



## RESPIRATORY PHYSIOTHERAPY, OTHER DISEASES AND COVID-19

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**Abstract:** The new Coronavirus disease (COVID-19) has already had a direct impact on more than 10 million people in the city of Wuhan and has reached other parts of China as well, posing a health threat of unknown magnitude globally. Presently, there is some vaccines for the prevention of the illness caused by the virus; The mechanism of action of this epidemic remains unknown and treatment ways still without success. The virus is transmitted from person to person through respiratory secretions. This work pretended to present the scientific evidence around the World using the research material produced by scientific community worldwide about the use of respiratory therapy to treat the problems produced by COVID-19 as a way to inform all the importance of this pandemic disturb of respiratory health and to show the advances in physiotherapy and the perspectives for the future.

**Keywords:** Coronavirus; COVID-19; Respiratory physiotherapy; Treatments.

### Introduction

The new Coronavirus disease (COVID-19) initiate in China has become the world's leading health headline and is causing major panic and public concerns. On January 30, 2020, the World Health Organization (WHO) declared that the new coronavirus outbreak is a public health emergency of international concern. The virus has already had a direct impact on more than 10 million people in the city of Wuhan and has reached other parts of China as well, posing a health threat of unknown magnitude globally. As of April 28, 2020, WHO reported 3098391 confirmed cases of COVID-19 globally, with 1004908 of them occurring in USA (including 17682 deaths only in New York City) [1]. The outbreak has caused governments in various countries to take swift and protective measures. In USA, these included putting cities on lockdown, implementing travel warnings/bans and cancellations, extending national holidays, and closing schools and postponing classes [2].

Presently, there is some vaccines for the prevention of the illness caused by the virus; The mechanism of

action of this disease remains unknown. There have been a lot of research papers published within the last 30 days that have tried to allow for the rapid sharing of scientific information about the virus, but serious questions regarding the causes or mechanisms of transmission, incubation period, risk assessments, and options for effective treatment or intervention of the virus remain largely unanswered.

Acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a new coronavirus that emerged in 2019 and causes coronavirus disease 2019 (COVID-19). SARS-CoV-2 is highly contagious. It differs from other respiratory viruses in that it appears that human-to-human transmission occurs approximately 2 to 10 days prior to the individual becoming symptomatic. The virus is transmitted from person to person through respiratory secretions [3]. Large droplets from coughing, sneezing or rhinorrhoea land on surfaces within 2 m of the infected person. SARS-CoV-2 remains viable for at least 24 hours on hard surfaces and up to 8 hours on soft surfaces. The virus is transferred to another person through hand contact on a



contaminated surface followed by touching the mouth, nose or eyes [4]. Aerosol airborne infected particles created during a sneeze or cough remain viable in the air for 3 hours [5]. The airborne particles of SARS-CoV-2 can then be inhaled by another person or land on the mucosal membranes of the eyes [6].

This work pretends to present the scientific evidence around the World using the research material produced by scientific community worldwide about the use of respiratory therapy to treat this disease as a way to inform all the importance of this pandemic disturb of health and to show the advances in physiotherapy that made today, and the perspectives for the future.

#### Material and methods

This work was researched in database PubMed (<https://www.ncbi.nlm.nih.gov/pubmed/>) to find articles that contain the following key-words: respiratory physiotherapy, coronavirus, COVID-19, respirators and SARS-CoV-2. It was done also using the research at

last 5 years and doing in humans. It wants to present the actual point of view of some researches about this pandemic and this research was limited by the articles founded.

This search was developed at June 28, 2021. It was founded 18 articles published in English language and done in humans. Only 16 of them are disposable with physiotherapy treatment for patients with COVID-19. And only 8 articles fulfilled of citations about respiratory physiotherapy and patients with coronavirus. All those articles were compared with others obtained in literature to discussed the purposes in the articles. The results were expressed in one table adapted for this work and express the opinion of the articles researchers.

#### Results

The results with the principal findings in these articles are shown in the table 1.

