IMPACT OF PULMONARY REHABILITATION ON POST-COVID-19 PATIENTS: A NARRATIVE REVIEW

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ABSTRACT

INTRODUCTION: Coronavirus Disease (Covid-19) is an infectious disease caused by the coronavirus (SAS-CoV-2). Clinically, in the acute phase, patients may be asymptomatic or develop mild or moderate symptoms, or progress to severe or critical symptoms, whether or not they require invasive mechanical ventilation (Soriano et al. 2022).
Most infected patients develop the mild form of the disease. However, the presence of underlying medical conditions such as systemic arterial hypertension (SAH), diabetes, the higher body mass index (BMI), or chronic respiratory diseases - chronic obstructive pulmonary disease (COPD) and asthma, contribute to the development of the severe form of the disease in the acute phase, as well as the permanence of post-Covid-19 or Long Covid symptoms (Miranda et al, 2022).

Keywords: Pulmonary Rehabilitation. Post-COVID-19. Respiratory Recovery.

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INTRODUCTION

Coronavirus Disease (Covid-19) is an infectious disease caused by the coronavirus (SAS-CoV-2). Clinically, in the acute phase, patients may be asymptomatic or develop mild or moderate symptoms, or progress to severe or critical symptoms, whether or not they require invasive mechanical ventilation (Soriano et al. 2022).

Most infected patients develop the mild form of the disease. However, the presence of underlying medical conditions such as systemic arterial hypertension (SAH), diabetes, the higher body mass index (BMI), or chronic respiratory diseases - chronic obstructive pulmonary disease (COPD) and asthma, contribute to the development of the severe form of the disease in the acute phase, as well as the permanence of post-Covid-19 or Long Covid symptoms (Miranda et al, 2022).

Long Covid is defined as the presence of persistent symptoms that appear up to 12 weeks after the acute phase of Covid-19, and are not explained by an alternative diagnosis (NICE, 2020)

It is estimated that 80% of patients will have one or more long-term persistent symptoms (Lopez-Leon et al., 2021) whose prevalence ranges from 50 to 70% in patients who develop the severe and critical forms and from 10 to 30% in those who develop the mild form of the disease in the acute phase (Fair Health, 2022; Ceban et al., 2022). On the other hand, Wijeratne et al. (2020); Townsend et al. (2020) suggest that post-acute Covid-19 complications are not associated with respiratory complications or initial severity of the disease.

Currently, more than 50 symptoms are identified, with fatigue being the most common, which resembles Chronic Fatigue Syndrome (CFS), which includes the presence of severe disabling fatigue, pain, neurocognitive disability, impaired sleep, symptoms suggestive of autonomic dysfunction, and worsening of global symptoms after small increases in physical and/or cognitive activity (Lopez-Leon et al, 2021; Wostyn, 2021). These symptoms are associated with poorer quality of life (QoL) especially in the physical, social, fatigue, pain and general health domains (Demko et al, 2022) and in physical performance (Han et al, 2022. According to Yelin et al (2023), patients with Long Covid walked an average distance of 129.5 ± 121.2 meters, corresponding to less than 80% of what was expected in the Six-Minute Walk Test (6MWT).

Pulmonary rehabilitation (PR) is already well established in the literature as an effective strategy to reduce functional impacts and improve quality of life in patients with chronic lung diseases. However, even though there are still no well-established and specific

protocols for pulmonary rehabilitation of Long Covid patients, it is important to identify its benefits for patients with persistent chronic post-Covid-19 symptoms.

Thus, our motivation for this narrative review was to identify the best evidence in the literature on the impact of ambulatory pulmonary rehabilitation (PAR) on QoL in patients with Long Covid.

MATERIALS AND METHODS

To prepare the review, the question "What is the impact of pulmonary rehabilitation on quality of life and functionality in post-Covid-19 patients?" was used.

The research strategy included controlled vocabulary (MeSH) and the acronym "PICO" was used, with "P" for patients, "I" for intervention, "C" for comparison, and "O" for results, as shown in the concept map in Chart 1 below.

Chart 1 - Concept map

P	I	C	Or
Covid-19 (Mesh)	"Pulmonary *Rehabilitation*" "cardiopulmonary *rehabilitation*"	*No comparator*	*Quality of life* (Mesh)

The studies were identified in Medline databases via PubMed and in the Physyoterapy Evidence Database (PEDro) in 2023.

