

Associations between Continuing Symptoms and Quality of Life in Post-COVID-19 Patients (2023)

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Abstract

COVID-19 is a multisystem disease that can cause various symptoms which last even after the acute stage and negatively impact the quality of life of patients. It is of utmost importance to comprehensively evaluate how COVID-19 affects not only patients' physical and mental health, but also their family and social life. This knowledge plays a significant role in the creation of effective ways to assist those suffering from long COVID to address health-related quality of life issues in a timely manner.

Keywords

COVID-19 Disease, Long COVID, Post-COVID Syndrome, Quality of Life, Health Related Quality of Life

1. Introduction

Continuing symptoms that persist beyond the acute period of COVID-19 disease, which can continue for an unforeseen period of time, are a significant challenge for the health care system. Such symptoms and their totality are called post-COVID syndrome or long COVID [1]. A series of continuing symptoms are distinguished, sometimes affecting patients so badly that they require hospitalization, rehabilitation or frequent visits to health care professionals in search of solutions to health problems. Studies have shown that this syndrome can affect about half of patients who have recovered from COVID-19 also including those with a relatively mild form of disease [2]. During the period of rapid spread of the virus, the focus of research was on the search for methods of managing the pandemic: the development of vaccines, the search for effective drugs, and the study of the virus itself; therefore, the long-term effect of the disease's

continuing symptoms on the quality of life of patients is a poorly studied area [3] [4] [5].

P. Demakakos (2021) singled out the importance of researching and evaluating the comprehensive impact of COVID-19 on a person in order to compile the most accurate information about the long-term consequences for health and quality of life. It is important to study the impact of prolonged symptoms of people who have recovered from COVID-19 on their family and social lives, changes in physical and mental health, emotional state and economic impact [3]. The role of nurses in developing patient-centered healthcare models is crucial, as is the case with the challenges posed by the pandemic. Nurses who are aware of the risks that patients may face after the acute stage of COVID-19 disease, develop a support plan, assess individual situations, and coordinate care activities can significantly improve patients' health outcomes and quality of life [6] [7] [8].

Long COVID is a fairly new disease that makes many scientists and health professionals anxious. When studying the quality of life, the most commonly used questionnaire is SF-36, created in 1990 and not corresponding to the current situation [9] [10]. It is difficult to collect accurate information using generic standardized questionnaires; disease-specific questionnaires help to more accurately assess the real situation [4]. Assessing the health-related quality of life of patients who have recovered from COVID-19 using SF36 questionnaire, studying: physical functioning, physical role, pain, overall health, vitality, social life, emotional role and mental health. The obtained data is very diverse without a similar sequence, so generalizing conclusions cannot be drawn [11]. General questionnaires do not have questions related to specific symptoms, since continuing symptoms are a key factor influencing the quality of life in post-COVID-19 patients, it could be discussed that such questionnaires are not suitable for evaluation of this patient group. It is worth emphasizing that the variety of continuing symptoms is limiting the possibilities of using questionnaires adapted to respiratory diseases such as CCQ, which mainly emphasizes respiratory symptoms and may not be sufficient to fully assess the quality of life in this group of patients. About 60% of patients still complained of poor respiratory function after a three-month period, but also an average of various 5 more continuing symptoms [12].

This study used the PAC-19 QoL questionnaire, validated in 2021 and intended for the studying of the quality of life of people who are experiencing continuing symptoms, post-COVID-19 [13]. Also, a long COVID symptom scale was used to research continuing symptoms (validated in 2021) [14].

The aim of the study was to identify links between continuing symptoms and quality of life in post-COVID-19 patients.

Research methods. An analysis of the scientific literature and a quantitative study (online questionnaire survey) were conducted.

Analysis of research data. The data obtained during the survey were processed using IBM's SPSS 28.0.1.1 (15) statistics program. The Chi-square (χ^2) criterion

(levels of significance of statistical hypotheses: data—statistically insignificant when $p > 0.05$) was used to assess differences in the prevalence of signs. Pearson's (r) correlation method was used to analyze the interrelationships of signs, where the value of +1 indicates a strong positive correlation and -1 negative correlation, 0—the absence of correlation. Numerically expressed data is shown with the median and standard deviation values.

