

RAPID LITERATURE REVIEW

What is Long COVID-19?

Clarifying Definitions and Symptoms.

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Keywords: Long COVID-19; Definitions; Symptoms, SARS-CoV-2

ABSTRACT

Background:

What is the definition of Long COVID-19? What are its currently acknowledged symptoms? As this is a new condition suspected to be evolving as a potentially post-Pandemic new disease, it becomes relevant to clarify the current definitions of Long COVID-19. The article puts together the most recent definitions and briefly discusses points of common understanding and points of uncertainty.

Objectives:

The main aim of the article is to clarify the definitions and symptoms of Long COVID-19 as international evidence defines them. This is relevant to support health professionals and interested parties to access a structured clarification of the disease at this stage of knowledge. Supporting evidence-based intervention is the fundamental objective of the article.

Methods:

The Rapid Literature Review is a form of evidence synthesis that provides timely information for decision making and evidence-based practice compared with standard systematic reviews. The review used the following sources: Web of Science and PubMed. The Search used the keywords 'Long Covid-19', 'Definitions' and 'Symptoms' and limited to articles published between January 2021 and June 2022. There were two reviewers to select articles based on the inclusion/exclusion criteria (keywords defined and time span of publications). Both reviewers appraised critically and rigorously within the criteria defined and a summary was produced.

Results:

Six articles were identified as relevant for the objectives of this article. These were individually evaluated on the contribution to clarifying definitions and symptoms of Long COVID-19. Definitions seem to follow the initial definition made available in a publication from World Health Organization. However, the follow-up articles seem to add additional interpretations and associated symptoms.

Main Contribution to Evidence-Based Practice:

The article puts together the recent evolution of the definition of Long COVID-19 and associated symptoms to support clinical decision-making and evidence-based practice.

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What do we already know about this topic?

Available evidence supports an overview of the definition of Long COVID-19 as initiated by the World Health Organization in May 2021.

What is the main contribution to Evidence-Based Practice from this article?

It is an update on the recent evidence concerning the topic and it clarifies the evolution of the proposed definitions and association of symptoms. The authors report on the recent evidence available to support clinical decision and evidence-based practice by health professionals around the World.

What are your research's implications towards theory, practice, or policy?

The article identified the need for further research on the symptoms of Long COVID-19 and an ongoing revision of its definition and associated symptoms..

Authors' Contributions Statement: Zhang and Moreira conceptualized and drafted the article; Xi revised the whole text

What is the definition of Long COVID-19? What are its currently acknowledged symptoms?

As this is a new condition suspected to be evolving as a potentially post-Pandemic new disease, it becomes relevant to clarify the current definitions and symptoms of Long COVID-19. This article puts together the most recent definitions and briefly discusses points of common understanding and points of uncertainty.

The main aim of the article is to clarify the definitions and symptoms of Long COVID-19 as international evidence defines them. This is relevant to support health professionals and interested parties to access a structured clarification of the disease at this stage of knowledge. Supporting evidence-based intervention is the fundamental objective of the article.

Methods:

The Rapid Literature Review is a form of evidence synthesis that provides timely information for decision making and evidence-based practice compared with standard systematic reviews (Tricco et al, 2015). The review used the following sources: Web of Science and PubMed,. The Search used the keywords 'Long Covid-19', 'Definitions' and 'Symptoms' and limited to articles published between January 2021 and June 2022. There were two reviewers to select articles based on the inclusion/exclusion criteria (keywords defined and time span of publications). Both reviewers appraised critically and rigorously within the criteria defined and a summary was produced.

Results:

Six articles were identified as relevant for the objectives of this article. These were individually evaluated on the contribution to clarifying definitions and symptoms of Long COVID-19. Definitions seem to follow the initial definition made available in a publication from World Health Organization in May 2020. However follow-up articles seem to add additional interpretations and associated symptoms.

Discussion:

The article puts together the recent evolution of the definition of Long COVID-19 and associated symptoms to support clinical decision-making and evidence-based practice.

