (mental health) OR (psychopathology). The search yielded a total of 7,374 publications: 7,049 in English and 325 in Russian.

Stage 2. From the aforementioned articles, 176 English-language and 276 Russian-language publications were selected, containing original research data and available in full-text version.

Stage 3. Upon examining the abstracts of the selected articles, 148 publications from the electronic search engine PubMed and 274 publications from the scientific electronic library eLIBRARY that were not related to the topic of this systematic literature review were excluded.

Stage 4. A detailed analysis of the full text of publications was conducted. Articles that did not meet the inclusion criteria were excluded. Two studies focused on the acute period of a new coronavirus infection; three other published studies did not assess functional indicators, quality of life, or mental disorders in post-COVID syndrome. Another publication reviewed contained information about the social consequences of the pandemic on a population of people who did not have COVID-19. Three studies with small sample sizes (less than 30 patients) were also excluded. One article appeared twice, in two articles the full results of the research were not presented, in another article access to the results was closed. For the review, 17 articles (including 2 in Russian) that met the inclusion criteria were included in the analysis (Fig. 1).

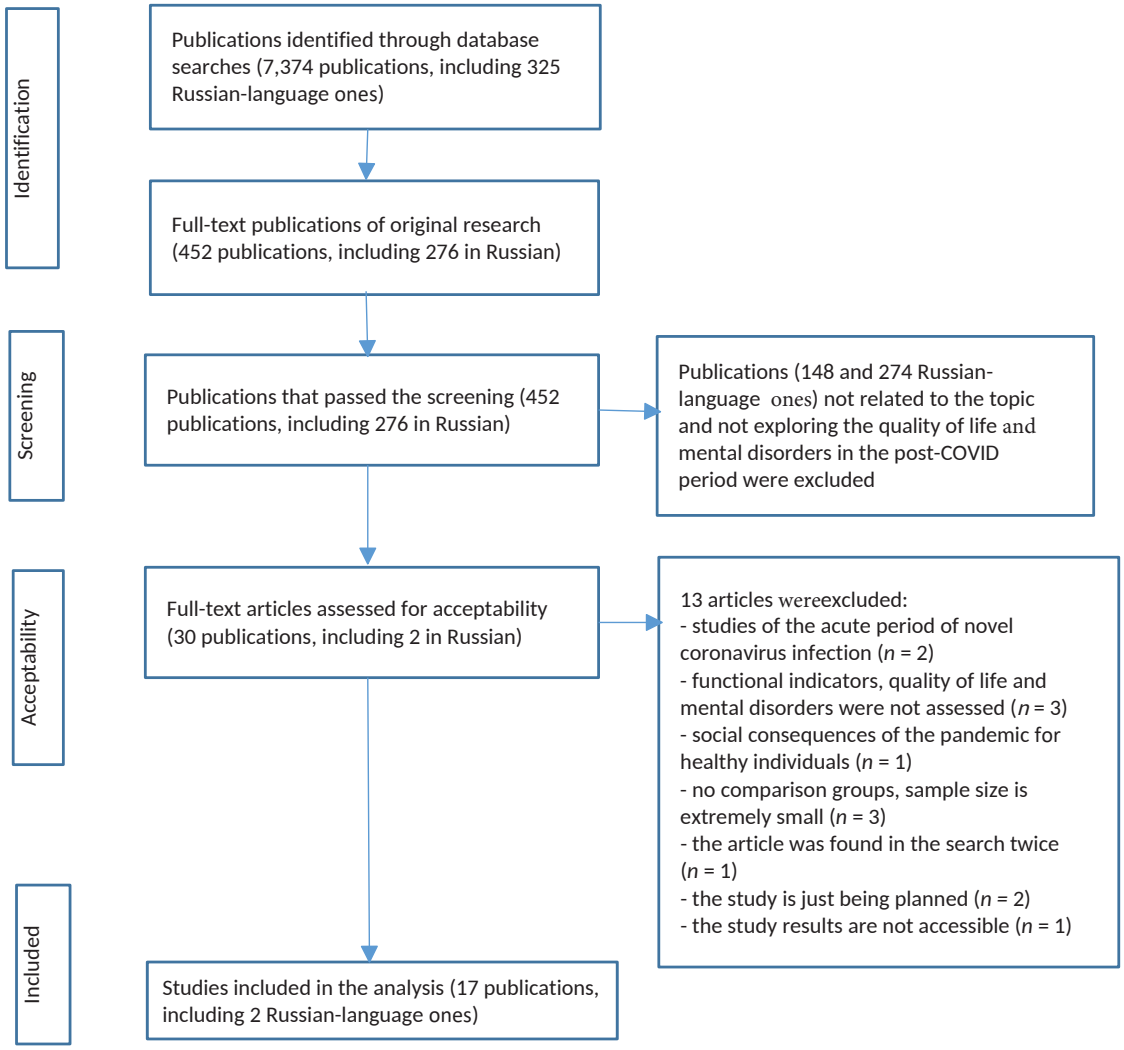

Fig. 1. Algorithm for identifying studies included in the review

MODERN CONCEPT OF POST-COVID SYNDROME, ITS RELEVANCE AND PREVALENCE

An analysis of the geography of published studies reveals that the issue of post-COVID syndrome is addressed worldwide. This review encompasses studies conducted in Russia, the USA, the countries of the European Union, China, India, Israel, and Iran.

In all the analyzed studies, authors report that individuals, after suffering a new coronavirus infection, face a range of complex health problems affecting the cardiovascular, respiratory, nervous systems, as well as the mental sphere. Consequently, these patients often seek medical attention and require rehabilitation measures, despite many having no pre-existing health issues before COVID-19.

