

## Transnational Impact Of Novel Corona Virus On Physiotherapy Profession: A Mini- Review

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### Abstract

The global COVID-19 pandemic, caused by the novel coronavirus (nCov), has reshaped healthcare systems and impacted healthcare professionals on a monumental scale. This article explores the multifaceted effects of the pandemic on the physiotherapy profession, both professionally and personally. Physiotherapists (PTs) have faced physical, mental, economic, and social challenges as they navigate the complexities of providing care during these trying times. As COVID-19 continues to evolve, PTs play a pivotal role in the rehabilitation and recovery of patients who have survived the virus. This article underscores the importance of physiotherapy in the prevention and rehabilitation of COVID-19 survivors and highlights the significant contributions of PTs working in intensive care units (ICUs) and with primary healthcare providers. It discusses the disruptions caused by lockdowns and social distancing measures, which have affected the delivery of clinical rehabilitation services. The article also addresses the financial burden faced by private practitioners due to increased costs associated with personal protective equipment (PPE).

In response to these challenges, the physiotherapy profession has adapted rapidly. The emergence of tele-physiotherapy has opened new avenues for PTs to provide care to patients, both with and without COVID-19, while adhering to infection control measures. Tele-rehabilitation programs have proven effective in various patient populations, including those with stroke, chronic respiratory diseases, musculoskeletal conditions, and cognitive impairments. Additionally, these programs have been valuable in mitigating the psychological and physical toll of isolation during the pandemic. Furthermore, the article delves into the profound impact of exercise on the human body's immune response, particularly its role in bolstering the immune system against viral infections.

COVID-19 has brought about unprecedented challenges for the physiotherapy profession, affecting PTs on multiple fronts. However, PTs have risen to the occasion, adapting to new modes of care delivery and demonstrating their crucial role in the treatment and recovery of COVID-19 patients. This article underscores the resilience and adaptability of PTs in the face of adversity, emphasizing their indispensable contribution to the global healthcare response to the pandemic.

**Keywords:** Physiotherapy, Corona virus, Tele-Physiotherapy, Exercise, Rehabilitation.

### 1. Introduction

Infection with novel COVID 19 (nCov) is a contagious condition as per the World Health Organization (WHO) <sup>[1]</sup>. WHO labeled it as COVID 19 on 2020, 11th February <sup>[2]</sup>. It was first seen in Wuhan city, Hubei, China 2019, on 31st December following the pneumonia cases of unknown etiology <sup>[3]</sup>. The WHO announced the spread of novel coronavirus (nCov) as a universal health crisis on 2020, 30th January and pandemic on 2020, 11th March <sup>[4]</sup>. The coronavirus spreads from individual to individual via respiratory secretions i.e. cough droplets, nasal droplets/secretions, hands contact on contaminated surfaces then touching the mouth, eyes and nose <sup>[5]</sup>. Aerial airborne infected molecules can remain suspended in the air for 180 minutes and can be inhaled by any individual or rest on the eyes <sup>[5]</sup>. nCov remains alive up to 960 minutes on different objects <sup>[5]</sup>. The WHO situation report states that 80 percent of patients demonstrate minimal/asymptomatic, 15 percent of patients demonstrate severely and require O<sub>2</sub> and 5 percent of patients demonstrate critical features which require ventilator support <sup>[6]</sup>. nCov presents symptoms like influenza, pyrexia, dyspnea, lethargy, expectoration and cough <sup>[7]</sup>.

As of 2020, on 19th September, the WHO reported 30.3 million confirmed cases with 948,795 deaths <sup>[8]</sup>. Data from China's largest case series showed that the majority of survivors (87%) were aged 30 and 79 years, one percent were 9 years of age or younger, one percent were between 10 years and 19 years of age, and 3 percent of survivors were aged 80 years and older <sup>[9]</sup>. Geriatric patients (aged  $\geq$  65 years) in the United States, constitute 31% of all the cases, 45% of in-patient departments, 53% of admissions in the intensive care units (ICU) and 80% of all deaths <sup>[10]</sup>.

Infection is reported to be much less common in children than in adults <sup>[11,12]</sup>. Children represent only one to five percent of confirmed cases <sup>[11]</sup>. In the United States, pediatric patients represent 1.7% of reported cases <sup>[12]</sup>. Most children were

seven years old in a sequence of 2143 pediatric survivors in China <sup>[13]</sup>. A Study published on 2020, 15th April reported around 4.4% survivors to be primary health care providers <sup>[14]</sup>.

## 2. Objectives

Many articles stated that COVID 19 pandemic has changed many aspects of Physical therapy and has impacted the lives of physiotherapists (PTs) professionally as well as personally. The article aims to describe the effect of nCov on PT professionals and to share the importance of physiotherapy between PTs and other providers of health care regarding the advantages of PT for the prevention and rehabilitation of the nCov survivors. PTs who work in ICUs or with primary healthcare providers can also play an important role in the rehabilitation of reported nCov survivors.