In short, the definitions identified range from WHO (2021) claiming that it is a *'Post COVID-19 condition, defined as symptoms that occur within three months after the onset of COVID-19, last more than two months and cannot be explained by other diagnosis'* to the definition by Lamontagne, et al (2021) claiming it is a *'psychiatric sequelae after SARS-CoV-2 infection, mainly mood dysregulation and cognitive impairment'*, through the definition proposed by Choutka et al (2022) claiming that it consists of *'post-acute sequelae of SARS-CoV-2 infection (PASC)/long COVID, defined as unexplained chronic sequelae after SARS-CoV-2'*.

Other definitions proposed include the one by Chen et al., (2022), defining it as *'Post COVID-19 condition, defined as having any symptoms or at least 1 new or persisting symptom during the follow-up time;*

Concentration/confusion/ brain fog, Anxiety, Depression, Cough, Taste/smell problems. Also, Aiyegbusi et al (2021) argue that *'long COVID, refers to the persistence of a wide range of physical and mental/psychological symptoms, Altered smell, Altered taste, Diarrhea, Cognitive impairment, Sleep disorders'*. Additionally, we identified the definition proposed by Rigoni et al. (2022) as a *'Post-COVID-19 syndrome, refers to the persistence of COVID-related symptoms and long-term sequelae'*. All definitions are summarized in table 1.

In this context, recent evidence also suggests that the most common physical symptoms reflected in relevant studies were fatigue and dyspnea (Aiyegbusi et al., 2021; Chen et al., 2022; Choutka et al., 2022; Lamontagne et al., 2021; Rigoni et al., 2022; WHO, 2022).

In addition, it was found that patients complained of headache, joint/muscle pain and cough (Aiyegbusi et al., 2021; Chen et al., 2022; Choutka et al., 2022; Lamontagne et al., 2021). Abnormal result of chest CT was also discovered as a manifestation of long COVID (Rigoni et al., 2022).

Some studies focused on the patients' mental/psychological sequelae, of which cognitive impairment was the most common problem (Aiyegbusi et al., 2021; Choutka et al., 2022; Lamontagne et al., 2021; Rigoni et al., 2022; WHO, 2022).

Other symptoms including sleep disorders (Aiyegbusi et al., 2021; Chen et al., 2022; Choutka et al., 2022), memory problems (Aiyegbusi et al., 2021; Chen et al., 2022; Rigoni et al., 2022) and emotional disorders (mainly anxiety and depression) (Aiyegbusi et al., 2021; Chen et al., 2022; Lamontagne et al., 2021; Rigoni et al., 2022) were also the problems complained by patients. Post-acute sequelae of COVID-19 (PASC), also known as long COVID-19 has become a long-term concern in the field of public health. PASC referred to the persistent COVID-19 symptoms after SARS-CoV-2 infection, and these symptoms indicated a long-term response to the virus (Lamontagne et al., 2021). It was defined as having any symptoms or at least 1 new or persisting symptom during the follow-up time (Chen et al., 2022). It was also called post-COVID-19 syndrome and referred to the related symptoms and sequelae due to long-term impact of COVID-19 (Rigoni et al., 2022). PASC was considered as chronic sequelae caused by unknown causes after SARS-CoV-2 infection (Choutka et al., 2022). Long COVID included

a series of physical and mental/psychological long-term symptoms (Aiyegbusi et al., 2021; Lamontagne et al., 2021).

In October 2021, the World Health Organization convened patients, researchers and other relevant personnel to draw up the clinical case definition through Delphi method. It was named post COVID-19 condition and defined as symptoms that occurred within three months after the onset of COVID-19, lasted more than two months and could not be explained by other diagnosis. These symptoms might occur after the initial cure of COVID-19 or might be persistent from the initial disease, and might fluctuate or recur as time went on. It was also pointed out that the emergence of new evidence has guiding significance for updating the definition of post COVID-19 condition and deeply understanding the outcome of COVID-19 (WHO, 2021). In conclusion, we consider that long COVID is reflected in many aspects of physical and mental conditions. In addition to the perceived physical symptoms or changes in mental health, we can further explore the long-term impact of long COVID through the patient's quality of life. Moreover, social aspects such as working status and social contact also affect the emergence, disappearance and fluctuation of long COVID.