The terms long COVID (Long-COVID) and post-COVID syndrome have been proposed for detailed research, clinical diagnosis, and the development of management tactics for patients experiencing symptoms beyond the acute phase of the SARS-CoV-2 infection. D. Munblit [11] defines long COVID (a post-COVID-19 condition, subacute consequences of SARS-CoV-2 infection) as a broad spectrum of symptoms occurring within several weeks or months after SARS-CoV-2 infection. According to R. Mahmud et al. [12], "post-coronavirus disease syndrome" includes persistence of symptoms after viral clearance, new development of symptoms after convalescence, or exacerbation of chronic diseases within a month after initial clinical and virological cure of the disease.

The National Institute for Health and Care Excellence (NICE) provides classifications based on the duration of the main clinical manifestations of COVID-19: "acute COVID" (<4 weeks), "continuing COVID" (4 weeks to 12 weeks), and "post-Covid syndrome" (symptoms lasting >12 weeks without an explanation by other illnesses). NICE also introduces the term "Long-COVID," encompassing both ongoing COVID and post-Covid syndrome [13]. Soriano J.B. et al. (2022) describe the post-COVID state as symptoms developing after 3 months of initial infection, lasting at least 2 months, including fatigue, shortness of breath, and cognitive dysfunction. These symptoms may persist after acute COVID-19 or occur for the first time after recovery [14]. Presently, post-COVID syndrome is relevant and classified under the International Classification of Diseases ICD-10 code U 09.09 as "Condition after COVID-19, unspecified" [15].

In a study conducted by L.G. Jacobs et al. (USA, 2020) among patients with a favorable outcome of hospitalization for COVID-19, confirmed by PCR, persistent symptoms on the 35th day after discharge were observed in 72.7% of patients [16].

According to the findings of another study led by D. Munblit et al. (Russia, 2021), among individuals discharged with a diagnosis of COVID-19, confirmed either by PCR or established clinically, 47.1% of patients reported enduring symptoms after an average of 218 days. Notable complaints included fatigue (21.2%), dyspnea (14.5%), and memory impairment (9.1%) [11].

