LONG COVID-19 AND QUALITY OF LIFE : A SYSTEMATICREVIEW

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Abstract

The majority of patients receiving Covid-19 report experiencing effects ranging from mild to severe. Ten percent to fifteen percent of patients develop severe symptoms, and five percent of cases progress to a critical stage. In many patients, particular symptoms may persist for several weeks or months after recovery has taken place. Also a possibility in more benign circumstances. During this stage of the process, the patient is no longer infectious. Patients experienced a wide range of different outcomes after Covid-19. Long covid syndrome is characterized by the persistence of clinical symptoms in Covid-19 patients for 4 to 12 weeks after the initial onset, or for 12 weeks or more, which is known as chronic post-covid syndrome, according to the World Health Organization (WHO) in the year 2020. Long- Covid syndrome is also known as post-covid syndrome. This drawn-out process of covid production results in symptoms such as fatigue, headache, shortness of breath, anosmia, muscle weakness, and cognitive impairment. Patients who have long-Covid suffer from a multitude of difficulties, including those related to the heart, the respiratory system, cognitive function, and so on. After pulmonary disorders, cognitive disorders are the most frequent type of illness. Patients diagnosed with both conditions frequently report having a lower quality of life due to the effects of long-Covid.

Keyword: *Cognitive Impariment; Covid-19; Long-Covid; Lung Fibrosis; Quality of life*

INTRODUCTION

A novel variety of coronavirus that causes respiratory tract infections is called the SARS CoV-2 (Severe Acute Respiratory Syndrome Coronavirus-2). The first case of this virus was discovered on December 31, 2019, in China. The World Health Organization (WHO) designated Coronavirus Disease 2019 as the new coronavirus discovered after examination of isolates from the patient's lower respiratory tract (Covid-19). The third coronavirus to be discovered in the last 18 years, Acute Respiratory Syndrome Coronavirus-2, is extremely contagious and spreads between species.[1,2]

The severe acute respiratory syndrome coronavirus-2 (SARS CoV-2) is a pathogen that causes respiratory tract infections. The first report of this virus was made on December 31, 2019 in China, China. Analysis of the patient's lower respiratory tract isolates led to the discovery of a new coronavirus, which the World Health Organization (WHO) called Coronavirus Disease 2019 (Covid-19). Acute respiratory syndrome Coronavirus-2 is highly contagious and is the third coronavirus discovered in the past 18 years that can be transmitted between species.[3,4]

This demonstrates that the majority of individuals infected with Covid-19 exhibit no symptoms or recover rapidly, however in other cases, clinical symptoms may continue or develop continually. This condition of lasting symptoms after Covid-19 infection is known as the long- Covid phenomenon, Post Acute Sequelae of SARS-CoV-2 Infection (PASC), or Post Acute Covid-19 Syndrome (PACS) having the features of long-term sequelae that persist after the convalescence period of the disease. Covid-19.[5]

According to the World Health Organization (WHO) in 2020, long- Covid syndrome is characterized by the persistence of clinical symptoms in Covid-19 patients for 4 to 12 weeks after the initial onset, or for 12 weeks or more, and is known as chronic post-covid syndrome. This lengthy covid causes symptoms such as fatigue, headache, shortness of breath, anosmia, muscle weakness, and cognitive impairment.[6] Carfi et al. (2020) reported that 87.4% of Covid-19 patients who had improved would continue to experience residual symptoms for up to 60 days after recovery.[7]

With prolonged symptoms, the patient's quality of life may decrease, and clinical deterioration may lead to death. Long-Covid syndrome risk factors include gender, onset symptoms, shortness of breath, and D-dimer.[3] 32% of hospitalized Covid-19 patients had 2 or 3 persistent symptoms, whereas 55% had 3 or more problems within 2 months. Post-Covid-19 tiredness and dyspnea were most common. Pulmonary fibrosis is frequent among Covid-19 patients and survivors, according to clinical, radiological, and postmortem data.[3]

This evidence suggests that pulmonary fibrosis is a complication of SARS-CoV- 2 infection. Other than connective tissue disorders and chronic granulomatous disease, pulmonary fibrosis is reported as a sequela of severe or continuous lung damage and is directly related to the severity of infection, with the main mechanism being mediated by viruses and the immune system. The goal of this literature review is to evaluate the prevalence, characteristics of clinical manifestations, and management in patients with post Covid-19 / long- Covid syndrome, as well as their impact on sufferers' quality of life.[8]

We decided to conduct this study to find out how long-Covid affects a person's quality of life after they have previously been exposed to Covid-19.