Chart 2 shows the search strategy with controlled vocabulary.

Chart 2 - Search strategy

Pubmed	Peter
(((((("Covid-19"[MeSH Terms] OR "Covid-19"[Title/Abstract]) AND "pulmonary rehabilitation"[Title/Abstract]) OR "cardiopulmonary rehabilitation"[Title/Abstract]) AND "quality of life"[MeSH Terms]) OR "quality of life"[Title/Abstract] OR "quality of life index"[Title/Abstract]) AND ((english[Filter]) AND (2020:2023[pdat]))	**Title and Abstract:** **Covid-19 Rehabilitation** **Method: Clinical Trial** **Since: 2020**

RESULTS AND DISCUSSION

SUGGESTION FOR RESULTS AND DISCUSSION

A total of 36 studies were selected, including 7 clinical trials, 7 systematic reviews, 6 cohort studies, 4 observational studies, 3 narrative reviews, 3 meta-analyses, 2 multicenter

studies, 1 case report, 1 comparative secondary analysis, 1 consensus statement, and 1 guideline, as shown in **Chart 1** below.

Of the 36 studies used in this narrative review in 2020 (n = 4), 2021 (n = 16), and 2022 (n = 16), published in 17 countries, the largest number occurred in China (n = 8), the United States (n = 7), and Brazil (n = 2). Since the average is n = 2.11, Brazil is in the average of publication.

Regarding the number of subjects in experimental field research, 4,862 individuals were approached in that period (2020 to 2022). The average age is 50 years, the minimum is 35 and the maximum is 69 years. The prevalence of severity ranged from mild to moderate according to xxxxxxxx

PR in patients with Long Covid performed in the acute stage of signs and symptoms, early and immediately after discharge, defining the intervention in the average period of one month after diagnosis (KUNOOR et al., 2022). As well as after two to four months, and the prevalence occurred from three months onwards, due to the persistence of signs and symptoms (CARVALHO et al., 2023). The average period of occurrence of the physical therapy protocol was eight to 48 weeks (JIMENO-ALMAZÁN et al., 2022).

Routinely, a training session lasts from 40 minutes to 1 hour, and is started with warm-up and stretching, followed by strength and/or muscle endurance training with or without aerobic training. The time of each step should be stipulated according to the specific needs of each patient, established by the previous anamnesis. Therefore, the selection of the appropriate exercise, duration, frequency, and intensity are fundamental in the rehabilitation process (SWAMINATHAN et al., 2020). The final five minutes are dedicated to relaxation and cool-down, with stretching and deep breathing techniques. In addition, walking with slow steps and balance activities can also be considered for the end of the session.

The prevalent symptoms treated were fatigue, dyspnea, and exercise intolerance, and the intervention protocols based on supervised individualized exercises promoted beneficial effects on pulmonary function, overall functional capacity, and quality of life.

Skeletal muscle dysfunction represented by muscle weakness or atrophy is one of the systemic impairments of Covid-19 in general physical fitness (HOCKELE et al., 2022). Global exercise training is based on the principles of overload, specificity, and reversibility with monitoring through specific equipment, such as pulse oximeter and cardiofrequency meter (GAO et al., 2022).

In this context, the performance of personalized physical training protocols with lower limb muscle strength exercises and stretching to improve body posture and flexibility, aimed

at functional capacity, represent the qualitative tool for the care provided in the various phases (acute, subacute and chronic) that improves performance with quantitative variables (PESCARU et al., 2022).

The collection instruments recommended in the studies of this narrative review, in the context of respiratory and multisystem sequelae, were: 6-minute Walk Test (6MWT'; *6-Minute Walk Test: 6MWT*) targeting Functional Capacity (FC) and Health-Related Quality of Life (HRQoL) Questionnaires such as *EQ-5D-5L* (*EuroQoL - 5Dimensions - 5Levels)*, *SF-36* (*Short Form 36*), and *SF-12* (*Short Form 12*).

Specifically to measure functionality limitations related to COVID-19, the Post-Covid-19 Functional Status Scale (*PCFS) was included*. This is a tool used to assess the functional status of patients after recovering from coronavirus infection. This instrument was developed to quantify and monitor the functional capacity of patients after COVID-19, and was graded from 0 (absence of functional limitations) to 4 (complete functional disability) points.