R. Mahmud et al. (Bangladesh, 2021) published results from a study in which 46% of patients developed symptoms within 1 month after recovering from COVID-19, with "post-viral" fatigue (asthenic syndrome) being the most prevalent complaint, occurring in 70% of cases [12].

In a study by A. Pérez-González et al. (Spain, 2022), involving hospitalized patients with a laboratory-confirmed diagnosis of COVID-19, 48.0% of individuals reported one or more persistent complaints six months after discharge. The most prevalent issues included extrathoracic symptoms (39.1%), symptoms associated with chest discomfort (27%), dyspnea (20.6%), and fatigue (16.1%) [17].

Analyzing publications dedicated to the post-COVID syndrome, it can be inferred that after recovering from COVID-19, symptoms and syndromes of psychiatric pathology are frequently discovered, necessitating correction and treatment. Among these disorders, asthenic, affective, and cognitive disorders hold a particular prominence.

COGNITIVE IMPAIRMENTS IN COVID-19

Cognitive functions represent the brain's ability to engage in the process of rational cognition of the world, encompassing attention, memory, speech, perception (gnosis - recognition of information from the senses), praxis (the ability to acquire, retain, or use various motor skills), and control (regulatory) functions (planning and monitoring the execution of actions). Cognitive impairment is defined as a subjective and/or objective decline compared to

the initial level of cognitive functions, affecting professional, social, and everyday activities [18].

Traditionally, clinicians focused primarily on severe cognitive disorders, such as dementia, which significantly impairs daily functioning, work capacity, self-care, communication, and independence [19]. Subsequently, researchers turned their attention to cognitive activity disorders detected through patient complaints (e.g., forgetfulness, decreased concentration) or identified during in-depth neuropsychological examinations. These disorders, not causing signs of social maladjustment, are now termed non-dementia cognitive disorders [20].

D. Munblit et al. analyzed data from 2649 COVID-19 patients discharged from four respiratory hospitals in Moscow. The average age was 56 years, with 51.1% being women. Notably, 34% of patients required supplemental oxygen therapy, and invasive respiratory support was necessary in 2.6% of cases. After 218 days post-hospitalization, researchers assessed patients' conditions via a telephone survey using the ISARIC Long-term Follow-up Study form (long-term follow-up study protocol). According to the survey conducted 7 months after COVID-19 recovery, 9.1% of respondents complained of forgetfulness [11].

Information regarding the prevalence of cognitive disorders in the post-COVID period is found in the results of a study by A. Pérez-González et al. (Spain, 2022). This prospective cohort study included 248 patients with a positive SARS-CoV-2 PCR test result. Participants averaged 57 years of age, with 59.7% being men. Hospitalization was required for 69.4% of patients, and 10.2% were in critical condition. Surveys conducted 1, 3, and 6 months after the COVID-19 diagnosis identified 3.2% of patients with complaints of impaired memory and attention six months after the diagnosis [17].

The study led by I.A. Zolotovskaya et al. (Russia, 2021) examined 12 outpatients with COVID-19, aged 49.8±8.9 years, presenting with asthenic complaints. The study assessed general weakness, fatigue, decreased concentration, non-systemic dizziness, headache, sleep disturbances, and decreased cognitive function. Results revealed that, among patients not using nootropics, neurometabolics, or antihypoxants, 80.0% reported impaired attention, and 58.5% reported memory impairment. Cognitive impairment was assessed using the Mini-Mental State Examination (MMSE), indicating a pronounced decrease in cognitive function in relatively young patients, attributed to pseudocognitive deficit amid severe asthenic syndrome. The study also identified a tendency towards spontaneous regression of complaints related to memory and attention over time, with no significant impact of nootropic therapy on symptom resolution speed or intensity [21].

