

# Modification of Lifestyle to Recover from Post-COVID Symptoms: A Short Review

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Poor lifestyle is associated with a high risk of developing the symptoms of post-COVID. It does not only have the negative effect on physical health, but also psychological health. This also creates a challenge on health care system. One of the cost-effective and easy ways to deal this situation is medication of lifestyle. The review study aimed to understand the importance of lifestyle modification in managing symptoms of post-COVID.

**Key Words:** COVID-19, Health, Lifestyle

## INTRODUCTION

The outbreak of Coronavirus Disease 2019 (COVID-19) disease due to SARS-CoV-2 infection caused a huge pandemic worldwide resulting in substantial spread of infection and death [1]. The disease initially diagnosed in Wuhan, China in December, 2019, but it has developed quickly all over the world [2]. Meanwhile, the virus has the higher capacity to mutate in a rapid rate. The variants of coronavirus SARS-CoV-2, respectively B.1.1.7 (Alpha), B.1.351 (Beta) and B.1.1.28.1 (P.1)—were noticed during the rapid rise of COVID-19 cases in United Kingdom, South Africa and Brazil, consequently result in transmission of infection across the whole world [3]. Frequency of the variant B.1.1.7

is more in India than the B.1.351 and B.1.1.28.1 variants [3]. Lineage B.1.617.2 (Delta) and B.1.618 of SARS-CoV-2 are also the reason of concern in India [3]. The variant of SARS-CoV-2, B.1.1.529 (Omicron) known to be mutated so heavily, is the new cause of concern around the globe [4]. Rapid mutation rate of the SARS-CoV-2 virus results in rapid spread of infection.

The virus, spreads via nasal and oral droplets to a very large extent, enters into the respiratory system of infected person and binds with the angiotensin-converting enzyme 2 (ACE2). Then it destroys the cells of alveoli. The alveolar cells normally synthesize and secrete lung surfactant, also involves in transepithelial transport of water, and even helps after lung injury to regenerate the alveolar epithelial structure [5]. Any types of alveolar damage may lead to problems in respiratory system, gradual manifestations of other conditions, and eventually lead to death. Symptoms most commonly manifest in a patient with COVID-19 include high temperature, breathlessness, cough, fatigue, myalgia, pneumonia, and diarrhoea [5].

National Institute for Health and Care Excellence (NICE) defines “Long COVID” as a group of physical, psychological and/or cognitive symptoms that continue beyond the acute

Received: April 23, 2022, Accepted: September 4, 2022

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illness of COVID-19 [6]. Patients with long COVID often complain about a confusing state of fluctuating and constant symptoms including breathing difficulty, cough, high temperature, sore throat, palpitations, pain in chest, cognitive impairment, muscular pain, neurological symptoms, and diarrhoea [7]. Persistent or intermittent lower level of oxygen saturation have also reported in some patients. The exact cause of long COVID is not yet known, but it may involve mechanism of several diseases including any inflammatory process affecting the vascular components [7].

The symptoms of post-COVID or long-COVID are not only the complain of patients discharged from the hospital/ICU but also experienced by those patients who were on home quarantine as per medical advice. Almost 10% of patients with COVID-19 who did not require inpatient care had also experienced symptoms of long-COVID [4]. Although the recovery rate from COVID-19 is high but the number of patients with post-COVID symptoms are also increased.

The symptoms of post-COVID thus put a greater burden to the health care system. Aim of this review is to summarize the literatures regarding lifestyle modification to manage the symptoms of long-COVID.

## DIFFERENTIATION BETWEEN POST-ACUTE COVID-19 & CHRONIC COVID-19

Classification as per time frame is important to define post-COVID symptoms. Recently a criterion has been made to distinguish between post-acute and chronic COVID-19. If the symptoms of long-covid persist beyond 3-4 weeks it can be defined as post-acute, while, it is known as chronic COVID-19 if symptoms last beyond 12 weeks [8].

Guideline of NICE classifies post-COVID symptoms as: symptoms persist up to 28 days (acute COVID-19), symptoms last from 4 to 12 weeks (ongoing symptomatic COVID-19), and symptoms that developed at the time or after infection and remain for >12 weeks (post-COVID) [7]. The guideline mentioned the term “long COVID” as both the subgroups, i.e., ongoing symptomatic COVID as well as, post-COVID syndrome [9].

These terminologies have been distinguished to clearly

understand about the condition and to help to manage short- and long-term symptoms.