Periodic reassessment by means of appropriate and reliable instruments ensures the accurate kinetic-functional diagnosis, in addition to measuring the efficacy of the rehabilitation protocol, confirming the adequacy of the therapeutic approach.

Chart 1 - Characteristics of the studies included in the narrative review

Authors	Year	Country	Type of study	n	Age	Severity of Covid-19 in the acute phase	Symptom time CL (months)	Symptoms of CL	PR Time (weeks)	Characteristics of the rehabilitation protocol	Denouement QV	
											5D EQ	SF-12
							> 3		8	Describe how the protocol was	Describe the improvement domain(s)	

Type of study
RS: systematic review
RCT - randomized controlled trial
CP - Prospective cohort
Retrospective CR-Cohort
T- Transverse

Severity of Covid-19 in the acute phase
L - lightweight
M - moderate
G - severe
C- Criticism

QoL = quality of life
CL- Long Covid

DISCUSSION

The literature review of this narrative review showed the promising impacts of pulmonary rehabilitation (PR) in patients infected with Covid-19, using several types of studies, which showed unanimous benefits for the reestablishment of functional capacity (FC) and quality of life (QoL) in different time lapses of intervention and severity of infection (BETSCHART et al., 2021; SAKAI et al., 2023).

The impairments of COVID-19 are described in a multisystemic way, that is, several organs are affected by a significant number of sequelae that evolved due to the permanence of symptoms, naming this context as a post-Covid-19 and/or Long Covid condition, since these signs and symptoms negatively impact pulmonary, cardiovascular, and muscle function (SILVA et al., 2021; SMITH et al., 2023).

The scientific literature shows reduced exercise capacity after SARS-CoV-2 infection among individuals who have consistent symptoms of long covid. It is necessary to monitor the post-Covid patient in the long term, since developed symptoms directly affect the individual's quality of life, making it difficult to resume their routine (DURSTENFELD et al., 2022).

Immobility resulting from hospitalization reduces muscle activation, which leads to muscle weakness, myopathy, and dysphagia, as well as hyperventilation, with a consequent reduction in activities of daily living and exercise resistance capacity (BOUTELEUX et al., 2021).

Functional limitations, fatigue, and dyspnea are the sequelae commonly reported in post-Covid-19 patients (NOPP et al., 2022). Impairment of pulmonary and physical functions, as well as reduced quality of life and emotional disorders were evidenced in outbreaks of viral transmission (SIMON, SIMMONS, 2022).

However, even after six months of acute covid infection, negative residual sequelae persist such as impairment of physical capacity (continuous muscle fatigue or weakness), lung performance, even sleep disorders, psychological symptoms related to anxiety and depression, directly affecting the quality of life of patients (DUN et al., 2021; LI et al., 2020).

Therefore, COVID-19 survivors need intensive care for physical, cognitive, and psychological disabilities, as well as guidance on rehabilitation even in mild cases that culminated in sequelae (BARKER et al., 2020; ALGAMDI, 2021).

Considering the longitudinal follow-up of post-covid sequelae in hospitalized patients, limitation of functionality was identified with muscle and joint pain, six months after discharge, that is, it is necessary to emphasize the monitoring and effectiveness of rehabilitative interventions (DU et al., 2021).

The pulmonary rehabilitation protocol is characterized as an individualized and supervised physical therapy program, through modalities in kinesiotherapy such as muscle strengthening and stretching, aerobic and respiratory exercises (DING et al., 2021). Since, movements of the upper and lower limbs, and trunk activate the somatosensory system due to the numerous amplitudes of the body segments, in addition to the increase in volumes and capacities related to the respiratory, cardiovascular, and musculoskeletal systems, enhancing skills in activities of daily living and reducing the hospitalization period and its harmful sequelae (TONELLI et al., 2023; CAVALCANTE, SILVA, 2022).

The applicability of pulmonary rehabilitation enhances exercise capacity and skills in activities of daily living, reducing the length of hospital stay and its harmful sequelae, as well as enabling the recovery of lung capacity to physiologically adequate levels similar to pre-disease levels, even in patients with some previous respiratory comorbidity (TONELLI et al., 2023; CAVALCANTE, SILVA, 2022).

Patients who developed the severe and critical forms of COVID-19 had more compromised functionality and quality of life at admission to the rehabilitation program, with a considerable beneficial evolution after six weeks of pulmonary rehabilitation (NOPP et al., 2022).

