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Evaluation Review

Multifactorial Analysis of the Consequences of Recovering from COVID-19

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Abstract

This review article is devoted to the analysis of the long-term consequences of COVID-19, manifested in the form of post-COVID syndrome. The work includes a detailed study of the clinical picture of the syndrome, its epidemiological characteristics and its impact on the health of patients and social aspects of public life.

The importance of conducting in-depth scientific research for a comprehensive study of the pathogenesis and development of effective methods of treatment of post-COVID syndrome is emphasized. The article also highlights the need to expand information campaigns among medical professionals and the general public to improve early diagnosis and optimize treatment of this condition.

Keywords: coronavirus infection, COVID-19, post-COVID syndrome, rehabilitation, SARS-CoV-2.

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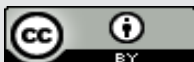
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Introduction

In recent months, against the backdrop of a distinct decrease in COVID-19 morbidity, there has been a significant increase in attention to the long-term consequences of the disease [1-3]. It is well known that in the vast majority of cases, the new coronavirus infection completely regresses within 2 weeks, and in severe cases, patients recover within 3-6 weeks. Studying the long-term consequences of COVID-19 within the so-called post-COVID syndrome is of great medical and social importance, considering the high prevalence of this pathology, the insufficient study of its etiology and pathogenesis, the absence of effective methods for treating and rehabilitating patients [2, 4-9].

The relevance of the topic is due to the high prevalence of post-covid syndrome worldwide, which affects a huge number of people who have suffered a

new coronavirus infection, and thus has an impact on public health and the economy.

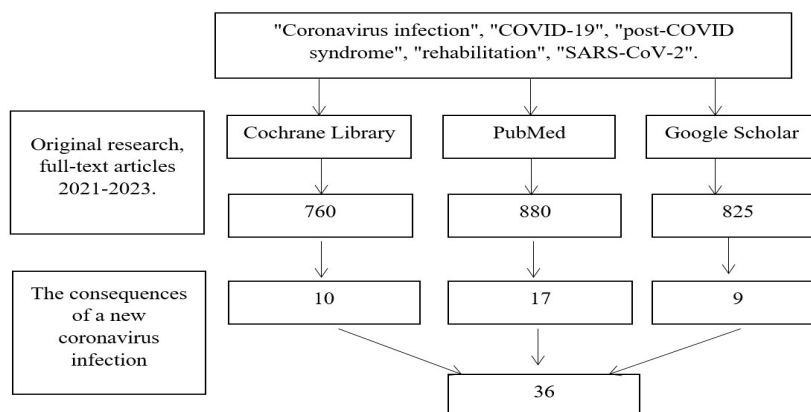
Currently, there are a sufficient number of studies on post-covid syndrome, but this condition remains poorly understood in terms of long-term effects on patient health and adaptation to social conditions. There is uncertainty in terms of diagnosis and treatment of postcovid syndrome, especially in patients with mild to moderate severity, and this cohort of people remains without rational medical care.

The purpose of this review is to explore comprehensive approaches to the definition of post-covid syndrome, the long-term social and economic consequences of post-covid syndrome, which can help in the formation of an effective public health strategy at the national and international levels.

Research methodology

In this study, we conducted a review of scientific publications related to the effects of coronavirus infection. As part of the study, international databases such as Cochrane Library, PubMed, Google Scholar were used, while searching for material, the priority was those articles that covered the condition of patients after COVID-19 infection (Picture 1). During the search query, the main condition was used as a basis: the mandatory presence in the title of the article,

annotation or keywords of terms related to coronavirus infection or COVID-19, including post-covid syndrome. This approach allowed us to collect and analyze a large amount of data, which, in turn, provides an understanding of the long-term effects of COVID-19 and contributes to the development of methods that improve rehabilitation for those who have suffered a new coronavirus infection.



Picture 1 - Research methodology

Main Body

According to the definition specified in adopted clinical protocol in Kazakhstan, post-COVID syndrome (post-COVID-19 condition) is a set of signs and symptoms that develop in patients who previously had new coronavirus infection and persist for more than 12 weeks after onset of the disease. Exclusion of other diseases that may cause the same symptoms is extremely important [10-12]. National Institute for Clinical Excellence (NICE) and Robert Koch Institute have proposed similar definition. Thus, it should be noted that while there is still no generally accepted definition for post-covid syndrome, diagnosis of this condition is based on defining the symptoms that persist or are determined 12 weeks after the onset of acute infectious process in most of the cases [8].

To date, true incidence of post-COVID syndrome is insufficiently studied. According to rough estimates, at least one in ten patients who had COVID-19 may have certain signs of post-COVID syndrome [13].

According to the latest epidemiological data, incidence of post-COVID syndrome is 10-70%. It is very common in hospitalized patients with severe courses [7, 14]. According to one study, incidence of post-COVID syndrome is 54% among patients treated in intensive care unit, and 34% among outpatients [15]. According to large systematic review and meta-analysis, up to 20% of outpatients that had new coronavirus infection have also had signs of post-covid syndrome [16]. S.A.M. van Kessel et al. (2022) showed similar results in their large systematic review. Thus, even with a mild course of new coronavirus infection, incidence of persisting individual symptoms of the disease (pathological/increased fatigue and weakness; respiratory symptoms such as coughing, shortness of breath, etc.; headache, psycho-emotional and cognitive impairment, etc.) is up to 30%.