In another study conducted by S. Zilberman-Itskovich et al. (Israel, 2022), the condition of 83 adult patients (average age 48 years, men – 34.9%) with cognitive complaints after COVID-19, negatively impacting quality of life and persisting for more than three months post a positive PCR test, was assessed. The study excluded individuals with previously diagnosed cognitive impairment and brain pathology before COVID-19. Conditions were evaluated twice: at baseline and 1–3 weeks after the last treatment session (hyperbaric oxygen therapy or placebo). Assessments included the SF-36 scale (The Short Form-36), PSQI (Pittsburgh Sleep Quality Index) for sleep research, Brief Symptom Inventory-18 (BSI-18) for assessing depression, anxiety, and somatization, Brief Pain Inventory (BPI), Mindstreams computerized cognitive testing program, and MRI brain scanning. The study found improved attention and executive functions (p = 0.04, p = 0.05, respectively) during hyperbaric oxygen therapy compared to the control group. Both groups showed improved memory, attributed by researchers more to the natural course of the disease than hyperbaric oxygen therapy [22].

Thus, the studies presented indicate a cognitive complaint prevalence ranging from 3.2–9.1% among recovered patients, with symptoms such as decreased memory and concentration persisting for at least 6 months post-clinical and laboratory recovery from acute SARS-CoV-2 infection. It is noteworthy that these symptoms tend to resolve spontaneously without drug treatment as part of the natural course of the disease.

ASTHENIC SYNDROME AND COVID-19

Asthenic syndrome is characterized by a loss of strength, feelings of overwork, excessive exhaustion, fluctuations in neuropsychic excitability, weakened attention, unstable mood, and a general decline in mental activity. Unlike ordinary fatigue, asthenia is

persistent, not directly linked to overexertion, and may persist even after extended periods of rest. In severe cases, weakness may be profound, hindering movement or medication intake. Symptoms typically exacerbate in the afternoon, towards the end of the workweek, and before vacations [23].

At the initial stage, neuropsychic excitability rises, sensitivity to visual, auditory, tactile, and other stimuli intensifies ("the clock is ticking loudly," "the text appears bold and voluminous"), and visceral sensitivity increases, resulting in headaches, heaviness, and body aches. Patients find waiting challenging, display impatience in queues, and often experience mood swings, expressed as irritability, tearfulness, anxiety, and moodiness. Objectively, examinations reveal exhaustion and distractibility of attention. Asthenic syndrome frequently presents with sleep disturbances, including difficulty falling asleep and frequent awakenings [23].

Numerous studies indicate the presence of asthenic syndrome in the post-COVID period. Information on the prevalence of asthenic complaints is reported in a study by L.G. Jacobs et al. (USA, 2020), involving 183 adult patients hospitalized for PCR-confirmed COVID-19. The average patient age was 57 years, with 61.5% being men. Immediately after completing inpatient treatment, 56.8% of respondents reported fatigue, and after 35 days, during a follow-up phone conversation, 55.0% still reported fatigue [16].

In a study by D. Munblit et al. (Russia, 2021), conducted 218 days after the end of the acute period of COVID-19, 21.2% of respondents reported fatigue, with chronic lung diseases being associated with chronic fatigue [11].

R. Mahmud et al. (Bangladesh, 2021) identified asthenia in 70.7% of respondents within a month after the resolution of the acute period of COVID-19. Furthermore, asthenic symptoms were statistically significantly associated with the female gender (p = 0.03).

In another study by A. Pérez-González et al. (Spain, 2022), hospitalized patients with laboratory-confirmed COVID-19 exhibited a higher prevalence of asthenic manifestations 6 months after discharge (20.9% versus 5.3%) compared to non-hospitalized patients (p = 0.001) [17].

According to S. Zilberman-Itskovich et al. (Israel, 2022), asthenic syndrome was recorded in 77% of patients with cognitive deficit 3 months after the detection of SARS-CoV-2 [22].