Pulmonary rehabilitation aims to reduce symptoms such as dyspnea, optimize exercise capacity, increase the patient's autonomy and participation in daily activities, enhancing health-related quality of life, as well as emphasizing long-term behavioral change (MAYER et al., 2021). Designed to intensify physical, cognitive, mental, and social condition, early intervention promotes significant beneficial effects on prognosis, both in acute and chronic conditions, with mild or severe symptoms (SIMON, SIMMONS, 2022; AHMED et al., 2022).

In addition to minimizing dyspnea, pulmonary rehabilitation reduces anxiety and kinesiophobia, with optimization of muscle strength, gait capacity, sit-and-stand performance, and quality of life, that is, rehabilitation interventions favor the return of functionality and endurance. Regarding quality of life and independence, the beneficial results in acute post-infection COVID-19 syndrome (PACS) are comparable to experimental pulmonary rehabilitation interventions in patients with COPD, asthma, and postoperative lung cancer, confirming their effectiveness in restoration and health promotion (FUGAZZARO et al., 2022).

The goal of pulmonary rehabilitation in patients with COVID-19 is to reduce symptoms of dyspnea, relieve anxiety, avoid complications, minimize disability, preserve

function, and optimize quality of life, considering the individual particularity of each patient (WANG et al., 2020).

Therefore, such conduct advocates the stability of the patient's hemodynamic conditions, as the modification of ventilatory and postural muscle recruitment, with increased oxygen consumption and pulmonary ventilation, triggers dyspnea due to excessive exertion due to inadequate stimulation (LIU et al., 2020).

The multidisciplinary approach (physician, nurse, physiotherapist, psychologist, and nutritionist) is based on individualized and personalized anamnesis, drug and non-drug therapy, in a safe and effective way, including musculoskeletal and cardiorespiratory training, as well as health education and behavioral modification (INCORVAIA et al., 2022).

The prescription of the exercise program is judicious and preceded by an individualized anamnesis of functional capacity, accompanied by an assessment of subjective tolerance to exercises involving intensity (overload), duration, frequency, and type of exercise (RUTKOWSKI et al., 2022). Since inadequate respiratory and muscle recruitment leads to dyspnea early due to overexertion.

The intensity of the exercises is determined based on the training heart rate, maximum or submaximal, by the Karvonen formula. The duration occurs between 45 and 50 minutes, with a frequency of 3 times a week on alternate days (CARVALHO et al., 2020; SANTANA et al., 2021). The exercise program is divided into 3 stages: WARM-UP (10 to 15 minutes with low-intensity exercises, such as walking associated with peripheral muscle resistance exercises, alternating and localized upper and lower limbs, as well as stretching); TRAINING (20 to 30 minutes of muscle endurance with exercises of large muscle groups, as well as treadmill, running and stationary bike) and COOL-DOWN (5 to 10 minutes with stretching exercises, light walking, body and postural awareness).

The progression of effort intensity is emphasized by analyzing and reassessing adaptive responses to training, such as subjective feeling of tiredness (modified Borg scale), heart and respiratory rate, digital oxygen saturation (SpO2) and blood pressure, reprogramming the PR in accordance with the patient's needs. O2 supplementation is essential and is usually already prescribed by the physician responsible for the patient, whenever the SpO2 is below 90%. The Borg Scale is a validated and easy-to-use tool for patients to self-monitor respiratory effort, with a close correlation with the magnitude of dyspnea (WANG et al., 2020).

The performance of ROM with elevation of the upper and lower limbs results in a considerable increase in oxygen consumption and pulmonary ventilation, altering ventilatory and postural muscle recruitment. Consequently, the potentiation of the mechanics of the rib

cage and abdominal compartment, triggered by kinesiotherapy and physical activity, entails global benefits that positively impact respiratory, aerobic, cognitive capacity, physical endurance, quality of life, and social aspects (REINA-GUTIÉRREZ et al., 2021).

Pulmonary rehabilitation recommends diaphragmatic breathing training, initially at rest, so that the patient can perceive respiratory movements during inspiration and expiration. Subsequently, it is performed during task training, preventing apnea from occurring and aiming to increase tolerance to exertion. Successively, activities are planned at different levels of demand, starting with light, slow exercises and with lower energy expenditure (GAO et al., 2022).