It should be also noted that there are significant difficulties in determining the true incidence of post-covid syndrome when considering polymorphism of clinical data, predominance of suppressed and asymptomatic forms. Furthermore, not all patients with signs of post-covid syndrome seek medical help [7, 17-21]. A specific approach to identification of post-covid syndrome is of great importance. Two large meta-analyses failed to determine the frequency of post-COVID syndrome due to evident heterogeneity and inhomogeneity of results of the studies [8]. In general, although the true incidence of post-COVID syndrome remains unknown, medical and socio-economic value of the problem is extremely important.

Organizational aspects of rehabilitation of post-COVID patients: from complications to rehabilitation after prolonged hospitalization

The results of numerous studies have shown that the factors of the severe course of the disease and the unfavorable prognosis of COVID-19 are the presence of comorbid pathology, such as hypertension, overweight, diabetes mellitus, diseases of the cardiovascular system, predictive parameters of the severe course of COVID-19 infection [22-27].

Prolonged inpatient treatment in infectious diseases departments in patients with a new coronavirus infection leads to various consequences, such as damage to the lungs, cardiovascular system, muscular and cognitive disorders, as well as the occurrence of anxiety and depression. These functional and physical complications contribute to limiting a person's daily activity, reduce the level of work capacity and thereby complicate social communication in general. Often, people after a new coronavirus infection, due to the severity of the disease, adhere to a sedentary lifestyle, thereby increasing the risk of developing additional diseases [28-30].

Thus, in addition to reducing the mortality rate, medical institutions are focused on developing methods for the physical and functional recovery of patients by creating respiratory rehabilitation programs. These

Conclusion

1. Post-covid syndrome is a serious and urgent public health problem, thus negatively affecting the quality of life of the population.
2. It is necessary to continuously increase awareness of the public and medical professionals about the post-covid syndrome in order to improve early recognition and monitoring of the condition after a coronavirus infection.
3. To improve the condition of patients, it is necessary to provide affordable physical as well as psychological rehabilitation, while preventing the development of chronic conditions and thereby

programs suggest that physical exercise is not only acceptable in rehabilitation after COVID-19, but also effective for the full restoration of the health of patients with severe forms of coronavirus infection.

To date, there are no specific approaches to the treatment of post-covid syndrome. As a rule, symptomatic treatment and comprehensive rehabilitation aimed at eliminating or minimizing both physical and psychological disorders are carried out [31-33].

Only general principles of rehabilitation of patients who have suffered severe new coronavirus infection COVID-19 and have been in the hospital for a long time are being implemented everywhere [33, 34]. Due to the lack of research on specialized methods of physical rehabilitation of people recovering from coronavirus infection, all recommendations are usually based on knowledge and experience gained during previous epidemics of SARS and Middle East respiratory syndrome. Effective methods of rehabilitation after COVID-19 are of paramount importance and play an important role in restoring the health and efficiency of the population, which is important to reduce the long-term burden on the health care system as a whole [35,36].

Thus, the new coronavirus infection is a serious disease that is characterized by a severe course and a long recovery after COVID-19. Despite the end of the pandemic, the SARS-CoV-2 virus continues to remain at the epicenter of attention of the medical community around the world. At the dawn of the pandemic, there was very little information about the pathogenesis mechanisms and treatment approaches for this new virus. Nevertheless, over the past three years, the situation has improved significantly thanks to many scientific studies that have greatly contributed to understanding the main causes of the severe course of COVID-19 and adverse outcomes, as well as led to the development of new therapeutic and preventive methods of recovery after the disease.

significantly reducing the burden on medical organizations and social services.

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Түйіндеме

Бұл шолу мақаласы пост-COVID синдромы түрінде көрінетін COVID-19-дың ұзақ мерзімді салдарын талдауға арналған. Мақалада аталмыш синдромның эпидемиологиялық сипаттамаларын және оның науқастардың денсаулығы мен халықтың өмірінің әлеуметтік аспектілеріне әсерін егжей-тегжейлі зерттеуді қамтиды. Патогенезді жан-жақты зерттеу және постковидті синдромды емдеудің тиімді әдістерін әзірлеу үшін терең ғылыми зерттеулер жүргізудің маңыздылығы атап өтіледі. Сондай-ақ, мақалада денсаулық сақтау саласы мамандары мен жалпы тұрғындар арасында пост-COVID синдромын ерте диагностикалауды жақсарту және емдеуді оңтайландыру үшін ақпараттық науқандарды кеңейту қажеттілігі көрсетілген. Түйін сөздер: коронавирустық инфекция, COVID-19, пост-COVID синдромы, оңалту, SARS-CoV-2.

Мультифакторный анализ последствий перенесенной COVID-19

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Резюме

Данная обзорная статья посвящена анализу отдаленных последствий перенесенной COVID-19, проявляющихся в виде постковидного синдрома. Работа включает детальное изучение клинической картины синдрома, его эпидемиологических характеристик и его влияния на здоровье пациентов и социальные аспекты жизни населения. Подчеркивается важность проведения углубленных научных исследований для всестороннего изучения патогенеза и разработки эффективных методов лечения постковидного синдрома.

В статье также подчеркивается необходимость расширения информационных кампаний среди медицинских работников и широкой общественности для улучшения ранней диагностики и оптимизации лечения этого состояния.

Ключевые слова: коронавирусная инфекция, COVID-19, пост-COVID синдром, реабилитация, SARS-CoV-2.