I.A. Zolotovskaya et al. (Russia, 2021), while studying asthenic syndrome in the post-COVID period, observed a positive effect of nootropic therapy. Improvement was noted in research scales, and the differences before and after treatment were statistically significant. The self-assessment of asthenia on a visual analogue scale in the treatment group changed from 8.4 ± 2.5 to 3.9 ± 1.2 cm over three visits, while the control group changed from 8.2 ± 2.7 to 5.1 ± 1.4 cm. On the MFI-20 scale, the treatment group changed from 70.85 ± 10.1 to 49.03 ± 10.1 points, while the control group changed from 69.99 ± 11.5 to 56.18 ± 11.25 points. Notably, the severity of asthenic syndrome decreased even without treatment during the natural course of the disease [21].

Thus, the prevalence of asthenic manifestations in the post-COVID period is consistently reported (approximately 55–70% of patients in the first month after recovery and 20% six months later). Additionally, post-COVID asthenia tends to resolve in most patients over time. There is a statistically significant association between asthenic symptoms in the post-COVID period and female gender, the presence of chronic bronchopulmonary diseases, and the experience of hospitalization for acute COVID-19.

DEPRESSIVE SYNDROME AND COVID-19

Classically, depressive syndrome includes low mood, mental retardation and decreased activity. In addition to these symptoms, there are also hypochondriacal ideas, sleep disturbances, appetite disorders, feelings of guilt, decreased self-esteem, and vegetative manifestations [23]. The ICD-10 diagnostic criteria contain an important indication that the main manifestation of affective disorders is a change in physical activity; these diseases are cyclical, that is, periods of exacerbations and remissions are observed. The main symptoms of a depressive episode are low mood, loss of pleasure and loss of energy. This state is monotonous and changes little for at least two weeks [24].

S. Zilberman-Itskovich et al. (Israel, 2022) revealed in patients with cognitive disorders 3 months after the resolution of the acute period of COVID-19 complaints of insomnia, the level of which, according

to the results of the PSQI questionnaire, was 10.6 ± 4.0 points; however, the level of distress (BSI-18) in the global indicator indicates the absence of anxiety-depressive symptoms in these patients (the average BSI-18 score was 25.1 ± 13.6 points, while a value above 63 points is considered critical) [22].

P. Sadeghipour et al. (Iran, 2022) in their study showed that female gender was associated with higher odds of developing depressive disorders (Patient Health Questionnaire-2 score ≥3) three months after resolution of acute COVID-19 symptoms. In individuals at risk for depressive disorder, the researchers found no statistically significant changes after 3 months (the proportion of patients with a PHQ-2 score ≥3 points decreased from 26.1% at day 30 to 16.6% at 90 days of follow-up ($p = 0.05$)) [8].

A. Pérez-González et al. (Spain, 2022) found sleep disturbances in 5.2% of hospitalized patients in the post-COVID period, while in the outpatient group there were no patients with such complaints, although the differences between the groups on this basis were not statistically significant [17].

R.G. Khabchabov et al. (Russia, 2021) in their study using the World Health Organization Quality of Life Questionnaire (QOL-100) found that depressive symptoms appeared in 68.6% of patients who had recovered from COVID-19, of which 24.8% noticed this family members [9].

S. Zhu et al. (China, 2020) examined 432 patients (average age 49 years, 49% women, a third of cases had severe COVID-19) upon discharge from hospital after COVID-19 using the Tsung scale for anxiety symptoms. 28.7% of patients showed positive test results for clinical anxiety. However, severe COVID-19 (adjusted risk ratio (RR) 2.533; 95% confidence interval (CI) 1.693–3.788) was the strongest risk factor for the development of clinically significant anxiety. Moreover, there was a trend towards an increased relative risk of anxiety in survivors who remained in hospital for more than 14 days (adjusted RR 1.482; 95% CI 0.998–2.200) [25].