2. Literature Review

After the first news from China about the new virus, the world daily experienced rapidly emerging problems with the spread of the virus, first inside China, and then around the world. Since the first detected case of the disease in December 2019, in a relatively short time it has spread around the world and the World Health Organization (WHO) had to declare a global pandemic [6]. Huge hospitals were built at a rapid pace in a short period of time; cities, later countries declared quarantines, closed borders.

The coronavirus pandemic caused millions of deaths and a heavy load on health systems, the most complex global health crisis since 1918. This led to international cooperation, funding of the scientific society, and strong scientific progress at the same time. Thanks to intensive research and the mobilization of large resources, we have been able to adapt, develop vaccines, learn more about the virus, understand it and better manage it [15]. The spread of the virus has forced a number of countries to make very difficult decisions and introduce different levels of restrictions. This influenced everyday life on a global scale and affected such important areas as: the economy, tourism, sports, education, access to food and health care. Severe restrictions have had negative consequences for various aspects of life: a significant deterioration in people's mental health, a decrease in the quality of education due to a change in the system and the introduction of distance education, economic stagnation and increased unemployment, deterioration in people's well-being and quality of life [6]. The economic and social strain of the pandemic and the loss of people have left deep scars, the consequences of which will be felt for many more years to come [16].

Health systems have experienced unprecedented challenges. The lack of protective equipment, intensive care beds, ventilators and qualified personnel, the constant risk of contracting the virus and transmitting it to their children or spouses, while at the same time trying to provide assistance to everyone who needs it most. Elective surgeries have been suspended, care and management of chronic diseases have been disrupted, and many had faced difficulties in seeking help [8].

Healthcare professionals who have worked with COVID-19 patients have consistently experienced traumatic events that have affected their psychological well-being. Rising patient numbers and their deaths, relocating to places where the workforce is most needed, frustration and a sense of helplessness was inevitable when it is simply impossible to devote the necessary attention and time to

everyone [7]. Ethical challenges have arisen in the daily lives of nurses: transfer from a patient-centered nursing model to a public health-oriented nursing model. The needs of the individual patient have become less important than protecting the public from the spread of the virus. Within a few weeks, nurses had to adapt and ignore certain principles: not allowing the families to say goodbyes to dying loved ones, isolating patients, distributing limited resources, trying not to get confused between what needs to be done and what one would like to do [17]. All this leads to moral trauma, because the fundamental ethical principles of preserving life and dignity for each patient are violated. Moral trauma is a long-lasting emotional, psychological, social and spiritual impact that occurs due to the inability to follow one's moral principles. Moral trauma can lead to the appearance of burnout or chronic fatigue, reduce the quality of work or influence the decision of nurses to leave the profession [7].

Efficiency and resilience are important aspects of the quality of health systems. The COVID-19 pandemic has revealed a gap between efficient processes and a resilient system. In anticipation of future crises and disasters, health care systems must be prepared for the challenges that arise. Hospitals and healthcare professionals are constantly busy treating patients but should not forget to be prepared for unexpected events as well. Resilience is the ability to tolerate, absorb, resist, recover and adapt during sudden critical situations, with the least possible influence on the activities already carried out. This should be pursued in all areas: infrastructure, human and financial resources, and in the planning of pharmaceutical and equipment resources [18]. An increase in the list of patients waiting for elective but important surgeries has been observed, the consequences of which will be felt for a long time to come. We have been given a great opportunity to learn and understand how easily planned health care can be interrupted if the health care system is not ready for unforeseen crises [19].

The course of the study and participants. In order to investigate the continuing symptoms after recovering from COVID-19 disease, their associations with quality of life and sociodemographic factors, a quantitative study was conducted between May and September 2022, a non-probability target was taken as part of an anonymous online survey. General population—patients who, after recovering from COVID-19 disease, 28 days after diagnosis, experienced symptoms that have arisen during or shortly after the disease. Out of 179 filled in questionnaires, 167 participants were suitable for data analysis.

Research instrument. Two validated questionnaires were used to conduct a quantitative study: For the study of continuing symptoms—VT Tran and P. Ravaud's long COVID-19 symptom scale, which is divided into groups of symptoms that assess problems of different systems: general symptoms; neurological and respiratory systems; muscular-skeletal system; digestive system; vascular and lymphatic systems; urogenital system; eyes, ears, nose and throat, as well as skin and hair symptoms. Study participants needed to note the symptoms that had bothered them in the last 30 days [14].

