Importance of Physiotherapy in COVID-19: A Recommendation

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Abstract: Background: Coronavirus disease 2019, COVID-19-is the 3rd coronavirus infectious disease happening in 20 years was initially defined in Asia, later Middle East Respiratory Syndrome (MERS), & Severe Acute Respiratory Syndrome (SARS). COVID-19 illness expands globally, intensive care unit (ICU) specialists, health care management, authority, plan creators, and researchers need to brace for sudden increase of high volume in critical patients. Physiotherapists (PTs), mostly respiratory PTs, are healthcare specialists involved in managing and caring for the population of these patients, & play important part in conservative care and treatment, changes in posture, functional mobility and while invasive mechanical ventilator support is being weaned.

Objective: To determine the recent research evidences for the importance of physiotherapist during COVID-19 pandemic. Method: This recommendation includes all COVID-19 related articles to physiotherapy to provide the role of physiotherapy as evidence. Searching done by Google scholar, PEDro. We used terms like- COVID-19, Physiotherapy, Role of physiotherapy, and physiotherapy management. Conclusion: This recommendation to provide a quick respiratory physiotherapist reference guide to set up treatments for the management in acute stages of patients suffering from severe COVID-19.

Keywords: COVID-19, Physiotherapy, Physiotherapy Management.

Introduction
Coronavirus disease-(COVID-19), is a severe acute respiratory syndrome coronavirus-2, (SARS-CoV-2), is a new coronavirus that appeared in 2019 [1, 2]. SARS-CoV-2, is extremely infectious disease. It is different from previous respiratory virus in a manner that it seems to have approximately 2-10 days human to human transmission before a person is becoming symptomatic [2-4].

The transmission of virus occurs through respiratory discharges from one individual to another. A huge amount of droplets due to sneezing, coughing, or rhinorrhea fall on surfaces within 2 meters surrounding COVID positive patients. SARS-CoV-2, stay at least for 1 day on hard fomites and in soft fomites its stay up to 8 hours [5]. COVID-19 individuals may have influenza-like, respiratory tract infection symptoms such as pyrexia-89%, coughing-68%, extreme tiredness-38%, increased mucus-34% and shortness of breath (SOB)-19% [4].

In 2012 MERS-COV was first reported in Middle East and has plagued the Middle East since then [6]. 2494 lab-confirmed cases with 858 deaths in Jan 2020 are notified by World Health Organization-(WHO) [7]. In Wuhan city of Hubei State in China group of pneumonia cases were
stated in 2019 December end. This new coronavirus was linked to a wet seafood market, recognized as etiologic agent who is presently named as SARS-CoV-2 [8-9]. Up to-date, the virus has quickly spreading-at the time of writing this article-a total of 154,233 infected cases and 98,917 cases recovered with 1,230 deaths in kingdom of Saudi Arabia [10].

The Global Surveillance Interim guidance developed by WHO [11]. (1)-A person having severe acute respiratory infection symptoms like pyrexia and coughing who require to admit in the hospital, there is no other cause which completely describes the clinical symptoms along with travel history or stay in China for the period of 14 days before beginning of signs. (2)-A person having any acute respiratory infection with at-least one of given below for the duration of 14 days before occurring symptoms: (i) Contacted a positive or possible COVID-19 infected patient or (ii). Served or appeared in medical center where cases with positive or possible COVID-19 acute respiratory illness individuals were being treated. Suspicious person demarcated by Saudi Center for Disease Prevention and Control (SCDC) as follows [11].

A individual with acute respiratory illness (ARI) having pyrexia with coughing & SOB along with one of the succeeding: (i) Travel history to China within 14 days preceding to symptoms. (ii) A close bodily contact within 14 days with a COVID-19 positive patient. The novel COVID-19 guidelines document [12] developed by SCDC offers health care facilities a different visual triage for acute respiratory illness having a worksheet for admitting a case in isolation provisions scoring more than six, along with traveling history within 14 days before developing signs, which scores 5 points [13]. Amongst health-care workers, physical-therapists, especially respiratory therapists, are also playing an important role in managing and caring novel COVID-19 patients. They are involved in conservative care, posture correction, mobilization and while training to wean of from the weaning from invasive mechanical ventilator support [14].

Therefore, our aim is to provide worldwide evidence of physical-therapists involvement in managing COVID-19 infected patients. Viewing the intricacy and frailty of COVID-19 cases, it is recommended, when likely, to have as a task force, physiotherapists with expertise and/or dedicated training in Respiratory Physiotherapy (RT) [14].

Method
This recommendation includes all COVID-19 related articles to physiotherapy to provide the role of physiotherapy as evidence. Searching done by Google scholar, PEDro. We used terms like-COVID-19, Physiotherapy, Role of physiotherapy, and physiotherapy management.