Consequently, respiratory function is enhanced with an increase in forced vital capacity, forced expiratory volume in one second, resistance to exercise with an increase in the distance reached in the six-minute walk test (MIOZZO et al., 2023), in addition to advances in increasing health-related quality of life and reducing symptoms such as anxiety and depression (RUTKOWSKI et al., 2022).

The literature emphasizes pulmonary mechanics and oxygenation through respiratory muscle recruitment exercises, with and without resistance, promoting strength and endurance to optimize pulmonary ventilation.

Szarvas et al. (2023) performed a rehabilitation program in 14 days, resulting in significant efficacy for 6MWT ($p=0.031$), fatigue (*mMRC: Modified Medical Research Council*, $p=0.003$), HRQoL (Health-Related Quality of Life, $p=0.015$), and FC (*PCFS: Post-COVID-19 Functional Status*, $p=0.032$).

PR was found to be significantly effective in improving dyspnea ($p<0.001$), fatigue ($p<0.05$), exercise capacity ($p<0.001$), and lung functions ($p<0.05$) in patients with acute and chronic COVID-19 with mild to severe symptoms (AHMED et al., 2022).

Betschart et al. (2021) utilized six-minute walk test to assess physical fitness, *EQ-5D-5L* (POTEET, CRAIG, 2021) for health-related quality of life, *PCFS* for COVID-19-related functionality limitations, and *mMRC* for dyspnea and fatigue during activity.

The ideal functional status achieved by pulmonary rehabilitation at three weeks after hospitalization (mean duration, 21.3 days) in the ICU was reassessed at the 18-month follow-up, and 70% (n=14) of the patients maintained their functionality (*PCFS* grade 0). However, in 30% (n=6) there was regression of functionality to grades 1 (15%, n=3), 2 (10%, n=2), and 3 (5%, n=1), being classified as insignificant, mild, and moderate, respectively (MORELLI, KLIJN, VAATE, 2022).

The absence of restrictions in the performance of activities of daily living leads to a score of zero and the dependence on caregivers for their development leads to a score of four.

The assessment of aerobic capacity and endurance in the literature currently available in patients with COVID-19 is the six-minute walk test (6MWT), which measures the distance covered in the time of 6 min (BEQAJ et al., 2022).

Health-related quality of life is assessed using the *SF-36 scale* (*36-item Short-Form Health Survey*), of a widely validated generic context, which includes eight health concepts: physical function, bodily pain, general pain, health, vitality, social function, role emotion, and mental health (QU et al., 2021).

In other words, it is essential to implement programs and instruments to monitor the evolution of patients in the long term to minimize the impairments resulting from Long Covid, advocating the reestablishment of pre-Covid-19 health conditions (TARAZONA et al., 2022).

Cardiopulmonary rehabilitation increased workload, quality of life, and respiratory function, and also reduced complaints and sequelae of the clinical status of patients with post-COVID syndrome (SZARVAS et al., 2023).

Pulmonary rehabilitation is a comprehensive intervention, both inpatient and outpatient, based on thorough patient assessment, followed by therapies adapted to the clinical picture that include, but are not limited to, airway clearance, breathing exercises, physical training, activity guidance, health education, behavior change, and anxiety control, aimed at optimizing functionality in respiratory diseases (WANG et al., 2020). It is based on interdisciplinary and comprehensive intervention that includes aerobic and resistance training and adjuvant interventions, such as education, management of nutritional and psychological aspects, which contribute to the optimization of quality of life (BENAVIDES-CORDOBA et al., 2022).

The beginning of pulmonary rehabilitation in a hospital environment should occur with safety criteria, that is, considering the period of exacerbation of the infection in severe and critical conditions, and the initial intensity of the activities should be graded and approached with caution and monitoring (VANHOREBEEK et al., 2020). The criteria for discontinuation of the management are based on oxyhemoglobin desaturation and intensification of dyspnea, with rest and oxygen supplementation (BÜSCHING et al., 2021).

Airway cleaning and clearance maneuvers reduce secretion stasis, quantitatively increase tracheobronchial expectoration, mucociliary clearance, and clearance, which, associated with therapeutic breathing exercises, promote alveolar recruitment, expansion,

and lung compliance (AQUINO, 2019; BURNHAM, STANFORD, STEWART, 2021; MCGREGOR et al., 2021).

