Rehabilitation needs of people recovering from COVID-19

Scientific brief
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Introduction

People who are critically unwell with COVID-19 are likely to have rehabilitation needs during and after their acute illness. In many individuals recovering from COVID-19, health problems may extend far beyond acute infection, even among those who experience mild illness. Limitations in functioning resulting from these problems may affect the physical, cognitive, and mental aspects of health, and may have an important impact on work and social life. Due to the new, fluctuating and protracted course of the after-effects of COVID-19, the need for rehabilitation services in this population may persist beyond the pandemic. This scientific brief informs program planners and decision-makers as well as health care workers about the health impact of COVID-19 and rehabilitation needs in the COVID-19 population.

Methods

This document was developed by the WHO Rehabilitation Programme. Its development was based on available evidence. The lists of papers provided by the Rapid Living Systematic Reviews on Rehabilitation and COVID-19 from the Cochrane Rehabilitation REH-COVER initiative (latest update, 19 June, 2021),[1] and publications provided by the WHO COVID-19 Clinical Management network formed the basis for inclusion to this document. Where relevant, cohort studies were identified covering the following research topics:

- clinical manifestations in COVID-19 patients who need rehabilitation;
- clinical characterization of Post COVID-19 Condition;
- prevalence estimates for ongoing symptoms and limitations in functioning in all COVID-19 population groups; and
- COVID-19-related health impact, including patient-reported quality of life and changes to professional and social life.

Identified papers were screened for references that contribute to the same research topics. Selected papers were then grouped according to study outcome data; findings were synthetized using summary tables for methodology and main results. Cohorts describing patients with other respiratory diseases or reasons for ICU admission have been identified from a rapid review of scientific literature *(1)*. Internal and external experts provided feedback on the draft document. A WHO Declaration of Interest form was filled in by all external experts and no conflicts of interest have been identified.

Health Impact of COVID-19

COVID-19 is a multisystem disease *(2)* which may result in several impairment types and limitations in functioning. All post-acute COVID-19 follow-up studies that incorporated assessments of health-related quality of life and capacity measures of functioning universally reported significant deficits in several

[1] See: https://rehabilitation.cochrane.org/covid-19/reh-cover-interactive-living-evidence.

clinical domains *(3)*. Limitations in functioning and poor quality of life were reported in both hospitalized and non-hospitalized adults and children recovering from COVID-19 *(4, 5)*.

- The physical, cognitive and mental health burden experienced by **people recovering from COVID-19 who were hospitalized** may be considerable. Studies reported ongoing symptoms in a significant proportion of patients several months after discharge *(6–7)*. A systematic review reported a median proportion of 72.5% of individuals (n 9751) experiencing at least 1 persistent symptom *(11)*. A spectrum of symptoms that persist has been identified by cohort studies; these include symptoms of anxiety and depression in 51 of 384 patients (14.6%) to 367 of 1 617 patients (22.6%); post-traumatic stress disorder in 7 of 97 patients (7.2%) to 31 of 100 patients (31%); cognitive impairment in 19 of 29 patients (65.5%) to 138 of 179 patients (77%); pain in 431 of 1 616 patients (27%); and reduced exercise capacity in 392 of 1 692 patients (22%) to 66 of 204 patients (32.3%) *(4, 5, 12–16)*. Limitations in functioning have been reported in half of COVID-19 patients at 6 months after hospital discharge *(17)*. In a study of 1 077 people recovering from COVID-19, 313 were feeling fully recovered after 6 months *(18)*. A study with patients aged 60 years and above reported a negative change in health-related quality of life in 57 of 106 patients 6 months following hospitalization due to COVID-19; 1 in 3 experienced a persistently impaired mobility and ability to carry out activities of daily living *(19)*. Another study reported about 431 hospitalized patients who worked prior to COVID-19, and 125 were found to be not working a median of 5 months after hospital discharge *(20*). In a cohort of 767 patients, 146 experienced a health-related change in occupation a median of 5 months after hospital discharge *(18)*.