METHODS

Protocol

The guidelines for this systematic review were derived from the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 checklist.

Eligibility Criteria

Studies with topics that discuss " long- Covid "; "COVID-19"; and "Quality of Life" are the topics analyzed in the writing of this systematic review. The following are the requirements for writing inclusion: 1) Articles must be accessible in their entirety; 2) Articles must be written in English; and 3) Articles must have been published after the year 2020 and up until the time that this systematic review is written (November 2022). The following types of written submissions will not be accepted: 1) Editorial letters; 2) submissions that do not contain a Digital Object Identifier (DOI); and 3) Article reviews and submissions similar to these.

Search Strategy

The search for studies to be included in the systematic review was carried out from November 10-14th, 2022 using the PubMed, SagePub, and Clinical Key databases by inputting the words: "Long- Covid"; "COVID-19"; and "Quality of Life". Where ("post acute covid 19 syndrome"[Supplementary Concept] OR "post acute covid 19 syndrome"[All Fields] OR "long covid"[All Fields]) AND ("covid 19"[All Fields] OR "covid 19"[MeSH Terms] OR "covid 19 vaccines"[All Fields] OR "covid 19 vaccines"[MeSH Terms] OR "covid 19 serotherapy"[All Fields] OR "covid 19 serotherapy"[Supplementary Concept] OR "covid 19 nucleic acid testing"[All Fields] OR "covid 19 nucleic acid testing"[MeSH Terms] OR "covid 19 serological testing"[All Fields] OR "covid 19 serological testing"[MeSH Terms] OR "covid 19 testing"[All Fields] OR "covid 19 testing"[MeSH Terms] OR "sars cov 2"[All Fields] OR "sars cov 2"[MeSH Terms] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR (("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields] OR "cov"[All Fields]) AND 2019/11/01:3000/12/31[Date - Publication])) AND ("quality of life"[MeSH Terms] OR ("quality"[All Fields] AND "life"[All Fields]) OR "quality of life"[All Fields]) is used as search keywords.

Data retrieval

The author performed a literature search by reading the titles and abstracts of the existing studies, after which he or she made adjustments to the inclusion and exclusion criteria. Only the studies that fulfilled the criteria were considered for inclusion in the systematic review. In each study, information can be collected in the form of a title, author, publication date, origin of study location, research study design, and research variables. This information is presented in a specific format.

Quality Assessment and Data Synthesis

To determine which studies might be eligible for consideration, the authors conducted their own independent reviews of a selection of the studies found in the articles' titles and abstracts. Following this, the full texts of the studies that qualify for inclusion in the systematic review will be read in order to determine which studies can be used as final inclusions for the purpose of the review.

RESULT

Tsuzuki, et al (2022)[9] conducted a study with 349 participants reported no symptoms and 108 reported any symptoms at the time of the survey. The participants who reported any symptoms showed a lower average value on the EQ-VAS (69.9 vs 82.8, respectively) and on the EQ-5D-3L (0.85 vs 0.96, respectively) than those reporting no symptoms considering the ATE of ongoing prolonged symptoms. The ATE of ongoing prolonged symptoms on EQ-VAS was -12.9 [95% CI -15.9 to -9.8], and on the EQ- 5D-3L it was -0.11 [95% CI -0.13 to -0.09], implying prolonged symptoms have a negative impact on patients' EQ-VAS and EQ-5D-3L score. In multivariable linear regression, only having prolonged symptoms was associated with lower scores (-11.7 [95% CI -15.0 to -8.5] for EQ-VAS and -0.10 [95% CI -0.13 to -0.08] for EQ-5D-3L).
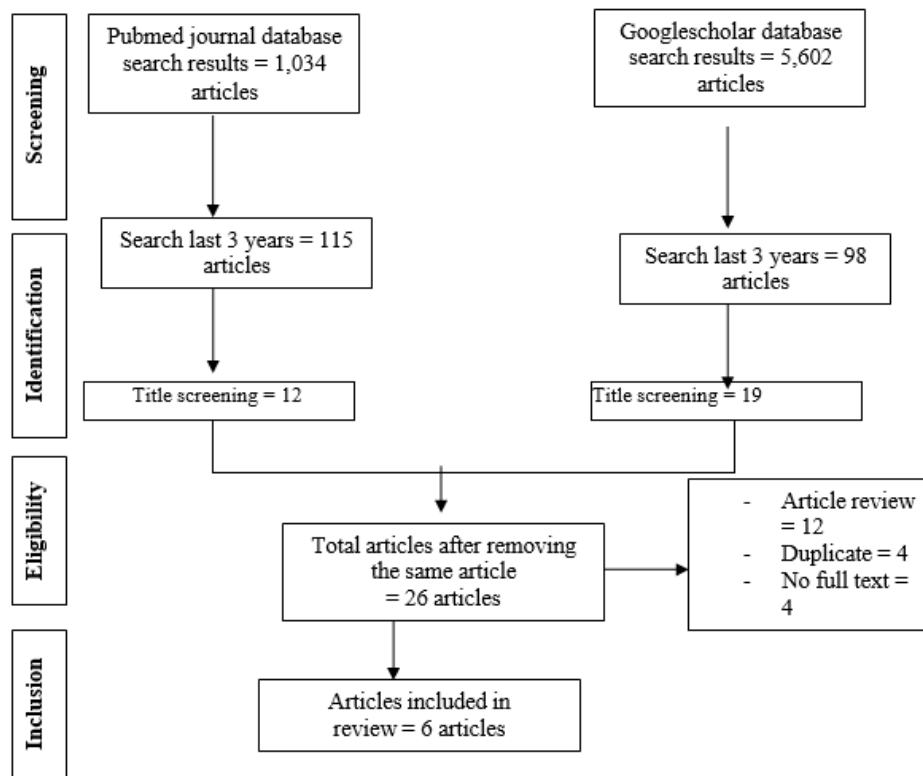