## 3. Methods

A literature search was carried on the pubmed, Elsevier (ScienceDirect), google scholar and Web of Science electronic database. The references of the searched articles with keywords using “novel virus”, “COVID-19”, “novel coronavirus”, nCov, “2019 coronavirus”, “physiotherapy”, physical therapy”, “Tele-Physiotherapy”, “exercise” and “rehabilitation”. Case reports, clinical analysis and fundamental research debating the Impact of Novel Corona virus on Physiotherapy Profession were collected. Data were filtered and narrowed down to information regarding Transnational Impact of Novel Corona virus on Physiotherapy Profession. Here, we reviewed Transnational Impact of Novel Corona virus on Physiotherapy Profession.

### Physiotherapy and COVID 19

The unexpected tempo at which nCov is spreading has changed the personal and professional lives of people <sup>[15]</sup>. Healthcare providers are impacted physically, mentally, economically and socially <sup>[15]</sup>. They feel the fear of getting infected and passing the infection to others and their family members <sup>[15]</sup>. It also affects their ability to make difficult decisions due to intense conditions <sup>[15,16]</sup>. This may impact the mental health of healthcare professionals <sup>[16]</sup>. It may also cause economical stress on PTs especially for private practitioners <sup>[16]</sup>. These factors may increase stress, anxiety, depression and decline their quality of life <sup>[15]</sup>. Identification of best treatment for COVID 19 is an ongoing process due to which clinical trial methods and assessments are being modified.

The rehabilitation team of COVID 19 requires a multidisciplinary approach and PT professionals are also part of this team. Rehabilitation of nCov is focused on advising exercise programs and educating patients about the self-management strategies such as breathing exercises, swallowing techniques, cognition and stress management techniques, use of assistive products and education to the caregivers and family members <sup>[17]</sup>.

Novel Corona virus has changed many aspects of rehabilitation workers due to lockdown and social distancing by disrupting the provision of clinical rehabilitation services. COVID 19 outbreak prevents visits of the patients to the therapists, has caused the cancellation of the appointments, alteration in the working hours, unemployment and pay reduction. Because PT interventions are based on manual or hands-on techniques, affordability of personal protection equipment (PPE) kits for PTs has increased the cost of PT services in the hospital and clinical settings.

On Friday, 2020, 20th March, a group of international specialists in the cardio-respiratory PT team came together to rapidly prepare guidelines for PT acute care globally about COVID 19 and their involvement in treating patients with COVID 19 survivors but any suggestions in management techniques of non-COVID patients were not made <sup>[18]</sup>.

Cardio-respiratory PT is focused to treat respiratory conditions which may be either acute or chronic and the main focus is to enhance the activity, health conditions and somatic recuperation after any sudden sickness <sup>[18]</sup>. Physical rehabilitation programs may be useful to enhance respiratory functions in COVID 19 cases <sup>[18,19]</sup>. However, productive cough is an infrequent symptom (34%), PT may be advised if patients with COVID 19 have large amounts of airway secretions and are not able to take out the secretions on their own <sup>[19]</sup>. It can be advised upon different cases and treatment planned based on clinical presentation of the cases <sup>[19]</sup>. PT professionals who practice in the intensive care units may use airway clearance or breathing exercises for patients who are on ventilation and reveal the manifestation of poor clearance of airways and breathing patterns, PT may help them to wean off the ventilators <sup>[19]</sup>. Also in COVID 19 patients with critical respiratory failure, positioning is very beneficial because of the advantage of optimizing oxygenation in prone position <sup>[19]</sup>.

Patients with nCov who are admitted to ICU might require sedation, prolonged protective lung ventilation and the use of neuromuscular blocking agents which may increase the risk of ICU acquired weakness (ICU-AW) <sup>[20,21]</sup>. Hence it is important to manage the severity of ICU-AW which can occur due to acute respiratory distress syndrome, exercises help in reducing the ongoing disability of compromised oxygen levels and hypoxemic patients of the ICU and also facilitates the functional recovery of nCov patients <sup>[21,22]</sup>. So, PT professionals can also play an essential role in improving respiratory functions, early mobilization of the patients and decreasing the ICU-AW of the COVID 19 survivors admitted in the hospitals.

