

ANALYTICAL ANALYSIS OF EXPERIMENTAL RESEARCH FROM PUBLICATIONS ON THE MANAGEMENT OF PHYSIOTHERAPY IN THE CONTEXT OF THE COVID-19 PANDEMIC

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Abstract

The study presented is actually an observational research resulting from the analysis of numerous articles and online guidelines, as well as from personal practice in hospitals both in the United Kingdom and Romania, regarding innovative physiotherapy management as well as the types of treatments developed by multidisciplinary teams, with the input of physiotherapists, which have contributed to improving the necessary environment for the development of an appropriate rehabilitation program for patients affected by the SARS-CoV-2 virus, according to current international standards.

In this analysis, we focus on recently published experimental research that explores the impact of physiotherapy intervention on the pulmonary function and recovery process of severely affected patients, providing a critical view of the results obtained in different experimental studies.

The hypothesis of the observational research starts from the premise that following studies conducted in various medical facilities worldwide regarding COVID-19 infection, specific physiotherapy management applied to these patients is resorted to.

Keywords: COVID-19, management, physiotherapy, physiotherapist, respiratory function.

Introduction

The SARS-CoV-2 virus, known as COVID-19, has sparked a global pandemic, highlighted the vital importance of survival and thus several ideas were born that have led to the creation of appropriate timely therapeutic schemes for affected patients.

The pandemic caused by this virus continues to pose a challenge for the medical community, as highlighted by numerous research studies and publications in this context, such as an article from 2020 in the "International Journal of Science and Healthcare Research," where the authors provided a definition, describing it as a severe acute respiratory syndrome caused by coronavirus 2, transmitted from person to person via airborne, through respiratory secretions (Shamsi et. al., 2020). Guan et. al. (2020), mentioned in the same publication, highlights various types of symptoms experienced by affected individuals, including fever in 89% of cases, cough in 68%, extreme fatigue in 38%, abundant mucous secretions in 34%, and breathing difficulties in 19% (Shamsi et. al., 2020; Guan et. al., 2020).

Physiotherapy has been an essential part of therapeutic management and played a crucial role in improving respiratory function in these patients, as reported in the publication from September 2022, where a cross-sectional study investigated how physiotherapists managed COVID-19 patients in hospitals across various geographic areas during the pandemic. The study concluded that out of 204 participating physiotherapists, a proportion of 22.5% either lacked experience working in intensive care units or had no experience in the cardio-respiratory physiotherapy practice area. Results showed that almost all participants, 90%, were informed regarding specific physiotherapy guidelines for treating COVID-19 patients, according to the WHO, however, the majority of participants performed tasks outside their practice area, such as repositioning patients in various atypical positions through an adaptation of the Trendelenburg method, at a rate of 55%, as well as adjusting mechanical ventilator settings, at a rate of 53% (Trojman, 2023).

Objectives

We consider that an appropriate physiotherapy treatment applied to patients with COVID-19 should be evaluated and developed due to recent experimental studies on the symptoms caused by this virus, which through publications of research in this field, they provide information aimed at improving therapeutic recovery strategies, and publishing them in an organized and systematized way, they can become a model of physiotherapy management reference guidelines for this type of patients.

Methods and materials

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To develop these publications, search engines such as Google Scholar were used, accessing articles published in databases such as Pub Med, Scopus, PEDro, Web of Science, EBSCO, as well as direct sources with information recorded in the following guides in the field, WHO-13.03.2020, SCCM, ESICM-20.03.2020, ANZICS-16.03.2020, NICE- Guidelines 20.03.2020 (Bahmani, Mollashahi, Shakhkaram, Delavar & Esfahani, 2022).

This observational analysis includes articles related to COVID-19, specifying similar terms, where the field of physiotherapy (kinetotherapy), as defined in Romania, corresponds to the term "physiotherapy" in most global geographic areas.