After two years of COVID-19 pandemic, health systems should try to find a solution to deal with long COVID and summarize the future direction from the current research and experience of fighting SARS-CoV-2. In summary, the clinical symptoms of acute phase of SARS-CoV-2 infection have been widely studied and a consensus has been reached. However, the long-term impact of SARS-CoV-2 infection is not quite clear. Emotional disorders and cognitive impairment might be caused by persistent inflammation. The physiological mechanism of long COVID-19 especially psychiatric sequelae should be studied as soon as possible after the patients were discharged from the hospital. Relevant research can contribute to guide the treatment of mental disorders after COVID-19 rehabilitation (Lamontagne et al., 2021).

Additionally, several studies in the field of COVID-19 have found that young patients have also suffered from Long COVID-19, which makes us pay more attention to the constant threat. With the large-scale vaccination changing the severity and process of the disease, and more understanding of the clinical characteristics and persistent symptoms after the

Authors or Source of Definition	Long COVID Definitions and Symptoms	
WHO, 2021	Post COVID-19 condition, defined as symptoms that occur within three months after the onset of COVID-19, last more than two months and cannot be explained by other diagnosis.	Fatigue Shortness of breath Cognitive dysfunction
Lamontagne, Winters, Pizzagalli, & Olmstead, 2021	Psychiatric sequelae after SARS-CoV-2 infection, mainly mood dysregulation and cognitive impairment.	Depression Anhedonia Selective impairment in attention Physical symptoms
Choutka, Jansari, Hornig, & Iwasaki, 2022	Post-acute sequelae of SARS-CoV-2 infection (PASC)/long COVID, defined as unexplained chronic sequelae after SARS-CoV-2	Exertion intolerance Disproportionate levels of fatigue Neurocognitive and sensory impairment Flu-like symptoms Unrefreshing sleep Myalgia/arthralgia
Chen et al., 2022	Post COVID-19 condition, defined as having any symptoms or at least 1 new or persisting symptom during the follow-up time; Concentration/confusion/brain fog Anxiety Depression Cough Taste/smell problems	Fatigue Memory problems Dyspnea Sleep problems Myalgia Joint pain Hair loss Headache
Aiyegbusi et al., 2021	long COVID, refers to the persistence of a wide range of physical and mental/psychological symptoms Altered smell Altered taste Diarrhea Cognitive impairment Sleep disorders	Fatigue Shortness of breath Muscle pain Joint pain Headache Cough Chest pain Memory loss Anxiety
Rigoni et al., 2022	Post-COVID-19 syndrome, refers to the persistence of COVID-related symptoms and long-term sequelae	Dyspnea Neurological symptoms Abnormal chest CT images

Table 1 Definitions and Symptoms of Long Covid

SARS-CoV-2 infection, it is very important to explore the relevant risk factors and feasible prevention methods of Long COVID-19 in children, adolescents and young people (Hageman, 2021).

Conclusion and Recommendations

Measuring patients' quality of life is conducive to understand the impact of long COVID-19. Although most of the SARS-CoV-2 patients have been cured and returned to daily life, we should reasonably estimate the social burden of the disease to assist the health department to optimize decision-making.

However, our understanding of the long-term impact of new infectious diseases after the acute infection

period is still insufficient.

Two key recommendations result from this review. One is the need for more empirical evidence to optimize clinical diagnosis and nursing. In the face of emerging infectious diseases, clinical treatment and patient rehabilitation are the first problems that need to be properly solved.

Another key recommendation is the need for pathological studies of COVID-19 to enrich the research progress of chronic disabilities and diseases caused by unexplained infection (Choutka et al., 2022).

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