Summarizing the analyzed studies, we can note quite clear indications that patients after COVID-19 are faced with insomnia, anxiety, emotional disturbances, which may reach the delineated depressive episodes, given that changes in the mood of patients are noticed by their close people. These emotional disturbances show a correlation with female gender and the fact of hospitalization for acute COVID-19. Clinically significant anxiety correlates with COVID-19 severity and length of hospital stay. Further study of the prevalence of affective disorders in people with post-COVID syndrome is required in order to qualify the mental state of patients according to the current ICD criteria.

QUALITY OF LIFE IN PATIENTS WITH POST-COVID SYNDROME

Currently, Quality of Life (QOL) is understood as a characteristic of a person's physical, psychological, emotional, and social functioning, based on their subjective perception [26]. The primary method for assessing QoL is questionnaires, with the SF-36 questionnaire being the most widely used in clinical studies. This questionnaire comprises 8 scales reflecting the main components of QoL: physical functioning, role functioning, bodily pain, general health, vitality, social functioning, emotional state, and mental health [27].

In a study by L.G. Jacobs et al. (USA, 2020), information regarding the quality of life of patients who had COVID-19 35 days after discharge from the hospital is presented. Among them, 13.8% of respondents rated their physical activity as low, 24.9% as moderate, and 61.3% as complete. 3.3% of patients reported great difficulty getting dressed, and 29.6% reported no or slight difficulty getting out of bed. At hospital discharge, 52% of participants were employed, but by day 35, only 29.9% had returned to work. Social relationships worsened for 60.4% of patients, and only 39.6% rated their social life as excellent [16].

J. Li et al. (China, 2021) conducted a study of 120 previously hospitalized adult patients diagnosed with COVID-19, persistently complaining of dyspnea. The average age was 50.6 years; 44.5% were men, and 86.6% received oxygen therapy or non-invasive respiratory support during treatment. Exclusion criteria included chronic diseases in the decompensation stage, dyspnea at rest, or tachycardia (heart rate > 100/min). The condition was assessed at baseline (on average 70 days after hospital discharge) and then after 6 weeks and six months. The 6-minute walk test value increased by 17.1 m over 6 weeks, indicating improvement. The physical component of QOL according to the SF-12 questionnaire improved from 39.69 to 43.53 points, and the mental component improved from 44.13

to 48.3 points, reflecting an overall betterment in patients' quality of life over time [28].

The results of the study by M.A. McNarry et al. (USA, 2022) contain information on the quality of life using the K-BILD (The King's Brief Interstitial Lung Disease) scale in 281 adult patients 9 months after acute COVID-19. The average age was 46.6 years, with 88% being women. The average quality of life score at the beginning and after 8 weeks remained virtually unchanged (at the beginning 59.7 points, after 8 weeks – 59.8 points). However, improvements were noted in individual domains: shortness of breath and activity increased from 40.6 points to 41.9 points, the psychological component from 56.9 points to 59.2 points, and chest symptoms from 56.6 to 59.5 points, indicating an enhancement in the health status of patients over time [29].

S. Dhooria et al. (India, 2022) conducted an analysis of the condition and quality of life of 130 individuals within 3–8 weeks from the onset of acute COVID-19, confirmed by PCR. The average age of the patients was 57 years, with 32% of study participants being female. Notably, 98% of patients experienced a severe form of COVID-19, and 43% of cases required invasive respiratory support or high-flow oxygen therapy. A distinctive aspect of this study was the examination of the health of patients with severe COVID-19. Consequently, inclusion criteria comprised persistent dyspnea (mMRC $\geq$ 2 points), resting hypoxemia (oxygen saturation $\leq$ 94%), or exercise desaturation ($\geq$4% drop in oxygen saturation during exercise) at screening; diffuse abnormalities affecting $\geq$ 20% of the lung parenchyma. All patients in this study received prednisolone, categorized into two groups with high and low doses of glucocorticosteroids (GCS). Six weeks after the first symptoms of COVID-19, the group receiving high doses of GCS exhibited an average physical activity score of 59.4 ± 26.3 points on the Health-Related Quality of Life (HRQoL) scale, while the low-dose group scored 62.9 ± 28.5 points (p = 0.49). The indicator of social adaptation after 6 weeks in the high-dose GCS group on the HRQoL scale was 76.4 ± 25.4 points. In the group with low doses of GCS, this indicator was 69.2 ± 29.9 points (p = 0.15). Additionally, in this study, no statistically significant differences were observed between the two groups in X-ray dynamics, changes in spirometry parameters, saturation levels, and the severity of shortness of breath. Consequently, the authors did not identify any advantage of high doses of prednisolone over low doses [30].