Figure 1. Article search flowchart

Table 1. The litelature include in this study

Author	Origin	Method	Period	Sample Size / Characteristic	Result
Tsuzuki, 2022[9]	Japan	Cross sectional	1st February 2020 and 31st March 2021	526 eligible patients	The participants who reported any symptoms showed a lower average value on the EQ-VAS (69.9 vs 82.8, respectively) and on the EQ-5D-3L (0.85 vs 0.96, respectively) than those reporting no symptoms considering the ATE of ongoing prolonged symptoms. The ATE of ongoing prolonged symptoms on EQ-VAS was − 12.9 [95% CI − 15.9 to − 9.8], and on the EQ-5D-3L it was − 0.11 [95% CI − 0.13 to − 0.09], implying prolonged symptoms have a negative impact on patients' EQ-VAS and EQ-5D-3L score. In multivariable linear regression, only having prolonged symptoms was associated with lower scores (− 11.7 [95% CI − 15.0 to − 8.5] for EQ-VAS and − 0.10 [95% CI − 0.13 to − 0.08] for EQ-5D-3L).
Chen, 2020[10]	China	Cross sectional	Jan 17, 2020 to Mar 20, 2020	503 survivors	SF-36 showed a significant change in HRQoL in COVID-19 patients, except in physical function (p <0.05). Age was adversely linked with PF, RP, and VT (p <0.05). PF, BP, and RE were linked adversely with female sex (p <0.05). Clinical subcategories were connected with mental health (p <0.05). LOS was adversely associated with RE and RP and positively associated with VT (p <0.05). Non-obese overweight (OR = 3.71) and obesity (OR = 3.94) were risk factors for a low PCS and female sex (OR = 2.22) for a low MCS.
Larenzo, 2021[11]	Italy	Cross sectional	March 1st to May 15th, 2020	47 patients	EQ-5D-5L measured life quality. The VAS was 80 [70–90] at the early follow-up and 85 [77.5–90] at 6 months. Mobility, self-care, and usual activities improved, but pain, discomfort, depression, and anxiety did not. In 27 of 41 samples (66%), the IES-R total score was above the 1.6 concern threshold.
Arab Zozani, 2020[12]	Iran	Cross sectional	March 2020	420 survivors	Mean EQ-5D-5L score (n = 409): 0.6125. Males, younger patients, those with a low level of education, the employed, those who worked in uncrowded workplaces, patients without diabetes, and those not admitted to ICU had higher EQ-5D-5L scores. Gender, age, education, employment status, diabetes, heart failure, and ICU admission were significant predictors of EQ-5D-5L index values.
Siska, 2022[13]	Slovakia	Cross sectional	July 1, 2020 and March 31, 2021	39 participants	There was a statistically significant difference between the students and the long- Covid patients in terms of physical function, with the students having a mean score of 94.9 ± 9.4 and the long- Covid patients having a mean score of 66.2 ± 25.4 (p <0.001). In the case of the physical role, the same effect was discovered (p <0.001). The overall quality of life score for patients with lengthy COVID was 331.9 ± 126.9, whereas the overall score for college students was 578.0 ± 111.9.
Oliveira, 2022[14]	Brazil	Cross sectional	July 1, 2020 and March 31, 2021	39 participants	At a median of 138 days (interquartile range [IQR] 90-201), following the onset of the disease, 84% of patients reported having at least one long- Covid symptom. The most common symptoms included fatigue (63.1%), dyspnea (53.7%), arthralgia (56.1%), and depression or anxiety (55.1%). Dysgeusia (odds ratio [OR] 2.0, 95% confidence interval [CI] 1.18-3.44, P 0.001) and intensive care unit (ICU) admission (OR 2.6, 95% confidence interval [CI] 1.19-6.56, P = 0.03) were independently linked with protracted COVID in the multivariate analysis. Fifty percent of patients felt that their clinical condition and quality of life had deteriorated as a result of the treatment.