**Table 1:** Principal characteristics founded about respiratory physiotherapy

Article	Objectives and study design	Type of interventions, controls and results	Authors conclusions
Mohamed and Alawna, 2020 [7]	to demonstrate the short- and long-term effects of increasing the aerobic capacity on increasing the function and strength of immune and respiratory systems, particularly those essential for overcoming COVID-19 infections and associated disorders	It was done with research about publications in databases sites to find out clinical trials and the effects of increasing the aerobic capacity on the function and strength of the immune system. Firstly, the immunity could increase the level and function of immune cells and immunoglobulins, regulating CRP levels, and decreasing anxiety and depression. Secondly, the respiratory system functions acting as an antibiotic, antioxidant, and antimycotic, restoring normal lung tissue elasticity and strength. Lastly, it could act as a protective	This review summarizes that increasing the aerobic capacity is recommended because it has potential of improving immune and respiratory functions which would help counter COVID-19



		barrier to decrease COVID-19 risk factors, which helps to decrease the incidence and progression of COVID-19.	
Yang et al, 2020 [8]	The authors suggested that integrative cancer therapies involving close contact with cancer patients should be rigidly considered or forbidden in endemic areas, and stronger personal protection provisions should be made for patients with cancer and integrative cancer therapists	To the authors knowledge, there is still neither a vaccine nor specific antiviral drugs to fight the COVID-19 infection, and current treatments mainly depend on therapy for symptoms. Comparison with integrative therapy, Chinese herbal medicine (CHM) was shown to be quite effective in preliminary clinical practice. China’s National Health Commission issued a Diagnosis and Treatment Protocol for COVID-19, providing a systemic treatment with CHM.3 Thus, cancer patients diagnosed with mild or medium COVID-19 should be encouraged to receive CHM therapies. In addition, we should strengthen monitoring and give priority to the patients infected with COVID-19 with cancer during CHM treatment, especially the elderly and those with complications.	To better understand the treatment of COVID-19 and other severe infectious diseases, more CHM clinical trials should be undertaken as soon as possible, and patients with cancer history should be taken into consideration. We hope that our suggestions could help better deal with challenges of integrative cancer therapy in the epidemic of COVID-19
Sheety, 2020 [9]	To make the viewpoint about post-acute rehabilitation for survivors of COVID-19 the authors searched to answer the question “What rehabilitation services do survivors of COVID-	Three areas relevant to rehabilitation after COVID-19 were identified. First, details of how patients may present have been summarized, including	A thorough assessment and an individualized, progressive treatment plan which focuses on function, disability, and return to participation in



	19 require?” The question was asked within the context of a subacute hospital delivering geriatric inpatient and outpatient rehabilitation services.	comorbidities, complications from an intensive care unit stay with or without intubation, and the effects of the virus on multiple body systems, including those pertaining to cardiac, neurological, cognitive, and mental health. Second, I have suggested procedures regarding the design of inpatient rehabilitation units for COVID-19 survivors, staffing issues, and considerations for outpatient rehabilitation. Third, guidelines for rehabilitation (physiotherapy, occupational therapy, speech-language pathology) following COVID-19 have been proposed with respect to recovery of the respiratory system as well as recovery of mobility and function.	society will help each patient to maximize their function and quality of life. Careful consideration of the rehabilitation environment will ensure that all patients recover as completely as possible.
Bhutani et al, 2020 [10]	Present The commentary of the Canadian Thoracic Society’s (CTS) position statement on managing COPD during the COVID-19 pandemic1 in an easy FAQ format.	The Canadian Thoracic Society website for additional COPD resources (action plans and tutorial videos for adults for the proper use of inhalers, etc.).	Updates on COVID-19 and other lung diseases (such as Asthma) and a link to recommendations regarding the clinical management of patients in the event of a Salbutamol MDI shortage can also be found on this webpage.
Gudi and Tiwari, 2020 [11]	To present a point of view about this pandemic disease	That pandemic has reiterated the importance of a saying “prevention is better than cure” and has psychologically prepared mankind to battle and combat this pandemic. It has also	Coronavirus is not only a curse, but also a chance to improve our facilities and health care infrastructure and, above all, to learn how