- Symptoms may also persist for **people with COVID-19 who were not admitted to hospital** *(21–25)*. At least 10% of those who were cared for at home have ongoing symptoms at 3 months after their acute illness *(26)*. Symptoms adversely affect the performance of daily activities in 66% (634 000/962 000) of those with self-reported ongoing symptoms *(27)*. In a study of 210 non-hospitalized patients, 65 were dependent on others for personal care *(28)*. About 6 months after the onset of symptoms, in a study with 239 members of an online COVID-19 support group, 199 self-reported moderate to poor health, and 110 reported moderate to severe limitations in functioning *(31)*. In another study of 2 550 people participating in a social media survey, 431 reported an inability to work due to COVID-19, and 1 642 were unable to perform their usual activities or duties *(32)*.

- Twelve weeks or more after onset of the disease, 2–15% of **all COVID-19 patients** continue to have symptoms *(29)*. Among a sample of over 20 000 survey participants in the UK who tested positive for COVID-19, 13.7% continued to experience symptoms for at least 12 weeks *(30)*. This percentage is higher when people self-report both on having had COVID-19 and persistent symptoms: over a third (28 713/76 155) reported at least 1 persistent symptom lasting 12 weeks or more *(53)*.

Clinical manifestations in COVID-19 patients who need rehabilitation

Rehabilitation is recommended to optimize health outcomes in the acute phase of care for COVID-19 patients presenting with respiratory failure *(33)*. However, several clinical manifestations exist which may require rehabilitation beyond acute care.

Rehabilitation is an integral part of universal health coverage (UHC), alongside health promotion, prevention, curative and palliative care. It is a set of interventions designed to optimize functioning and reduce disability in individuals with health conditions in interaction with their environment *(54)*. It includes a broad range of interventions provided by a multidisciplinary workforce, including education and advice, therapeutic exercise and training, provision of pharmaceutical agents, assistive product provision, and individual adaptations to the home or work environment. Rehabilitation

- **Post-Intensive Care Syndrome** (PICS) refers to a range of impairments including physical deconditioning, and cognitive and mental health impairments that occur in more than half of Intensive Care Unit (ICU) survivors. COVID-19 patients who are at higher risk of ICU admission are also those at higher risk of developing PICS; these include older persons with increased frailty or underlying diseases such as diabetes, hypertension, and other chronic disorders *(34)*. ICU-acquired weakness is ubiquitous in survivors of acute respiratory distress syndrome (ARDS), as it is in critically ill COVID-19 patients who required prolonged sedation *(35–37)*. Recovery from PICS may be incomplete at 5 years after ICU discharge *(38)*. Cognitive impairments range from problems with memory or attention deficits, to difficulties with expression. Mental health impairments include anxiety, mood disorders such as depression, and Post-Traumatic Stress Disorder. Interventions for rehabilitation addressing PICS may include supervised or self-directed physical exercises, ICU diaries, coping-skills training, cognitive rehabilitation interventions, nutritional supplements, educational sessions, follow-up consultations, and referral to mental health professionals *(1, 39)*. These interventions may be provided through a comprehensive inpatient multidisciplinary rehabilitation program or continued follow-up from an outpatient rehabilitation setting or outreach program closer to the patient's community.

- In hospitalized COVID-19 patients, several **complications from acute illness** have been reported that are amenable for rehabilitation. Some result from a thrombotic event (such as ischemic stroke and ischemic heart disease), direct viral toxicity (such as myositis and meningitis), or an immune-mediated reaction (such as Guillain Barré syndrome). The pooled prevalence estimates from systematic reviews on neurological manifestations show that up to one third of individuals (145 634, 89% hospitalized) experienced some type of neurological manifestation, and 1 in 50 developed stroke *(40–42)*. Many of these lead to impairments including, but not limited to, speech and language problems, swallowing problems, muscle weakness, reduced exercise capacity, cognitive decline, and mood disorders. Patients suffering from a critical functional decline will require inpatient multidisciplinary rehabilitation for a duration of weeks to months, and continued follow-up with outpatient rehabilitation services.