For the assessment of the quality of life the "PAC-19 QoL" questionnaire was

used. It was designed by R. Jandhyala, and is intended to assess the quality of life after the acute COVID-19 stage has passed, the following areas are studied: psychological state (assessed: anxiety, mood, motivation, mental fatigue); physical state (assessed: physical fatigue, pain, shortness of breath, influence of olfactory/taste changes, performance of daily activities, libido); social situation (assessed: isolation, relationships with others, hobbies); working capacity (assessed: the impact of continuing symptoms on work and the financial situation) [13].

The ethics of the study. The study was carried out on the basis of the basic principles of the Declaration of Helsinki: ensuring anonymity, privacy, voluntariness and respect of the patients participating in the study, and the integrity of the researcher (all necessary permits were obtained, copyright was respected, and the research data were presented as received) [20] [21] [22]. The research instrument was approved by the Ethics Commission of Klaipeda University (21/02/2022).

3. Results

Unfortunately 21.6% (N - 36) of study participants did not indicate the exact date of diagnosis, provided only part of the information (year, month), so the exact duration of their symptoms could not be calculated; 12% (N - 20) were experiencing symptoms for 4 - 12 weeks, 33.5% (N - 56) 3 - 6 months, 16.8% (N - 28) 6 - 12 months; 16.2% (N - 27) of respondents indicated that they still experience symptoms for a year or longer. A positive correlation has been found between the duration of symptoms and the incidence of cardiovascular disease ($r = 0.396$, $p < 0.001$), as well as chronic respiratory diseases ($r = 0.293$, $p < 0.001$).

The long COVID scale consists of 53 symptoms. The least chosen was 1, the most 42 symptoms. The most common troublesome symptoms have been identified (Figure 1). Nearly a quarter of the subjects, (22.8 percent, N - 38) reported suffering from 20 or more symptoms; 34.7% (N - 58) had 11 to 19 different symptoms; 23.4% (N - 39) 6 to 10 different symptoms; 19.2% (N - 32) reported 1 - 5 symptoms. A statistically significant correlation between the number of symptoms and their duration was not found.

The rarest symptoms were: swollen and painful ganglia (0.6%); hypoacusis (3%); hypoesthesia (3%); weight loss (4.8%); white, red, purple, swollen fingers and toes (5%); chest pain (7.2%); tremor (9.6%).

For quality of life assessment three values and general QoL score were counted:

1) Ability to perform activities, subjects assessed: the ability to perform daily and household chores; process information, concentrate, express thoughts; participate in social activities; take care of hygiene; take care of family members; driving, using public transport; enjoying food, drinks; performing minor tasks with fingers; sexual desire; relationships with friends and family members; hobbies and work activities. The median score for the assessment of the ability to perform activities was $66 \pm 10,830$ (the lowest available score was 19, highest 95; the lowest score received was 35, the highest 90; higher score indicates poorer ability to perform activities).

