

## The Development of Rehabilitation Medical Services during the COVID-19 Pandemic Crisis

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### Abstract

*The medical research conducted during the COVID-19 pandemic has highlighted numerous sequelae and readmissions (to hospitals) of patients with moderate and severe forms of COVID-19 and has outlined the need for a post-COVID 19 rehabilitation process developed and conducted in an organized, safe, and accurate manner. This is a new challenge for both the medical rehabilitation community and the economy and also for a large number of patients who need to be in contact with the medical staff more than ever.*

*The aim of this article is to investigate the literature from 2020 to 2021 on the extent of post-COVID sequelae and their management. During this period a lot of research has been done regarding the treatment for this disease and how necessary it is to change the provision of medical services so as to serve the patients who are hospitalized, as well as the patients who need additional medical care at home after being discharged from the intensive care units.*

**Key words:** pandemic, rehabilitation, telemedicine, physiotherapy, sequelae

**J.E.L. classification:** I15

### 1. Introduction

In March 2020, the World Health Organization declared the epidemic of the new coronavirus (COVID-19) caused by the Sars-CoV-2 a worldwide pandemic. Currently, the number of cases of those infected with the new coronavirus has reached about 95,000,000 worldwide, and the number of deaths about 2 million (according to Worldometer). In cases tested positive, about 10-15% progress to severe forms, and about 5% reach critical condition, which requires assisted ventilation, and 1/5 require hospitalization, according to the report of the World Health Organization. Typically, people recover from COVID in 2 to 6 weeks, but in some cases, the symptoms may persist; recurrences or other complications may occur in the weeks and even months following the initial recovery. This can happen even in moderate cases. According to a new study conducted in the UK (Ayoubkhani *et al*, 2021), almost a third of recovered COVID-19 patients ended up back in the hospital within five months, and up to one in eight died of complications from the illness. The involvement of medical rehabilitation specialists could help reduce these complications.

## 2. Theoretical background

Throughout the pandemic, COVID-19 has entailed significant challenges for rehabilitation services around the world. Rehabilitation services are among the medical services most severely affected by the pandemic. At the same time, COVID-19 increases the need for rehabilitation, both for patients currently suffering from the disease and for those who suffer from (experience) its long-term consequences. The World Health Organization, together with its partners, is developing guidelines and resources for medical specialists and patients, including the integration of rehabilitation into key clinical protocols and independent rehabilitation resources (World Health Organization, 2020).

### 2.1. Post-COVID sequelae

There are numerous clinical signs of the new coronavirus (SARS-CoV-2) that can range from asymptomatic illness to serious acute respiratory failure. Different pathophysiological pathways are due to phenotypes and require the development of various treatment protocols depending on the patient.

The assessment and detection of different phenotypes can help configure treatment protocols which include various therapies, such as oxygen therapy, non-invasive ventilation, airway management, or tracheal intubation. It is essential to conduct more studies, as they can provide the necessary information to assess the impact of different phenotypes in rehabilitation strategies.

The residual sequelae and their limitations in the respiratory system of survivors of COVID 19 will be a concern for recovery programs around the world. Lung lesions are directly linked to the present phenotypes and, based on their severity, rehabilitation care is provided. As far as the decision-making process is concerned, differentiating patients according to phenotypes will enhance the decision-making process (de França *et al*, 2020).

Among the most common post-COVID symptoms are those of the underlying disease, as well as those related to post-hospitalization, which usually occur in patients who were hospitalized for a longer period in an intensive care unit:

- cardiac sequelae: arrhythmia, heart failure, severe myocarditis;
- neurological sequelae: convulsions, paresthesia, lack of taste and smell, viral encephalitis, increased risk of stroke, cognitive disorders, headache;
- sequelae of the respiratory system: pulmonary fibrosis, functional lung deficiency, respiratory failure;
- musculoskeletal sequelae: physical deconditioning, muscle weakness, low joint mobility, pain in the neck and hips, balance disorders;
- other symptoms can be added to the list above: dysphagia, limitation of self-care activities, communication disorder.

The presence of cardio-pulmonary sequelae, as well as the symptoms described above and other comorbidities need to be considered in the patients who are about to enter a post-acute rehabilitation program.

### 2.2. Post-acute rehabilitation in the context of COVID-19

Rehabilitation involves a whole process of assessing and treating a series of complications associated with chronic diseases, through an integrative physical and psychosocial approach, focused on the individual needs of the patient, being practiced by a multidisciplinary team. Rehabilitation is beneficial for any patient suffering from a chronic disabling disease, at any stage, and can be performed in any environment (at home or in a hospital).

The main goals of rehabilitation are: optimizing the quality of life by reducing pain and stress, facilitating the social integration of patients by increasing their independence in household activities and self-care and improving their ability to adapt and respond to changes in the environment.