When compared to the general Chinese population, the SF-36 showed a significant difference in HRQoL in patients with COVID-19, with the exception of physical function (PF), where there was no significant change (p <0.05). The results of the multiple linear regressions showed that age had a significant negative association withPF and role physical (RP), but a significant positive association with vitality (VT) (p <0.05). There was a statistically significant negative association between female sex andPF, bodily pain (BP), and role-emotional (RE). The clinical subtypes were shown to be significant related factors in relation to mental health (p <0.05)[10]

Study by Carenzo, et al (2021)[11] showed one in three patients and four out of eighteen (22%) of those who had a good functional baseline prior to COVID-19 (CFS of 1 or 2) had lower (84%) than predicted 6MWTs. Quality of life was measured using the EQ-5D-5L scale. At the early follow-up, the VAS was 80 [70–90] out of 100, and it showed a slight improvement to 85 [77.5–90] at the 6-month mark. Mobility, self-care, and usual activities all improved between the two timepoints, but pain and discomfort, aswell as depression and anxiety, remained the same or got worse. In 27 out of 41 (66%) ofthe samples, the IES-R total score was higher than the threshold for concern, which was set at 1.6.

Arab-Zozani, et al (2020)[12] showed mean score EuroQol 5-dimensional-5 levels (EQ-5D-5L) = 0.6125. The scores on the EQ-5D-5L were significantly higher for males, patients who were younger in age, those who had a low level of education, those who were employed, patients who worked in workplaces that were not crowded, patients whodid not have diabetes, and those who were not admitted to the intensive care unit. According to the findings of the BetaMix model, significant independent predictors of EQ-5D-5L index values include gender, age, education level, employment status, the presence of diabetes and heart failure, as well as admission to an intensive care unit.

Liska, et al (2022) showed a statistically significant difference between the students and the long- Covid patients in terms of physical function, with the students having a mean score of 94.9 ± 9.4 and the long- Covid patients having a mean score of 66.2 ± 25.4 (p <0.001). In the case of the physical role, the same effect was discovered (p <0.001). The overall quality of life score for patients with lengthy COVID was 331.9 ± 126.9, whereas the overall score for college students was 578.0 (111.9).[13]

At a median of 138 days (interquartile range [IQR] 90-201), following the onset of the disease, 84% of patients reported having at least one long- Covid symptom. The most common symptoms included fatigue (63.1%), dyspnea (53.7%), arthralgia (56.1%),and depression or anxiety (55.1%). Dysgeusia (odds ratio [OR] 2.0, 95% confidence interval [CI] 1.18-3.44, P 0.001) and ICU admission (OR 2.6, 95% CI 1.19-6.56, P = 0.03) were independently linked with protracted COVID in the multivariate analysis. Fifty percent of patients felt that their clinical condition and quality of life had deteriorated as a result of the treatment.[14]

DISCUSSION

Long- Covid / post acute Covid-19 syndrome / post acute sequelae long- Covid / post acute Covid-19 syndrome / post acute sequelae long- Covid / post acute Covid-19 syndrome / post acute sequelae long- Covid / post acute Covid-19 syndrome / post acutesequelae long- Covid / post acute Covid-19 syndrome / post acute sequela long- Covid isdefined by guidelines from the National Institute for Health and Care Excellence (NICE), the Royal College of General Practitioners (RCGP), and the Scottish Intercollegiate Guidelines Network (SIGN) as patients with signs and symptoms that persist or developafter an acute Covid-19 infection. covers continued symptoms of Covid-19 (4-12 weeks)and post-covid syndrome (12 weeks or more) in the absence of other possible disease causes.[15]

Tabel 2. Long Covid risk factor analysis[3]