		revealed weak points in how we think about health and prepare for the disease.	to be more ready for the next emergency crises.
Ramalingam et al, 2020 [12]	Post-hoc analysis of a pilot randomised controlled trial of hypertonic saline nasal irrigation and gargling in adults with upper respiratory tract infection found that in a subgroup with alpha and beta coronavirus infection	The use of hypertonic saline nasal irrigation intervention appeared likely to be effective in reducing symptoms and duration of the illness.	It is unclear if hypertonic saline nasal irrigation and gargling is also effective in COVID-19 caused by SARS-CoV-2; I trial is therefore urgently needed.
Zhang et al, 2020 [13]	Efficacy of conventional treatment plus the complementary therapy Liu-zi-jue (a mind-body exercise) to treat patients with mild COVID-19.	The study is a single-center 2 arm, randomized controlled trial with parallel-group design. It is presented the protocols to use complementary therapy.	No conclusions were presented.
Winck and Ambrosino, 2020 [14]	This narrative review attempts to describe some problems with the management of Covid-19 induced acute respiratory failure (ARF) by pulmonologists.	Protection of Health care workers should be paramount, so full Personal Protective Equipment and Negative pressure rooms are warranted. HFNC alone or with PP could be offered for mild cases (PaO <sub>2</sub> /FiO <sub>2</sub> between 200---300); NIV alone or with PP may work in moderate cases (PaO <sub>2</sub> /FiO <sub>2</sub> between 100---200). Rotation and coupled (HFNC/NIV) strategy can be beneficial. A window of opportunity of 1--2 h is advised. If PaO <sub>2</sub> /FIO <sub>2</sub> significantly increases, Respiratory Rate decreases with a relatively low Exhaled Tidal Volume, the non-invasive	Although there is a role for non-invasive respiratory therapies in the context of COVID-19 ARF, more research is still needed to define the balance of benefits and risks to patients and HCW. Indirectly, non-invasive respiratory therapies may be of particular benefit in reducing the risks to healthcare workers by obviating the need for intubation, a potentially highly infectious procedure.



		strategy could be working and intubation delayed.	
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### **Discussion**

In their review article Mohamed and Alawna [7] showed that increasing the aerobic capacity is suggested because it has potential of educating immune and respiratory functions which would aid to counter COVID-19. Also, growing the aerobic capacity of people in the lockdown period is powerfully recommended to reduction risk factors of COVID-19 and advance the function of immunity and respiratory systems to let better body functions contrary to COVID-19. Thus, the presentation of a repetitive of 10-30 min of mild to moderate aerobic exercises should be tracked by all people in the lockdown or patients with minor pulmonary symptoms. Although, Thomas et al [15] in their article recommends for physiotherapy administration for COVID-19 in the acute hospital background includes: norms for physiotherapy workforce development and preparation, a screening tool for determining condition for physiotherapy, and approvals for the selection of physiotherapy treatments and personal protective equipment. Ambrosino et al [16] affirms that due to the increasing number of intensive care units' admissions and the global risk of complications and mortality over the following years, wide-ranging programs including physiotherapy should be applied to speed-up the patients' functional recovery and to prevent the difficulties of prolonged immobilisation especially in ventilator-dependent or difficult to discourage patients. To manage the multiple and complex problems of these patients, combined programs dealing with both whole-body physical therapy and pulmonary care are desired.

Yang et al [8] wrote that about his best knowledge, there is still neither a vaccine nor specific antiviral drugs to fight the COVID-19 infection, and present treatments mainly depend on therapy for symptoms. In comparison, one integrative therapy, Chinese herbal

medicine (CHM), is widely used in the treatment of COVID-19, and was shown to be quite effective in preliminary clinical practice. Thus, cancer patients diagnosed with mild or medium COVID-19 should be encouraged to receive CHM therapies. In addition, we should reinforce monitoring and give priority to the patients infected with COVID-19 with cancer during CHM treatment, especially the elderly and those with complications. With a practical viewpoint suggesting that patients with lung cancer undergo systematic testing for COVID-19 at the beginning of treatment and whenever it is deemed necessary by the treating physician in the course of therapy [16].

In geriatric rehabilitation units the physiotherapy after COVID-19 is similar to that provide for many patients' rehabilitation who have been affected by illness or injury. Sequelae associated with the viral illness and with a prolonged stay in the intensive unit, possibly including mechanical ventilation [9]. The pulmonologists and respiratory therapists, who have been engaged for years in the care of patients with disabilities secondary to respiratory diseases and/or conditions. Their experience acquired in the management of chronic and acute respiratory failure is proving to be a fundamental asset for the management of patients during the COVID-19 epidemic [18].