### 1. Symptoms of post-acute COVID-19

Fatigue is the most common symptom experienced by more than 30% of patients still after 14-21 days [6]. The patients describe the symptom as excessive sleepiness. Studies have also stated about cough, breathlessness and pain in the lung tissue experienced by patients [6]. The patients explain the symptom as stuffy feeling while talking or during activity. Some case studies also reported persistent olfactory dysfunctions, headache and fluctuation in body temperature in some patients even 14-21 days after tested being positive [6]. Loss of energy, lack of functional capacity and concern about full recovery had also been complained by some patients that increase the level of physical as well as emotional stress among patients [8]. Emotional stress predisposes the victims of COVID-19 to suffer emotionally, which ultimately shows the signs and symptoms of major cognitive and psychiatric disorders. Sleep disturbance and fatigue are most commonly reported psychiatric symptoms [10]. Symptoms of anxiety, depression, specific phobia, and post-traumatic stress are also common among these patients. Sensorimotor disorders and vertigo are not reported usually but observe in a small proportion of patients [10].

### 2. Symptoms of chronic COVID-19

Fatigue remains the most common symptom complain by patients even after 12 weeks. Breathlessness, cough and pain in lungs are still experienced by 71%, 29% and 24% of patients respectively [6]. Although, no study has been conducted that clearly state about olfactory symptoms in case of post chronic-COVID but symptom like disturbance in sense of smell has been reported by patients approximately after 3 months. Cognitive and psychological symptoms which were reported in the post-acute case, namely fatigue, depression, anxiety, and post-traumatic stress disorder, have been reduced to some extent in patients with long-COVID [6].

## ATTRIBUTES OF POST-COVID SYMPTOMS

Study suggests that people with older age, female, higher

body mass index (BMI) and patients who suffered from more  $\geq 5$  symptoms within first week of illness, are at higher risk of developing post-COVID symptoms [11]. The most common five symptoms that are experienced during the first week are mainly headache, fatigue, breathlessness, hoarseness of voice, and myalgia. Middle aged women are at greater risk of developing long-COVID than the men, might be because of gender based differences in the immune responses. Autoimmune conditions are more prominent in female than in male of 40-60 years of age [8]. Female gender has double the risk of developing symptoms of long-COVID compared to male [11].

It has been reported in an observational study that health care workers, who have respiratory symptoms or BMI  $>25$  kg/m<sup>2</sup>, have higher risk of developing the symptoms of long COVID, that can be lasted for at least 35 days [12]. History of comorbidities in patients with COVID-19 also raises the risk of long COVID. Even patients with mild symptoms of COVID-19 initially were reported to suffer from long COVID [13].

## LIFESTYLE MODIFICATION STRATEGIES TO MANAGE SYMPTOMS

Cost-effective strategies and lifestyle modification techniques simultaneously improving many of the symptoms related to long-COVID. These strategies should be considered on urgent basis to manage the symptoms of post-COVID and to reduce health care burden. Social distancing, covering of nose and mouth, along with all the approach to maintain hygiene should follow even after the negative test report of COVID-19.

Measures should be taken before to prevent post-COVID complications. Healthy diet and regular exercise or physical activity should be prioritized in daily life to boost the immunity and control BMI. Literatures suggest that dietary management is an important factor to manage symptoms of long-COVID [1]. Plant-based diets including vegetables, fruits, legumes, whole grains, herbs, nuts, and seeds, are abundant in antioxidants, fiber and phytochemicals. Such diets are cholesterol free and have less saturated fat and animal-derived pro-inflammatory molecules [14]. Less fiber or high intake of saturated fat in diet may associated with less

or disturbed sleep. Thus, consuming plant-based diet may be beneficial to improve the sleep disturbance related to long-COVID [15]. Natural-dietary polyphenols have antidepressant activity, which may be helpful in relieving mental health problems related to long-COVID [1]. Dietary antioxidants neutralize the free radicals which may beneficial to halt the prolonged systemic inflammation related to post-COVID. Polyphenols improve immune function and directly exhibit antiviral properties [1]. Healthy diets along with regular physical activity can improve the modifiable risk factors of long-COVID, like high BMI and decreased immunity.

To improve the respiratory symptoms, proper evaluation of the condition, management with expert advice should be considered. Patients are instructed to do light aerobic exercises (for e.g., walking, jogging) as per the capacity of individual; the level of difficulties can be gradually increased within paced levels that will help to improve post-COVID related respiratory symptoms, such as fatigue and breathlessness [12]. Patients should be taught about the use of Borg-RPE scale and pulse oximeter during rest as well as, with activity for self-assessment and to perform safe level of exercise [6]. Regular practice of breathing exercises assists to control breath, strengthen the muscles of respiration, especially diaphragm, and reduce the work of breathing. 5-10 min of exercise session regularly per day is benefitted for physical, as well as, mental health and promote relaxation [16]. Patients can start diaphragmatic breathing exercise in erect sitting position by placing the hands over abdomen to feel the inflation and deflation of abdomen during slow, deep inhalation through nose and exhalation through mouth simultaneously [17]. Pursed lip breathing also provide relaxation of accessory muscles of respiration and help to regulate breath. In relaxed, erect, sitting position, patients should inhale through the nose slowly, as if they are trying to smell a flower and then exhale through purse lips like they are blowing candle. The inhalation and exhalation ratio should be 1:2 [18].