S. Zilberman-Itskovich et al. (Israel, 2022) conducted a study assessing Quality of Life (QoL) using the SF-36 scale. The results indicated an improvement in QoL characteristics such as physical functioning and vitality in the group of patients receiving hyperbaric oxygen therapy [22].

P. Sadeghipour et al. (Iran, 2022) undertook a study involving 375 patients diagnosed with COVID-19 who received treatment in the ICU. The average age of participants was 62 years, with 42% being women. Mechanical ventilation was administered to 20.8% of patients, non-invasive ventilation to 33.2%, and oxygen therapy to 46.1%. The study employed the Post-COVID-19 Functional Status Scale (PCFS) to evaluate functional status and the Patient Health Questionnaire-2 (PHQ-2) to assess depressive symptoms. From days 30 to 90, the proportion of patients with moderate to severe functional limitations (PCSF grade 3 or 4) decreased from 20.0% to 4.8% ($p < 0.001$). Concurrently, the percentage of patients without functional limitations (grade 0 PCFS) increased from 4.2 to 15.4% ($p < 0.001$). Statistical analysis revealed that younger age predicted functional recovery at 90 days, while a longer ICU stay (>7 days) was associated with increased odds of severe functional limitation at the 3-month follow-up [8].

E. Zasadzka et al. (Poland, 2022) evaluated 30 adult patients admitted to a neurological rehabilitation unit after severe COVID-19. The examination, including the Functional Independence Measure (FIM), showed a change in FIM values from 89 to 117 points, indicating a gradual increase in the ability for self-care (independence) among recovered COVID-19 patients [31].

In another work (Germany, 2022), a comparative analysis was presented, examining 206 patients who had COVID-19 on an outpatient basis and individuals who had never contracted COVID-19 (negative test for antibodies to SARS-CoV-2). The assessment included indicators such as hospitalization rates over 7 months and quality of life assessment (EQ-5D-5L, SF-36, PCFS, 6-minute walk test). The average age was 47 years, with women comprising 58.2% of the participants. Hospitalization rates were low and comparable in both groups (2.4% in the COVID-19

group versus 2.9% in the control group). However, the analysis revealed a decrease in QoL on the EQ-5D-5L scale in patients who had COVID-19 (average VAS values 83.6 ± 15.2 mm versus 88.6 ± 12.4 mm in the control group; $p < 0.05$) [32].

Keir E.J. Philip et al. (UK, 2022) analyzed the condition of 150 adult patients who had recovered from COVID-19 with ongoing shortness of breath. The average age was 49 years, with 81% being female. After 320 days from the onset of the first symptoms of COVID-19, quality of life (SF-36, SF-6D), severity of shortness of breath (VAS), and anxiety level (GAD-7) were assessed. Despite the performance of breathing exercises in one of the groups, there were no differences in the domain of the physical component of QoL compared to the control group. However, patients in the main group showed better scores in the psychological component ($p = 0.047$) [33].

In another study that examined Quality of Life (QoL) in the post-COVID period, S.I. Filippchenkova et al. (Russia, 2022) included 87 adult patients (average age 44.8 years; 29% of them were men) and conducted a survey using the SF-36. The study excluded individuals with traumatic brain injuries, diseases of the central nervous system, mental disorders, oncological, endocrine, and somatic pathologies, as well as bad habits (alcohol and drug abuse). According to the survey results, approximately 50% of patients demonstrated average indicators of the physical component of health, and almost 30% of study participants experienced difficulties in performing daily tasks [34].