Research Studies and COVID-19 Guidelines

We specify the fact that various research studies have analyzed the impact of the pandemic on medical management, including physiotherapy, and implicitly on patients with COVID-19, thus guidelines have been developed that provide essential recommendations for managing these patients, emphasizing the need for new therapeutic strategies that are personalized and adaptable according to the progression of the disease, a fact that has also been observed in our physiotherapeutic activity, on various clinical cases.

An initial version of such guideline emerged on March 23, 2020 (Thomas et. al., 2020), being approved by the WHO and the World Confederation for Physiotherapy and is available online. The recommendations highlighted the integration of physiotherapists into treatment protocols and the need for knowledge in treating patients with deficiencies and cardio-respiratory pathologies.

Another recommendation, inspired by another international guideline (ANZICS COVID-19 Guidelines, 2020), indicates that therapists working in intensive care units can support patients connected to mechanical ventilators by applying airway clearance techniques, this being recommended for cases where patients exhibit signs of inadequate airway clearance, and specific positioning and posturing were used for those with severe respiratory insufficiency associated with COVID-19 to optimize oxygenation.

Specific Physiotherapy Management for Patients with COVID-19

As a physiotherapist, I have examined online published articles to study the healthcare activities of physiotherapists in other countries, where various types of respiratory therapy management have been addressed, in order to establish specific treatments in the acute stages of patients presenting with symptoms associated with SARS-CoV-2 infection. These patients are prone to develop moderate and severe forms of the disease, often having other medical conditions such as cardiovascular, respiratory, oncological, renal, or metabolic disorders, as presented in the article titled "Physiotherapeutic management for patients with COVID-19," from 2021, where the term physiotherapeutic management was explained as the early rehabilitation of patients with COVID-19, determined by clinical assessment based on results obtained from biomedical engineering tools, supporting in the development of an optimal respiratory recovery program by the physiotherapist (Crăciun, 2021).

Also, in the article published by Crăciun (2021), the significant impact of physiotherapeutic management is introduced as being "elaborated through the efforts of a multidisciplinary team, including doctor, physiotherapist assistants, all with the same goal of ensuring that upon discharge from the hospital, the patient shows improved signs and symptoms, capable of continuing activities of daily living independently" (Crăciun, 2021).

An essential aspect is the adaptation of physiotherapeutic treatment according to the individual needs and overall health status of each patient. Internationally, COVID-19 deaths have a higher rate among older, male patients that presents multiple comorbidities (Graziano, Rezza & Brusaferrò, 2020).

On May 9, 2020, the publication titled "Rehabilitation Considerations During the COVID-19 Outbreak" was attached online, highlighting several key aspects about the role of rehabilitation in patients with severe COVID-19 symptoms. It has been recommended that severely ill COVID-19 patients who are intubated and connected to mechanical ventilators benefit from the involvement of rehabilitation professionals to provide interventions that help improve respiratory function. by clearing respiratory secretions through tracheostomy suction methods, vibration, and percussion techniques, as well as preventing aspiration pneumonia, especially post-extubation. contributing to more efficient airway maintenance and help avoid potential complications (PAHO, 2020).

Through the implementation of respiratory physiotherapy exercises according to the progression of the disease, we have observed that some patients with mild symptoms recover without difficulties, while others in critical stages may develop respiratory failure and require admission to intensive care units (PAHO, 2020).

Due to the complex cases of COVID-19 that medical professionals have faced during the pandemic, numerous shortcomings in healthcare systems worldwide have come to light, and thus, a review of the pulmonary rehabilitation program was necessary. Dixit S. and colleagues highlighted in their 2021 publication the fact that subjects who no longer had associated symptoms shortly after exposure still tested positive for the SARS-CoV-2 virus. Information in this regard had already been circulating, but it was found that a large portion of these individuals had low chances of transmitting the infection and were no longer contagious, thus, new prevention criteria, such as the incubation period, gave rise to new treatment schemes, taking into account both the time since exposure and the use of protective equipment (Dexit, Borghi-Silva & Chakravarthy Bairapareddy, 2021).

