

Post-COVID-19 Physiotherapy Rehabilitation: A Case Report

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ABSTRACT

Coronavirus Disease 2019 (COVID-19) is a severe disease mostly affecting the respiratory system. Even after the acute symptoms of COVID-19 subside, there are many post acute symptoms that are still present in the COVID-19 survivors. Post-COVID-19 fatigue is seen to affect people of all age groups. This case report emphasises on the Physiotherapy view point. There are very few studies showing the benefits of Physiotherapy exercises in Post-COVID-19 manifestations. A 21-year-old female presented to physiotherapy department. An 8-week Physiotherapy protocol was given and outcomes were assessed before and after the treatment protocol. The presented symptoms were found to be relieved, thus, showing the effectiveness of Physiotherapy in Post-COVID-19 phase.

Keywords: Breathlessness, Coronavirus, Exercise, Fatigue, Fitness

CASE REPORT

A 21-year-old female, student by profession presented with the complaints of breathlessness, generalised weakness, lower back pain and weight gain. Height and weight were 157 cm and 71 kg, respectively. The Body Mass Index (BMI) was found to be 28.8 kg/cm² which was categorised as overweight according to the Asian classification of BMI.

In the month of September 2020, she was tested positive for COVID-19 on rapid antigen test as her father had a travel history during that period. The symptoms were loss of appetite, dizziness, weakness and headache. Medications were given and home quarantine of 14 days was advised. Drugs prescribed were-Vitamin B complex, vitamin C and paracetamol. After completion of the medications for 14 days, investigations were done and she was tested negative for COVID-19. After a week, she started suffering from persistent headache for which she visited the Medicine Department of the hospital and found it to be due to sinusitis. Medications like paracetamol, antibiotics and nimesulide were given.

A month later, she visited for Physiotherapy and presented with breathlessness after walking for a few miles, generalised weakness, lower back pain, weight gain and menstrual irregularities on 31st December 2020. She had started with Ayurvedic medications for the irregular menstrual cycle. Physiotherapy assessment was done which included all the components of fitness and special tests for back. Body composition, endurance, cardio-respiratory fitness, flexibility and strength were assessed. The special tests done for back pain was Faber test, Straight leg raise test and Gillet's test. Faber test was found to be positive which indicated Sacroiliac joint involvement.

Treatment procedure was informed and written consent was obtained from the participant and overall study protocol was explained. The tests and scales used for each of the fitness component is shown in [Table/Fig-1][1-3].

Physiotherapy session: The Physiotherapy session began on 2nd January 2021. Treatment was given for five days a week for 40-45 minutes daily for eight weeks. Treatment protocol included aerobic exercises along with strengthening according to the World Health Organisation (WHO) guidelines [4]. The procedure was followed as:

| Tests | Procedure |
|----------------------------|--|
| Body composition | It was assessed with Body Mass Index (BMI), Bio-electric Impedance Analysis, Skin fold measurements with Harpenden caliper and circumference measurements [1]. |
| Endurance | It was assessed using the Partial Curl-up test [1]. |
| Cardio-respiratory fitness | This was measured with the help of 6-minute walk test and VO ₂ max was then calculated [1]. |
| Flexibility | For Upper Limb flexibility Back Scratch test was used while, for Trunk and Lower Limb flexibility V sit and reach test was used [1]. |
| Strength | It was assessed with the 10 RM test (Repetitive Maximum) [1]. |
| Dyspnoea | It was measured using the Modified Borg's scale. |
| Physical activity level | This was assessed using the Physical Activity Index [2]. |
| Functional status | The Functional Status was assessed using Post-COVID-19 Functional Status (PCFS) Scale [3]. |
| Pain | Visual Analogue Scale was used to assess pain. |

[Table/Fig-1]: Tests and scales used to assess fitness in the patient.

Warm up: Stretching of upper limb and lower limb (30 seconds hold for 3 repetitions), Spot marching (30 seconds, 2 sets).

Aerobic exercises: Step up and step down (2 minutes, 3 sets), mild intensity aerobics of 32 count beats for 20 minutes. Given for three times a week. Weekly progression by increasing the intensity from mild to moderate.

Strengthening exercises: Initially, low resistance band (Red colour TheraBand) was used for strengthening upper limb and lower limb muscles (15 repetitions, 3 sets). Given for two times a week. Progression was given by increasing the repetitions of the exercise and later the resistance to Green colour TheraBand.