- **Post COVID-19 Condition**, with WHO ICD-10 (U09) and ICD-11 (RA02) coding[2], occurs in individuals with a history of probable or confirmed SARS-CoV-2 infection, usually three months from the onset of COVID-19 with symptoms lasting for at least two months, that cannot be explained by an alternative diagnosis. Common symptoms include fatigue, shortness of breath, cognitive dysfunction among other, and generally have an impact on everyday functioning. Symptoms may be new-onset following initial recovery from an acute COVID-19 episode or persist from the initial illness. Symptoms may also

[2] See: https://www.who.int/standards/classifications/classification-of-diseases/emergency-use-icd-codes-for-covid-19-disease-outbreak.

fluctuate or relapse over time *(55)*. The condition may occur irrespective of initial disease severity. However, the risk may increase across the severity spectrum of the acute infection (non-hospitalized; hospitalized; admitted to intensive care) *(20, 43)*. The most commonly described ongoing symptoms are weakness, general malaise, fatigue, concentration impairment and breathlessness *(44)*. While initial symptoms may persist, cognitive dysfunction, including problems with attention, executive function and memory, may become more prevalent later in the illness *(32, 45)*. Over 50 long-term effects have been described *(46)*; some symptoms may develop in addition to the acute symptoms *(47)*. Patients have reported that physical activity, stress and sleep disturbance commonly trigger symptoms *(32)*. Rehabilitation for people experiencing severe problems or a protracted course of Post COVID-19 Condition most likely requires a person-centred, comprehensive and multidisciplinary approach to interventions which are provided in close collaboration with primary health care and several medical specialties. Interventions for rehabilitation may include advice on resumption of activities; breathing techniques; exercise therapy; psychological interventions; cognitive training; rehabilitation for communication and swallowing difficulties; and occupational rehabilitation *(48–52)*. Currently, the evidence base on interventions for rehabilitation and outcomes is limited; an interim guidance will be developed by WHO based on available evidence and clinical expertise.

WHO resources for rehabilitation of COVID-19

1. The use of WHO Post COVID-19 Case Report Form (CRF) is recommended to collect standardized and anonymized patient-level data for the monitoring of mid- and long-term consequences of COVID-19 (WHO Post COVID-19 CRF).

2. The WHO COVID-19 Clinical Management: Living Guidance contains a chapter on rehabilitation for physical, cognitive and mental health issues in COVID-19 (WHO COVID-19 Clinical management: living guidance).

3. An online training course on the rehabilitation of patients with COVID-19 is available at OpenWHO.org (WHO Rehabilitation of patients with COVID-19 Course).

4. To ensure appropriate, effective and safe rehabilitation self-management, a WHO patient-leaflet has been developed (WHO support for rehabilitation self-management after COVID-19).

5. The WHO Rehabilitation Programme is collaborating with Cochrane Rehabilitation to define a research agenda for the rehabilitation of COVID-19 (WHO Rehabilitation Programme and COVID-19 resources)

Limitations

The current body of evidence about the health impact of COVID-19 and rehabilitation needs is limited and has several shortcomings. Describing health impact of COVID-19 and clinical manifestations amenable for rehabilitation remains difficult without widespread use of standardized and comparable outcome measures of functioning in longitudinal trials that include a representative control group. Many studies are based on self-reported symptoms and outcomes, and this may lead to recall biases and case misclassification. The use of an app and social media to recruit patients may result in a selection bias towards recruitment of those more likely to be symptomatic following SARS-CoV-2 infection and lead to an overestimation of the prevalence of symptoms. Publication and reporting bias may be substantial

issues; in primary studies that seek to evaluate health impact and limitations in functioning in people recovering from COVID-19, authors may report only those estimates where statistically significant differences are found.

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Plans for updating

WHO continues to monitor the situation closely for any changes that may affect this scientific brief. Should any factors change, WHO will issue a further update. Otherwise, this scientific brief document will expire one year after the date of publication.

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