Special physiotherapy respiratory techniques and methods are frequently applied to patients with respiratory pathologies, such as assisted expiration, where the goal of this technique is to assist respiratory muscles that are unable to "generate sufficient increases in intra-abdominal and intrathoracic pressure to enhance the expiratory flow generated

during the cough maneuver" (Chatwin et. al., 2018). Manual techniques like percussion, vibrations, and chest shaking can be performed "using a hand, fingers, or a face mask and is well tolerated and widely used in infants, young children, and patients who cannot cooperate with therapy". In our personal practice, we predominantly resort to applying these techniques to patients in ICU settings, often in a comatose state. The same authors define chest vibrations as "a rapid extrathoracic force at the beginning of expiration, followed by oscillatory compressions until complete expiration" (Chatwin et. al., 2018).

We've noticed, based on multiple available evidence at the time of publication of an article in 2021, "Rehabilitation to enable recovery from COVID-19: a rapid systematic review," rapid systematic reviews have been conducted, indicating that patients with severe respiratory diseases, as well as various populations with respiratory problems, admitted for critical care, can obtain significant benefits through "progressive physical exercises, early mobilization, and multi-component programs to improve functional independence and walking. Qualitative evidence from those participating in these rehabilitation programs had led to the appreciation of the individualized approach and has brought hope and confidence in their recovery" (Goodwin et al., 2021). Subjects who participated in these rehabilitation and recovery programs highlighted the importance of an individualized physiotherapeutic approach and the positive impact brought by trust and motivation, which are essential components in their recovery process. The authors mentioned above also emphasize in the same publication that there is room for "improvement in the quality of research in this domain but there is a lack of evidence for effective interventions after discharge from the ICU. There is a lack of evidence specifically regarding the elderly and frail individuals" (Goodwin et al., 2021) when it comes to specific physiotherapeutic evaluations. We believe that further research is necessary to understand the rehabilitation needs of COVID-19 patients throughout the care process, aiming to develop and evaluate relevant interventions.

Implementation of protocols and guidelines for rehabilitation of patients with COVID-19

Rehabilitation management has become an outstanding component in the management of patients recovering from COVID-19. The rehabilitation protocol, according to the stability regulations specified in Order of the Ministry of Health, Labor and Social Protection of the Republic of Moldova no. 889, is adapted to the particular needs of the patient, with an emphasis on restoring respiratory function and recovery capabilities. It aims to standardize rehabilitation services for patients with COVID-19, describing in detail the rehabilitation management of these actions (National Guideline, 2020).

Discussions

We found that recent research evidence on physiotherapy management during the COVID-19 pandemic has provided pathways for the development of rapid reference guidelines.

The purpose of these guidelines is to support the management of patients infected with COVID-19 virus, recommending the inclusion of experienced and dedicated physiotherapists in respiratory physiotherapy within multidisciplinary teams, both in active hospital services and intensive care units. They are considered key elements of these teams.

In the publication "Physiotherapeutic management for patients with COVID-19" from 2021 (Crăciun, 2021), several inclusion criteria were suggested for the safe application of physiotherapy, whereby the patient presents an oxygen saturation increase in more than 60%, using oxygen therapy and presenting pulmonary secretions with difficulty in expectoration and inefficient expectorant coughing for clearing the airways.

The majority of trusts in Great Britain have integrated these criteria into their physiotherapeutic management, as evidenced by personal practical experience, and unofficially, in November 2020, Carda et al. developed a classification of different clinical characteristics in patients with COVID-19, presenting the most common forms of manifestation (Carda et. al., 2020):

- Mild form: absence of dyspnea, with oxygen saturation (SaO₂) not decreased;
- Moderate form: presents dyspnea, with oxygen saturation (SaO₂) ranging from 94% to 98%, and with radiological signs of pneumonia;
- Severe form: characterized by dyspnea, with oxygen saturation (SaO₂) ≤ 93%, respiratory rate (RR) > 30/min, and radiological progression of lesions may be observed, requiring supplemental oxygen support and potentially non-invasive ventilation;
- Critical form: patients require mechanical ventilation and intubation.