Cool down: Relaxation, Deep breathing exercise, Thoracic expansion exercise to improve lung capacity.

Exercises for low back pain: Pelvic bridging, bird-dog position. (Weekly progression with increase in repetitions and hold was given).

Rehabilitation protocol in the post-COVID-19 phase, found a significant effect on the fitness components like strength, endurance, and cardio-respiratory fitness that were assessed and the patient had relief in the presented complaints. The results of outcomes assessed before and after the treatment are given in [Table/Fig-2].

| Variables | Pre-values | Post-values |
|---|-------------------------|-------------------------|
| Body Mass Index | 28.8 kg/cm ² | 27.2 kg/cm ² |
| Endurance | Fair | Good |
| VO ₂ max (6 MWT) | 31.3 mL/kg/min (Fair) | 34.4 mL/kg/min (Good) |
| Flexibility (V sit and reach test) (Back scratch test) | Good Good | Good Good |
| Strength (10 RM test) | Average | Good |
| Dyspnoea (modified Borg's scale) | 3 (moderate) | 2 (somewhat easy) |
| Physical activity index | 48 (Good) | 61 (Good) |
| PCFS | 2 | 0 |
| Pain on VAS | 6/10 | 2/10 |

[Table/Fig-2]: Data of treatment protocol assessed in the patient.
6 MWT; 6 minute walk test, PCFS: Post- COVID-19 functional status scale [3], VAS: Visual analogue scale

DISCUSSION

Coronavirus disease is an infectious disease which is caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and has affected more than 15 million people around the world. The most commonly affected organ is the respiratory system. The virus binds to the Angiotensin Converting Enzyme 2 (ACE2) receptors which are present in the lungs, heart, kidneys, pharynx, liver and other tissues of the body [5]. With progressive researches on COVID-19, it is highly evident that these patients experience long term effects like fatigue. This post-COVID-19 fatigue is the reduction in physical and mental ability which are the effects of changes in central, peripheral or psychological factors associated with COVID-19 disease [6].

Also, COVID-19 might have the ability to affect a variety of tissues, which also includes the skeletal muscles. The most common COVID-19 symptoms are muscle weakness and pain. Therefore, COVID-19 may directly affect the skeletal muscles and cause fatigue [6]. This fatigue is becoming a major issue and affecting the quality of life. Thus, it is important to restore the functional status with proper rehabilitation [7].

The present study showed the effect of a rehabilitation protocol in the post-COVID-19 phase, found a significant effect on the fitness components like strength, endurance, and cardio-respiratory fitness that were assessed and the patient had relief from the presented complaints.

Physical activity is thought to be one of the chief components of healthy living and therefore is primary constituent of healthy living medicine. It has steadily shown significant reduction in the risk of developing systemic inflammation, excessive body mass and building immunity. This immune response to physical activity is due to increase in the immunosurveillance [8].

Physical activity also improves muscle strength, flexibility and endurance, thereby improving overall functional status [9].

In a case series of seven Post-COVID-19 patients, rehabilitation program for 1-2 sessions/day for 30 minutes, each for 6 days/week

was done. The protocol followed showed improvement in functional outcomes [10].

A study has shown the correlation between obesity/ overweight and severity of COVID-19. The factors linked are reduced lung capacities and reduction in cardiovascular function along with reduction in immune response in obese/ overweight individuals [11]. Obesity/overweight has shown to weaken immunity, and an overall negative impact on the efficiency of pathogen defenses. It is linked to a reduction in the diversity of T-cell receptors and also shown to cause a reduction in lymph node size, inhibition of the number of T- cells in the lymph nodes, and reduced ability of the immune system to recognise and effectively deal with foreign antigens. Obesity is known to cause chronic inflammation and an increase in circulatory, pro-inflammatory cytokines, which may play a role in the worsening of COVID-19 outcomes. Thus, the physiological outcomes of obesity/overweight, such as inflammation, contribute to COVID-19 severity in people with high BMI [11]. Another study focused on the pulmonary rehabilitation in Post-COVID phase showing improvements in anxiety and dyspnoea [12].

CONCLUSION(S)

Post-COVID-19 phase needs to be addressed with a tailor made rehabilitation protocol. The treatment given in this case was found to be useful in relieving the symptoms presented.

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