R.G. Khabchabov et al. (Russia, 2021) conducted a special assessment of the quality of life in 121 patients aged 41–76 years (68.6% men) one month after discharge from the cardiology hospital, where they were treated for COVID-19. Participants were individuals who had been under the supervision of doctors for more than two years with functional class III–IV angina pectoris, arterial hypertension, and type 2 diabetes mellitus. All of them suffered from COVID-19, while in 3.4% of patients, the degree of lung damage varied from 30% to 60%, in 15.7% of patients – 10–30%, in 38.0% of patients, the extent of damage to the pulmonary parenchyma was < 10%, and 43.0% of patients were diagnosed with mild COVID-19. A survey of patients using the QOL-100 questionnaire showed that a month after suffering from COVID-19, the proportion of patients with insufficient energy for everyday life increased by 23.2% ($p = 0.001$); those dissatisfied with their health increased by 31.4% ($p = 0.0016$); anxious and depressive experiences began to be detected 33.9% more often ($p = 0.0018$). 17.3% more patients reported insomnia ($p = 0.0005$), and personal relationships with friends and relatives worsened by 63.6% ($p = 0.0027$). At the same time, the number of patients with temporary disability after COVID-19 increased by 15.7% ($p = 0.0003$), compared with their number before COVID-19 [9].

Thus, the results of assessing various domains of QoL in patients after clinical recovery from COVID-19 remain at a statistically significantly lower level than in persons who have not had COVID-19 for an extended period. There is a decrease in both the physical and psychological components of QoL. After completing hospitalization for at least 35 days, a significant proportion of patients remained unable to work. Some patients, after completing the acute phase of COVID-19, experienced limitations in physical functioning, difficulty getting dressed, getting out of bed, and restrictions in social functioning. Many studies provide evidence that the deterioration in the quality of life in the post-COVID period is temporary and is characterized by a tendency towards gradual recovery. Some authors find a relationship between the low severity of functional impairments and high rehabilitation capabilities in young people; they also note that a worsening functional prognosis in patients is associated with a length of stay in the ICU of more than 7 days.

CONCLUSION

This review delves into a critical public health concern – the medical and social repercussions of COVID-19, shaping the so-called post-COVID syndrome.

Through the analysis of published data, it can be inferred that individuals recovering from COVID-19 experience cognitive impairment [11] [17][21], asthenia, and insomnia [17]. However, these issues tend to spontaneously resolve over time [21] and exhibit partial responsiveness to currently available methods of pharmacotherapy and physical rehabilitation [22].

It is noteworthy that post-COVID asthenic manifestations were more frequently associated

with female gender [12], the presence of chronic bronchopulmonary diseases [11], and hospitalization for COVID-19 [17]. Additionally, anxiety symptoms correlated with the severity of COVID-19 and the length of hospital stay [25]. Emotional disorders were also identified in the post-COVID period, but further clarification is needed [8, 9].

The literature analysis results lead to the assertion that there is a decline in the quality of life in patients after the resolution of acute COVID-19 [9, 32]. Importantly, unlike many other infectious diseases (e.g., bacterial pneumonia), individuals completing hospitalization may not be able to return to work and remain disabled even 35 days after leaving the hospital [16]. Simultaneously, there is a degradation in results across all domains contributing to the Quality of Life (QoL). However, with time, QoL indicators gradually improve, particularly in young individuals [8]. Conversely, an ICU stay exceeding 7 days correlates with a poorer rehabilitation prognosis [8].

Despite substantial progress in post-COVID mental disorders and quality of life research, several unresolved questions necessitate further investigation. Extended observation of psychopathological symptoms in individuals recovering from COVID-19, continuous assessment of their functional status, identification of criteria for permanent disability in people with long-term COVID, and a comprehensive understanding of affective sphere pathology remain areas of interest.

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