As patients are transferred to sub-acute care units or are discharged and reintegrated into the community, rehabilitation services need to have well-structured operating and organizational protocols to provide safe and effective therapy for patients and healthcare professionals.

Post-acute management and rehabilitation of post-COVID-19 patients will be the focus for the coming months, given the magnitude of functional, psychological, and clinical deficits reported in many patients.

Early rehabilitation interventions in intensive care units after a comprehensive assessment by an interdisciplinary team are necessary for safety reasons.

The necessary interventions fall into 5 categories: exercises for the cardio-respiratory system, repeated training of functional activities (muscle toning, walking, etc.) through physical therapy and physiotherapy, psycho-social therapy, education with an emphasis on self-management (self-care) and prevention, as well as regular risk/ benefit assessment and possible adverse reactions, to determine if treatment is safe and if it can be continued or if it should be changed/ discontinued.

### 3. Research methodology and results

By investigating the specialized studies published in the period 2020-2021 and the way in which various authors related to the COVID-19 pandemic, we have identified the answers and solutions offered by them, answers which confirm our research hypothesis according to which medical rehabilitation has an essential role in the new protocols which need to be developed in order to treat post-COVID-19 sequelae.

The issues described above show that it is necessary to configure a personalized and individual rehabilitation service according to the particular needs and goals of each patient, to optimize the patients' quality of life through a holistic and comprehensive approach.

New scientific information is emerging, and therapeutic behavior changes depending on the acquired knowledge.

At present, the specific rehabilitation protocols for post-COVID patients are still limited.

Several pandemic rehabilitation approaches are studied, assessed, and recommended, including virtual rehabilitation through telemedicine, using smartphone applications.

These rehabilitation protocols will represent the basis of specific programs for the management of participation restrictions and limitations in fulfilling the following basic functions of the human body:

1. respiratory functions, with particular attention to cardio-pulmonary resistance and correct respiratory patterns;
2. neurocognitive functions, specifically for memory deficit, central sensory-motor impairment, central and peripheral neuropathies, and dysphagia;
3. motor functions, including muscle strength, flexibility, and endurance.

The necessary resources are represented by a multidisciplinary team endowed with skills and knowledge for the integral management of patients with post-COVID-19 disabling sequelae and associated comorbidities.

In addition, the provision of rehabilitation services for patients would need to include electronic equipment for remote monitoring as appropriate, as well as orthoses. These equipment items can be personal or given for use to the patients, to be returned at the end of the treatment, subjected to sanitization according to the new regulations, and then offered for use to other patients.

Another way to include patients in rehabilitation programs is telerehabilitation. Telemedicine has become an adjuvant in this pandemic context for the provision of medical services through state-of-the-art technology that facilitates communication between patients and the therapist through videoconferencing and platforms specially designed for this purpose.

Several telerehabilitation techniques can be used both for the patients who have suffered a stroke and for those with post-COVID myocardial infarction such as TENS (transcutaneous electrical stimulation, mirror therapy, home exercises, and virtual reality exercises). Several studies have shown that the telerehabilitation alternative is not inferior to the physical exercise performed in the clinic and both have shown a considerable improvement in motor function in post-stroke patients, reducing the risk of death and complications.

Observational studies and meta-analyses (Nan *et al*, 2021) have shown that telemedicine can be used to reduce time waiting for hospitalization in patients who need rehabilitation or who have had a recent stent surgery.

Moreover, clinical pieces of information about patients (heart rate, blood pressure, body mass index, etc.) are provided through portable devices and telemedicine. These pieces of information help diagnosticians and physicians implement a personalized treatment program for patients without making them physically come to the hospital.

Remote monitoring is therefore a promising aspect of telemedicine, which involves more strategies, such as smartphone applications, GPS, and Bluetooth technologies.

During the COVID-19 pandemic, many academics and businesses used smartphone applications and online information to collect data and encourage patients to report symptoms and demographical data. These applications are collectively called Symptom Tracking Apps. Collecting patient information through these resources leads to the storage of valuable data for efficient analysis.

As health systems continue to be compromised during the COVID-19 pandemic, telemedicine is therefore an effective method for patient management.

#### 4. Conclusions

The Covid-19 pandemic was a challenge for both the medical community and the general population, in terms of organization, economic, psycho-social, and crisis management.

Thus, this pandemic turned into a crisis for the economic and health system, which led to numerous changes in these areas. The provision of medical services has become significantly more difficult, and telemedicine has become a welcome and relatively easy-to-implement alternative for assessing and treating patients, helping the medical community make better decisions for patients, especially when social distance has become mandatory.

Furthermore, an appropriate and rapid response is needed from the medical community, but also from an economic point of view regarding the rehabilitation services needed to underpin adequate medical support for managing the impact of the pandemic on the patients' functional and physical decline.

Medical rehabilitation needs to be an ongoing process, with a holistic and comprehensive approach to achieve the restoration/ improvement of the functional level of disability and to maintain the optimal independence of the treated patients.

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