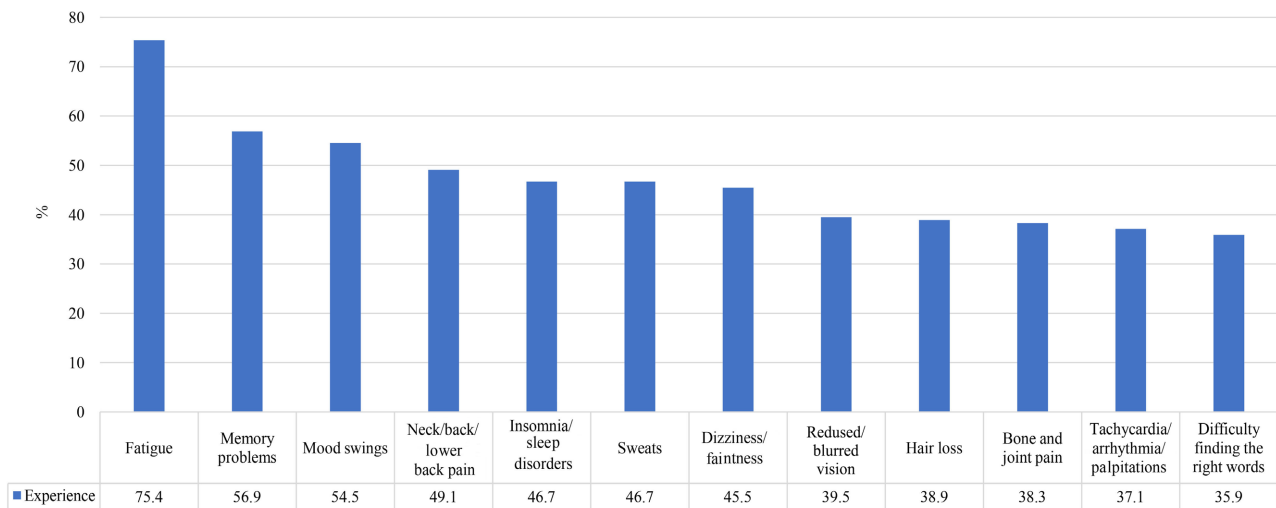


Figure 1. The most common continuing symptoms in the study.

2) Influence score, participants were asked to assess the severity of the effect of the continuing symptoms on them (separation from family and friends; career progress or lack of it and income changes). The median impact score was 8 ± 3941 (lowest possible score 4, highest 20; lowest value scored was 4, highest 18; higher score meaning higher influence). A correlation was found between the assessment of the severity of the influence and the number of symptoms ($r = 0.312$, $p < 0.001$) also the duration of symptoms ($r = 0.212$; $p = 0.006$).

3) Assessment of the frequency of negative feelings or sensations, how often they experienced bad mood, anger; felt lonely or separated, dependent on others; felt anxious about health or the possibility of getting COVID-19 again; were worried about the health of children, family relationships, their financial situation; experiencing unpleasant memories; felt pain, fatigue, shortness of breath, drowsiness; were troubled by emotions. The median of this assessment in the study was $50 \pm 12,436$ (lowest possible value 21, highest 105; lowest value scored was 25, highest 85; higher score meaning more frequent negative feelings and sensations). A correlation was found between the number of symptoms experienced and the frequency of the sensations occurred ($r = 0.296$; $p < 0.001$).

QoL score. The median for quality of life score was 125 ± 9484 (highest possible value was 220, lowest 44; the higher score the poorer QoL, lowest scored value was 96, highest 151).

When analyzing the associations between quality of life and sociodemographic factors, statistically significant links were found with: age ($p = 0.004$), younger people (under 60) scored a higher quality of life score and rated their quality of life worse; education ($p = 0.018$), subjects with lower levels of education scored a lower quality of life score and rated their quality of life better.

The study of the associations of quality of life with continuing symptoms showed statistically significant associations with 20 symptoms (**Table 1**), subjects experiencing them, rated the quality of life worse more frequently.

Table 1. Symptoms associated with poor quality of life assessment.

Symptom	Poor QoL* with symptom %	Poor QoL without symptom %	Symptom	Poor QoL with symptom %	Poor QoL without symptom %
Cough (p = 0.016)	34	17.1	Tachycardia/arrhythmia/Palpitations (p < 0.001)	40.3	11.4
Dyspnea (p < 0.001)	48.6	15.2	Bone and joint pain (p < 0.001)	36.9	12.7
Headache/migraine (p < 0.001)	38.2	14.3	Neck/back/lower back pain (p < 0.001)	30.5	14.1
Dizziness/faintness (p = 0.021)	30.3	15.4	Tremors (p = 0.029)	43.8	19.9
Balance disorder (p = 0.003)	39.5	17.0	Heavy legs/swelling of the lower limbs (p < 0.001)	43.1	12.9
Sleep problems/insomnia (p = 0.004)	32.1	13.4	Abdominal discomfort/pain (p = 0.016)	32.8	16.5
Mood swings (p = 0.003)	30.7	11.8	Runny nose/nasal blockage (p = 0.035)	32.7	17.8
Muscle aches (p = 0.001)	35.4	13.7	Dry/irritated/watery eyes (p = 0.008)	39.4	17.9
Fatigue (p = 0.008)	27.3	7.3	Blood pressure disorders (p = 0.006)	37.2	16.9
Drawsiness (p < 0.001)	36.9	10.6	Urinary symptoms (p < 0.001)	54.5	17.4

QoL *—Quality of Life.