Bhutani et al [10] described a series of questions about acute and chronic management of Chronic Obstructive Pulmonary Disease (COPD) during the pandemic. They pointed the use of exercise/pulmonary rehabilitation as a tool for self-management of COVID-19 problems. In the other hand, Lee and co-workers [19], in a nationwide retrospective cohort study conducted in 4610 patients infected with COVID-19 between January and May, 2020, using data from the Ministry of Health and Welfare and Health Insurance Review and Assessment Service in Korea, concluded that relatively



greater proportions of patients with this disease received mechanical ventilation and intensive critical care, and COPD is an independent risk factor for all-cause mortality in virus patients.

The point of view of Gudi and Tiwari [11], the importance of saying “prevention is better than cure” and had psychologically prepared mankind to battle and combat this pandemic, it is essential. Weak points had also revealed in how we think about health and prepare for the disease. Coronavirus is also a chance to improve our facilities and health care infrastructure and, above all, to learn how to be more prepared for the next emergency crises [20]. Then, to give orientations for physiotherapists are very important on the adult acute hospital setting. These recommendations are in two sections: workforce planning and preparation, including screening to determine indications for physiotherapy, and mobilisation/rehabilitation as well as personal protective equipment requirements, recognising that physiotherapy practices vary across the world.

Ramalingam et al [12] showed in their pilot randomised controlled trial indicated that hypertonic saline nasal irrigation and gargling reduced the duration of coronavirus upper respiratory tract infection by an average of two-and-a-half days, consisting an effective and scalable intervention in those with COVID-19 following infection with the beta-coronavirus severe acute respiratory syndrome. Farrel et al [21] in their point of view confirmed the benefit of topical nasal saline and the evidence for both isotonic and hypertonic saline efficacy in vivo studies. Those solutions improve mucociliary clearance while also decreasing epithelial edema. The presence of those solutions could result in calcium efflux from epithelial cells, stimulating ciliary function and meliorates mucociliary clearance.

In their work Zhang et al [13] proposed a study protocol in what patients with mild pneumonia will be treated and given symptomatic supportive treatment. The intervention group will be instructed in performing Chinese exercise therapy that is widely used for the prevention and treatment of respiratory diseases as a complementary therapy. On the other hand, physical

exercise has shown to be an effective therapy for most of the chronic diseases with direct effects on both mental and physical health, and has been considered the real based on epidemiological evidence of its preventive/therapeutic benefits and considering the main biological mediators involved. Special attention is deserved for the elderly population group, because in older people physical activities and exercise impact the mentioned benefits on many diseases but also has additional effects on hallmarks of aging and associated diseases [22].

Winck and Ambrosino [14] concludes that there is a role for non-invasive respiratory therapies in the context of COVID-19 still is needed more research to define the balance of benefits and risks to patients. Indirectly, non-invasive respiratory therapies could be of particular benefit in reducing the risks to healthcare workers by obviating the need for intubation, a potentially highly infectious procedure. Nasal high flow, non-invasive ventilation, and invasive ventilation with intubation should be carried out in a stepwise treatment strategy, under appropriate intensive-care monitoring and with the observance of all relevant anti-infectious precautions [23].

#### **Conclusion**

This work pretended to present the scientific evidence around the World using the research material produced by scientific community worldwide about the use of respiratory therapy to treat the problems produced by COVID-19 as a way to inform all the importance of this pandemic disturb of respiratory health and to show the advances in physiotherapy and the perspectives for the future.

The final conclusion of this work is that the use of physiotherapy approaches will be essential to evolution of the clinical state of the patient and to give them better conditions to fight against this pandemic respiratory problem.

#### **Conflict of interests:**

Author declare that no conflict of interest there is in this work.

#### **Acknowledgments**

**International Academic Journal of Medical and Clinical Practice**

**An official Publication of Center for International Research Development**

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The author thanks to the *Universidade Federal do Rio Grande do Norte, UFRN*, and *Medical Imagen Service Clinic* to the support for this research.

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