Symptoms of the acute phase of Covid-19	Risk Factors
Fatigue Headache Congested	old age
Pain when breathing deeplysensitive skin	Co-morbid (>3 chronic conditions)Obesity
Hoarsenessmyalgia	History of psychiatric disorders A blood
Symptoms of severe pneumonia	type

The majority of Covid-19 patients experience mild to severe effects. Approximately 10 to 15% of cases have severe symptoms, and 5% become critical. In many patients, certain symptoms may continue for weeks to months beyond recovery. Also possible in mild situations. The patient is no longer infectious during this phase. Post-Covid-19 consequences varied amongst patients.[15–18] There are still not manyclinical studies regarding post-Covid-19 sequelae. There are four frameworks to help identify and diagnose post-Covid 19 manifestations. The identification framework includes 4 screening categories namely laboratory, radiological pathology, decreased functional status and subjective symptoms and quality of life.[19]

The aftereffects of COVID-19 symptoms that persist for a long time might be veryserious. Patients who have COVID for an extended period of time and continue to experience symptoms have a lower quality of life. The subjective continuation of symptoms in patients, such as fatigue, can have an effect on aspects of quality of life, including physical function, bodily pain, vitality, emotional health, and social functioning, all of which were significantly lower in patients in comparison to a healthy control group. Patients reported a considerable decline in their ability to operate socially, which may be indicative of a diminished desire to participate in regular aspects of life as a direct result of the disease. Patients who have lengthy COVID often withdraw socially,which can have a substantial negative impact on their quality of life.[20–22]

Study conducted by Chen, et al (2020) showed COVID-19 patients had a subpar quality of life in regards to their health.

Patients had severe manifestations of both physical and mental disability. Therefore, prospective monitoring of individuals who were exposed to SARS-CoV-2 is required in order to fully understand the long-term effects of COVID-19, as well as to inform prompt and efficient interventions to alleviate suffering. This is necessary in order to fully understand the long-term effects of COVID-19.[10]

A decrease in HRQoL may be the result of symptoms brought on by long- Covid. Because long- Covid has the potential to be a significant contributor to future disease burden, it is crucial to consider taking actionable preventative actions. There is currently no treatment that is considered to be standard for long- Covid. Both pharmaceutical (like immunization) and non-pharmaceutical (like social distance) preventive strategies (like getting away from people) are still very important as we wait for the development of treatment medications for long- Covid.[9]

Other study showed patients who recover from severe COVID-19 that required invasive mechanical ventilation and survived hospital discharge present with early mild to moderate functional impairment, mildly reduced quality of life from hospital discharge, and an overall improvement of mobility, self-care, and the ability to perform usual activities, while a worsening of pain and depression/anxiety symptoms at 6 months and a large proportion of symptoms of post-traumatic distress soon after hospital discharge. Patients also present with early mild to moderate functional impairment and mildly reduced quality of life from hospital discharge.[11]

Several systems or organs of the body can be affected by Covid-19. In the lungs, Covid-19 infection can cause lung tissue damage and lung restriction disorders. Dyspnea, reduced exercise capacity and hypoxia are the most common persistent symptoms. In supporting examinations, a decrease in the value of diffusion capacity and ground glass opacity and fibrosis can be found on radiological examination. Assessment of the progress or improvement of lung function can be done by examining oxygen saturation, 6 minute walk tests (6MWTs), examination of lung physiology, high-resolution CT (HRCT) of the chest and CT angiography if needed.[19]

ICU admission, having diabetes, and heart failure were among the clinical characteristics that showed significant differences in mean HRQoL scores when compared to one another in this study. The patients who had been admitted to hospital wards had significantly different mean HRQoL scores than the other patients. Patients who were admitted to the ICU for treatment of COVID-19 had worse scores on the HRQoL scale than patients who were admitted to hospital wards. This is likely because ICU patients encountered more severe issues connected to COVID-19. When compared with patients who did not have diabetes, those with diabetes had significantly lower mean scores on the HRQoL. This is due to the fact that the condition was more severe in the individuals who already had diabetes, and it also makes the symptoms of their diabetes worse.[23]

At the moment, there is no one treatment that is particularly effective for extended covid. The primary purpose of the pharmacological therapy alternatives is to alleviate symptoms, and some of these options are also used to treat lung fibrosis, which is brought on by long-term COVID exposure; however, the majority of these therapeutic approaches are still in the research phase.

CONCLUSION

Patients with long- Covid experience many problems, such as heart, respiratory, cognitive problems and so on. Cognitive disorders are the most common after pulmonary disorders. Patients with both conditions often experience reduced quality of life related to long- Covid.

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