4. Discussion of the Results of the Study

This study found that fatigue was the most common continuing symptom. Studies conducted by other authors have found that fatigue is also one of the most common symptoms [23] [24]. Prolonged symptoms have a negative impact on health-related quality of life, but comparing the data is difficult because of use of different quality of life assessment questionnaires [23] [25]. The study found that continuing symptoms can last longer than a year. Such conclusions are also provided by Tran *et al.*, the author of the long COVID symptom scale. They assessed the manifestation of various symptoms as more and more time passed since the initial diagnosis. An important observation is that recovery of patients experiencing continuing symptoms is a long and slow process, after 6 - 8 months situation begins to improve [26]. This study has not found a statistically significant decrease in the number of symptoms, among participants who have been experiencing symptoms for more than six months.

The study of the quality of life using the same instrument was carried out by Jandhyala and Lin (2022), who in the study found significant changes: as the time interval increases, the quality of life score decreases—the quality of life improves, but they do not exclude the possibility that patients simply adapt and get used to the symptoms experienced, so their presence is no longer so troublesome and the influence on everyday activities decreases [27]. Both studies showed statistically significant data that younger people rated their quality of life worse than older people. Such results could be explained by the fact that younger

people are more sensitive to health problems, and various restrictions; tend to experience stress and anxiety more strongly than older people. Interestingly, using a specialized questionnaire adapted to the disease, the results are obtained differently from those conducted with generic questionnaires. It can be debated that quality of life questionnaires that are not adapted to the COVID-19 disease do not convey the real situation, do not fully assess the quality of life related to health, and therefore receive contradictory results.

This study found that patients with higher education rated quality of life worse ($p = 0.018$). It can be inferred that they were more aware of the risks of COVID-19 and the full impact on their lives. Such results were obtained by Arab-Zozani *et al.* (2020), in their study [28]. Another study found that people with higher levels of education have a greater predisposition to severe stress and depression during the pandemic, which can have a strong negative impact on their quality of life [29]. With the increase in information about long COVID, with the appearance of the results of new studies, there remains a tendency that the results obtained are similar, but difficult to compare, since various questionnaires are used that evaluate slightly different aspects of the quality of life and are not focused on the problems caused by the continuing symptoms experienced during the long COVID.

The consequences of COVID-19 pandemic will remain between us for an unforeseen time [30]. As a result of the intense, continuing symptoms, part of the patients faces financial difficulties, and there is a risk of isolation, loneliness, and rejection. In such cases, social assistance and quick effective access to mental health services are necessary [31]. It is recommended not to underestimate the continuing symptoms, but to take them seriously, to monitor the state of health of patients. Due to the variety of symptoms, an individual and holistic approach to each case is extremely important to achieve good results [32]. According to studies, rehabilitation and other interventions (behavioral therapy, acupuncture, physical exercise therapy of varying intensity, training of respiratory cleansing techniques, and balanced diet) are very effective tools for improving various aspects of quality of life [30] [33].

Children and adolescents also experience physical and mental long COVID symptoms [34]. This group of patients is not well researched due to the challenges of testing, as children are less likely to have a positive PCR test to confirm the diagnosis [35].

5. Conclusions

Patients who have recovered from COVID-19 are plagued by long-term multiple symptoms. The study identified the most common symptom—fatigue. Other common symptoms include memory problems, mood swings, irritability, feeling unwell, neck/back/lower back pain, insomnia/sleep disturbances, sweating, and dizziness/weakness. The rarest symptoms were: swollen and painful ganglia; hypoacusis; hypoesthesia; weight loss; white/red/purple/swollen fingers and toes; chest pain; tremors.

Symptoms of COVID-19 can persist for over a year. An assessment of the quality of life score reveals that patients face significant challenges in performing daily activities, processing information, maintaining social connections, and taking care of themselves and others.

This study has revealed that a lower quality of life assessment is associated with certain ongoing symptoms and a higher number of symptoms experienced. The research found that 20 symptoms were most significantly associated with a poor quality of life assessment (statistically significant data $p < 0.05$). Furthermore, subjects with higher levels of education and those under 60 rated their health-related quality of life more poorly.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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