These investigations have generated recent research evidence that has been fundamental in the development of quick reference guidelines, recommended by physiotherapy specialists in cases of COVID-19, to optimize therapeutic treatment.

The Role of Multidisciplinary Teams

In the context of COVID-19, patient management requires an integrated approach. Multidisciplinary teams, including physiotherapists, doctors/physicians, nurses, and other specialties, collaborate to provide patients with comprehensive and tailored care. This collaboration enables an approach that addresses patient needs and improves therapeutic outcomes, providing the opportunity for all participating physiotherapists involved in treating these types of patients to expand their scope of practice and expertise.

Physiotherapy management categories are defined according to the functional status of hospitalized patients

Type A: Ventilated patients who are alert but unable to actively participate in rehab. The main goals of physiotherapy at this stage include promoting oxygenation through exercises and providing remote care in the ICU to prevent muscle weakness.

Type B: Patients who are ventilated and have minimal sedation, benefiting from an individualized treatment plan adapted to their level of consciousness and hemodynamic status.

Type C: Divided into subcategories (C.1, C.2, C.3) based on the level of consciousness and patient participation, physiotherapy sessions is adapted accordingly, including movement, breathing, and rehabilitation exercises tailored to the patient's individual potential and needs (Shamsi, Mugheeb, & Khan, 2020).

Conclusions: *The Essential Role of Physiotherapy in the Treatment of Patients with COVID-19*

In the context of the global pandemic of COVID-19, physiotherapy has become a vital component in the approach and management of patients affected by this virus. By using international guidelines and updated clinical practices, physiotherapists have adopted an essential role in the treatment of respiratory diseases caused by the SARS-CoV-2 virus. (Huang et. al., 2020).

Respiratory exercises and suitable physiotherapy according to the stage of the disease have demonstrated effectiveness in improving the respiratory capacity of patients with COVID-19. From patients with mild symptoms to those in critical stages, physiotherapeutic interventions have helped maintain optimal airway function, improve pulmonary function, and prevent complications such as respiratory failure in certain patients.

The diversity of physiotherapy management categories, adapted to the different stages and needs of patients, demonstrates the importance and effectiveness of the personalized approach. From ventilated patients to those who are conscious and mobile, physiotherapists have contributed to the development and implementation of individualized treatment plans aimed at improving respiratory function and facilitating recovery.

The implementation of an appropriate physiotherapeutic treatment, based on scientific protocols and adapted to the individual needs of patients, is a crucial step in their recovery and improvement of their quality of life.

Thus, physiotherapy within the management of COVID-19 patients is not only an essential aid in preventing disease progression but also an indispensable component in facilitating recovery and reintegrating patients into daily activities. The expertise of physiotherapists in physical therapy has demonstrated not only effectiveness but also the importance of this discipline in combating the effects of COVID-19 infection.

These guidelines also have limits due to the pathological evolution, as other different aspects may arise during treatment, such as different variants of the disease, which require monitoring of physiotherapy interventions by physiotherapists in the care of acute patients (Thomas et al., 2020).

This observational study highlights the importance of physiotherapists in managing the treatment of critically ill patients with COVID-19 in intensive care units and underscores the need for the development and consultation of a well-conceived guideline recommended in physiotherapy and "kinotherapy" management, specific to best practice proposed for the care of patients with acute respiratory manifestations, including those with COVID-19 symptoms. A guideline that can be considered a best practice support can guide practitioners in avoiding malpractice and promoting optimal and efficient recovery programs.

A significant importance allocated in the revised guidelines is to respect the protective measures aimed at preventing the risk of COVID-19 transmission (Zhu et. al., 2020).

We conclude that in many publications, as well as from personal practice, there has been a need to increase the workforce in the field of physiotherapy, with a particular emphasis on the essential formation of a larger number of experienced physiotherapists with training in cardiorespiratory physiotherapy, especially in intensive care units (ICUs), considered key elements of multidisciplinary teams in hospital services.

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