The studies published, so far, do not present standardization and specificities in protocols aimed at covid, diversifying according to the impairments and stage of the disease, considering pre-existing comorbidities and physiological effects of therapeutic conducts (REINA-GUTIÉRREZ et al., 2021).

In this context, it is necessary to create specific protocols and guidelines, in order to enhance the results and remedy the adversities caused by the Covid-19 pandemic and its consequences, since the absence of individualized conducts negatively interferes with the prognosis (SUN et al., 2021).

Delvento et al. (2023) report the increase in demand for primary health care (PHC) services, considering that the symptoms of Long Covid are underrepresented in primary care, possibly due to the limited access of patients to longitudinal care, which leads to underestimation of the breadth and extent of the post-Covid-19 condition. Therefore, it is essential to approach patients with Long Covid (CHEN et al. 2024).

The identification and quantification of persistent symptoms and their negative impacts on functionality, ADLs, and quality of life make the clinical management of Long Covid effective in the population (CHUANG et al., 2024). Therefore, health services, worldwide, must plan, adapt, and invest in multidisciplinary specialized rehabilitation, aiming to minimize the harmful impacts of this context (PUTEKOVA et al., 2023).

The recent pandemic period supports the prevalent need for longitudinal monitoring and investigations, with the aim of remedying inaccuracies regarding biological and socioeconomic impacts. In view of the recent occurrence of coronavirus infection and its repercussions, long-term follow-up of infected patients, both critical and mild, is instigated so that the sequelae and treatments can be described and published scientifically (LARSSON et al., 2023).

It is believed that through recent and modern technologies, such as artificial intelligence, global adaptation of protocols is promoted to optimize the patient's prognosis, in addition to reducing the severity of sequelae (HASAN et al., 2023). In addition, it is essential that the multidisciplinary team is trained to treat this patient, in order to ensure health, functionality, and quality of life, from the critical stage of infection to the total reestablishment of systemic homeostasis (PETRAGLIA et al., 2020; AGOSTINI et al., 2021; PLATZ et al., 2022).

Technological evolution has added virtual reality to physical rehabilitation, as a strategy of attendance, dedication, interactive engagement and playfulness, intentional and

planned. Virtual reality, connecting the real and virtual environments through game therapy, enhances motor and cognitive skills due to motivational audiovisuospatial interaction with body movements (PITTARA et al., 2023). During the activity in video games, it is necessary to make decisions, changes in strategy and division of attention, which increase the functional capacity in the learning process, memory, concentration and three-dimensional environmental actions, in order to evoke behaviors similar to those that occur in real life on a daily basis, in addition to stimulating the release of neurotransmitters such as dopamine and neural plasticity, producing significant effects on quality of life (RUTKOWSKI et al., 2022; VIANA, LIRA, 2020).

As a perspective, it is suggested that studies evaluate the repercussions of rehabilitation until the remission of signs and symptoms, to identify significant protocols to specifically assist patients who have sequelae due to Covid-19. Future research should include longitudinal assessments to elucidate the trajectory of exercise ability. Interventional trials of potential therapies are urgently needed, including rehabilitation studies to address deconditioning, as well as additional mechanistic investigations into dysfunctional breathing, autonomic dysfunction, chronotropic incompetence, impaired oxygen uptake or utilization, and failure in preload to validate treatments to long covid.

FINAL CONSIDERATIONS

Pulmonary rehabilitation (PR) has proven to be significantly effective in the treatment of COVID-19 sequelae regardless of the severity of symptoms (mild, moderate, severe, and/or critical) of the acute phase (BÜSCHING et al., 2021). The prevalence of long-term impairment of patients infected by SARS-CoV is notorious, evidencing chronic pandemic consequences that negatively impact quality of life, capacity, and functional performance, both at rest and during exercise, despite the reduction in the number and severity of cases (HAYDEN et al., 2021).

Universal implementation of PR programs is proposed, considering their therapeutic validation in post-covid-19 sequelae. The health system needs to support strategies in public policies for the management, approach, and longitudinal follow-up of these underreported patients in primary care, with pulmonary, cardiovascular, and musculoskeletal rehabilitation programs.

In short, continued primary care for Covid-19 is indispensable, at the individual, collective, community, and outpatient levels, aiming to promote and preserve significant beneficial health conditions, with functionality and quality of life.

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