### **Approach To Physiotherapy during Lock Down**

In outpatient departments (OPDs) and the private sectors/clinics, PT treatment can be provided through telerehabilitation programs by working within the new confines of infection management, by rethinking the new standard recommendation for the examination and treatment of patients with nCov<sup>[15]</sup>. Telerehabilitation may prove as a feasible alternative to continue the wide range of services for OPD patients<sup>[15]</sup>. Patients who can be treated by PTs in group therapy can be remotely treated using Tele PT<sup>[23,24,25,26]</sup>. Many types of research already exist on PT telerehabilitation programs such as for stroke patients, chronic respiratory disease, musculoskeletal conditions, cognitive problems, dementia, etc<sup>[23,24,25,26]</sup>. Researchers suggest that living in isolation might result in different psychological problems, sleep disorders, mental health problems and physical activity restriction during the COVID 19 pandemic<sup>[27,28]</sup>. In old age, mild cognitive impairment and dementia also increase the load on family and caregiver's<sup>[27]</sup>. Telerehabilitation programs for cognitive impairment and dementia patients have proved to be helpful for the nCov patients and also reduces the caregivers burden<sup>[27]</sup>. Studies also conclude that cognitive stimulation exercises through telerehabilitation improve the mental health and physical fitness of the patients during exceptional circumstances, such as the current nCov outbreak<sup>[27]</sup>. Masahiko Mukaino, et al. introduced a telerehabilitation program in their study to teach exercise protocol to COVID 19 survivors in an isolation period<sup>[28]</sup>. A PT professional guided each survivor for a 20 minutes exercise session, the participants were simply asked to wear pulse oximeters while exercising<sup>[28]</sup>. These types of telerehabilitation technologies are useful and feasible for the survivors in hospital settings and communities<sup>[28]</sup>.

### **Benefits of Exercise**

Exercise has an extreme effect on normal body function and immune responses. A single bout of a cardio-respiratory exercise, instantly mobilizes billions of immune cells, particularly those capable of fighting the viruses<sup>[29]</sup>. Exercise also helps to release various proteins in the body that can help and maintain the immune system<sup>[29]</sup>. Exercise is particularly effective for geriatrics who are generally more prone to infection<sup>[29]</sup>. Exercises help to improve the immune response, thereby, reducing the worst effect of viral infections<sup>[29]</sup>. Exercise is also necessary to maintain muscle mass via activation of protein synthesis of muscles<sup>[30]</sup>. Physical inactivity during a quarantine period of 14 days may lead to muscle atrophy particularly in the geriatric population due to lack of muscular contractile activities<sup>[30]</sup>. There is also an impact on the brain functions leading to mental illness, depression, dementia causing disruptions in the learning skills, memory and emotions, whereas, regular exercising enhances the neuroprotection mechanism, neurogenesis process, immune response, release of endorphins, neurotrophic factors, good learning skills and memory and increases the antioxidant defense and anti-inflammatory response<sup>[31]</sup>.

As the nCov usually attacks the lungs and respiratory tract, and in severe cases, the musculoskeletal system, CNS, immune system and cardiovascular system leading to systematic failure of the human body<sup>[31]</sup>.

Mortality and morbidity are common in people with co-morbidities or pre-existing pathological conditions<sup>[31]</sup>. Physical activity (PA) and its outcome lead to a positive effect on the cardio-respiratory system, immune system, mental health, psychological well-being, etc<sup>[32]</sup>. Hence, physical activity/exercise could be a supportive therapy for nCov patients<sup>[32]</sup>.

Non-pharmaceutical therapy may be considered a preventive therapy in this pandemic to bring down the spread of nCov<sup>[33]</sup>. It is a simple and effective method to prevent both non-communicable and communicable diseases<sup>[33]</sup>. According to WHO 2 hours 30 minutes and 1 hour, 15 minutes of moderate-intensity and vigorous-intensity PA in a week respectively or a combination of both is beneficial to retain a healthy lifestyle<sup>[34]</sup>. For children/adolescents, the guidelines state a minimum of 1 hour of moderate or vigorous intensity exercise in a day<sup>[35]</sup>. At least 60 minutes of moderate-intensity aerobic exercise results in an antipathogen process due to a rise in circulating immunoglobulins, cytotoxic T cells, anti-inflammatory cytokines, immature B cells, neutrophils and natural killer cells<sup>[36,37]</sup>, this helps in the defense system of the human body<sup>[33]</sup>. While the geriatric population and people with chronic illness are recommended to do multi-training programs involving aerobic, strengthening, flexibility and balance exercises<sup>[38]</sup>. One in four adults globally do not perform the minimum recommended guidelines of exercise, and the persisting lockdown/quarantine periods have made it further worse<sup>[32]</sup>.

### **Conclusion**

Cov has affected the healthcare system and healthcare professionals. PT is one of the established professions throughout the world which has been affected by nCov and has impacted the PTs personally, professionally, physically, mentally, economically and socially. The Multidisciplinary approach is required by the rehabilitation team in the management of patients with nCov in which PTs help in the betterment of the patient by physical recuperation. Cardio-respiratory PT is particularly helpful in acute and chronic respiratory conditions including COVID-19. Early exercises and mobilization in patients with nCov are useful in the prevention of ICU-AW.

Tele-Physiotherapy is the new scope of practice for PTs to provide healthcare services to the needful patients with or without nCov. As more COVID-19 patients are at home during quarantine they may benefit from Tele-Physiotherapy.

Exercises improve the immune response and mental health and help in reducing the worst effects of viral infections. Exercises are effective for the elderly population too for staying healthy. Therefore, PT professionals also contribute to the treatment of COVID 19 patients and support the health care system.

Key Messages: This article summarized how the covid-19 impacts the lives of physiotherapy professionals and how they contribute to the pandemic for the betterment of the patient by physical recuperation.

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