Positioning techniques and techniques of breathing while moving are useful strategies to manage breathlessness [4]. High side lying position supporting head and neck with help of pillow and knees bending forward, or, sitting or standing with leaning forward, or standing with back support are

some positions that may help to manage the symptom of breathlessness. To improve oxygenation prone position can be adapted by patients. Lying in prone leads to more uniform architecture of the alveolar structure and perfusion, results in reduction of regional ventilation/perfusion (V/Q) mismatch and improve in oxygenation. The subsequent increase in oxygenation is associated with improve health condition [19].

Airway clearance techniques (forced expiratory techniques, active cycle of breathing technique, positioning, gravity assisted postural drainage, huffing and coughing technique, assisted coughing) and use of positive expiratory pressure device should be taught to patients to remove or expel out accumulated secretion and reduce the chance of repeated chest infection. Breathing retraining, self-stretching exercise, coughing manoeuvre should be continued to improve the breathing quality, lung volume and capacity, endurance level and quality of life of patients [5].

Self-management strategies to avoid pleuritic pain, such as education to avoid exertion, should be included in patient's education plan. Patients should also be instructed to go for ECG (electrocardiogram) screening occasionally to diagnose and medically manage life threatening conditions [4].

Myalgia or joint pain can be managed at home by hot/cold therapy guided by physiotherapists. Pain related deconditioning is one of the common results in patients with long-COVID. Prescribed exercises can be started for reconditioning of those patients [4]. Exercise can be continued for at least 3 days/week for patients who were not usual to do regular exercises. Those who participate in regular exercise can restart their physical activity for at least 5 days/week [13]. Care should be taken while prescribing the exercise protocol for individual patient about the exercise intensity. Anaerobic and excessively tiring exercises should be avoided. Frequency should increase first, then duration, and then the exercise intensity [20].

Exercises or regular physical activities are known to enhance perception, improve social functioning, and quality of sleep. Exercise is also known to improve psychological health by increasing synaptic transmission of the monoamines which has an action to reduce depression. Production of endorphin, especially betaendorphin, during physical activity, suppresses the CNS (central nervous System) which

provides calmness and relaxation of mind [13].

Practice of yogic breathing exercises and pranayama promote relaxation of body and mind which could release all stresses and worries and improve immunity of the patients suffering from long-COVID symptoms [21]. Marjarisana and setubandhasana can aid improving overall endurance and stability. Pawanmuktasana and balasana can help in better functioning of the viscus organs and also assist to recruit the diaphragm, thereby enhance lung function [18]. Balasana may assist in relaxation in the events of dyspnea. Shavasana is another powerful technique that provide relaxation and is preference of choice at the end of exercise session [22]. Yoga can improve flexibility, promote strength of muscle by stretching the body through different postures. Also, yoga can improve lung and heart function, reduce anxiety, stress and help in sleep disturbance, thus may improve quality of life.

## CLINICAL IMPLICATION

The present review suggests an urgent awareness drive towards the management of the symptoms of post-COVID. The virus relatively has much higher dynamic rate of mutation than the other viruses of RNA strands. Meanwhile, the burden on health care system is overwhelmed across the world not only by number of cases that stresses the capacity of health care system, but also the risk of infection among health care workers. At this situation, these lifestyle modification techniques can lessen the load of health care system and retrieve the quality of life of patients back in track.

## CONCLUSION

The review demonstrates the impact of post-COVID in physical and mental health of individual [6,8]. Many countries have suffered from huge burden to the economy and public health policies, resulted from COVID-19 pandemic. Therefore, productive and cost-effective strategies should also include in daily life to deal with long-COVID symptoms as many as possible. Our study highlights the importance of lifestyle modification to normalize physical and mental health of patients with long-COVID.

To educate the society about the importance of lifestyle

management, is one of the effective strategies in lowering the severity curve of post-COVID symptoms. The review discussed about the potential benefit of healthy diet, exercise, and yoga in both physical, as well as mental health conditions which are most common complaints in long-COVID. Finally, tele consultation are also used for the follow up of patients. Tele rehabilitation or tele consultation is the use of rehabilitation services utilizing communication technologies from a distance. Using the technology, patients can discuss about their health status with the health care provider, learn self-care techniques and exercises under the supervision of expert [23]. It does not only reduce the health care burden, but also reduces the chance of reinfection by reducing the need of person-to-person contact.

## CONFLICTS OF INTERESTS

None to declare.

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