Objective
The purpose of this article is to provide evidence to physical therapists and acute care health-care specialists regarding possible role of physical therapy in the managing suspects or infected COVID-19 cases admitted in the hospital. Physical therapists working in acute health-care facilities are expected to have an important part in the managing such cases. Physical therapy is a globally well-known and recognized occupation. Physical therapists are working in wards and ICUs of acute health-care centers. To be specific, chest physical therapy emphases in managing acute and chronic respiratory diseases, intending to enhance restoration of physical health after an acute disease. Physical therapy might be valuable in the respiratory management and physical recovery of COVID-19 cases [4].

Physical therapy might be applicable for COVID-19 patients presenting with profuse airway discharges which patients cannot clear individually. Patients having associated diseases (like neuromuscular disease, respiratory diseases, lung fibrosis etc.) leading to increased secretion or weak cough may also be benefited from physical therapy. Physical therapists working in ICU can help in clearing airways for patients who are ventilated and provide assistance in placing them in proper position [15].
Table 1. Physical therapy ideologies–Management, Mobilization and Exercise interventions

<table>
<thead>
<tr>
<th>Author</th>
<th>Study design</th>
<th>Result</th>
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| Peter Thomas, Claire Baldwin et al. 2020<sup>15</sup> | Clinical practice recommendations | PTs are responsible for the provision of musculo-skeletal, neuro-logical, and cardio-pulmonary treatment responsibilities as described below.  
✔ ROM exercises.  
✔ ROM, muscle strength and integrity of joint can be maintained or preserved by passive/ active-assisted/ active/ resisted ROM exercises.  
✔ Management with mobilization, including mobilizing in and out of the bed, sitting to standing, balance training in sitting and standing, gait training using tilt-table, hoists, upper and lower limb ergometer and exercise protocol. |
| Marta Lazzeri, Andrea Lanza et al. 2020<sup>14</sup> | Clinical practice recommendations | Physiotherapists are well trained to execute incredible commitment and willingness to deal with COVID 19. ARIR (Italian Association of Respiratory Therapists), in collaboration with AIFI (Italian Association of Physiotherapists), issued this document to provide a quick respiratory reference guide to set up treatments for the management in acute stages of patients suffering from severe COVID-19. The aim of this management is to decrease adverse effects in this patients’ population and maximally protecting healthcare professionals. |
| Ajimsha MS, et al. 2020<sup>16</sup> | Consensus-Based Recommendations | Physiotherapy treatment recommendations for COVID-19 infected patients established in Qatar includes combining of systematic evidences searched, followed by critically evaluating them. The approved recommendations were incorporated into physiotherapy management and care system. Such as recommendations on Physiotherapy appointment, evaluation and treatment classifications. It is proposed to be used by physiotherapists and other related settings |

Recommendations

Table 2. Physiotherapy employees’ arrangement and planning recommendations [15]

| 1 | Planning for increasing physiotherapy staff. For instance:  
✔ Allowing over-time for employees.  
✔ Offering employees to be able to withdraw their vacations optionally.  
✔ Recruiting additional employees.  
✔ Recruiting teachers and researchers, who are retire or presently employed as |
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| 1 | non-health workers.  
✓ Offering altered working period arrangements like-10-hours shift, evening extra shifts etc. |
| 2 | Identifying extra employees to be possibly utilized to COVID-19 zones, such as, unit for infectious diseases, ICU, high dependence ward, acute care units etc., prioritizing employees who have previously worked with such acute care units. |
| 3 | Physiotherapists should be expert in skills and knowledgeable in handling ICU patients. Physiotherapists who are experienced working in ICU should be recognized and utilized to coming back to ICU. |
| 4 | Hospitals should recognize physiotherapists who are not having current cardio-respiratory experience and bring them back to help in extra hospital services, like employee who don’t have ICU experience may assist in treatment, discharge summary etc. for those who are non-infected with COVID-19. |
| 5 | Persons with COVID-19 should be screened by employees having an excellent ICU physiotherapy experience. They can also be apportioned to other cases related to physiotherapy and supervising/supporting new ICU employees, mainly with policy-making for complicated COVID-19 cases. For implementation of such recommendations, hospitals need to recognize proper physiotherapy supervisors. |
| 6 | Identifying prevailing knowledge sources for employees who can be placed to ICU. For e.g.:  
✓ e-Learning bundles, such as- Services providing improvement in clinical ability, Critical-care management in physiotherapy.  
✓ Orienting native physiotherapy ICU employees.  
✓ Personal Protective Equipment training. |
| 7 | Informing employees about policies is important for delivering effective and harmless clinical facilities. |
| 8 | Do not allow following high-risk COVID-19 employees to work in quarantine unit.  
✓ Immunocompromised  
✓ Having major prolonged respiratory diseases  
✓ Having serious prolonged physical illnesses like-heart and lung-disease, DM  
✓ Pregnant  
✓ Over 60 years of age  
✓ Having immunity deficits, like- neutropenia, disseminated malignancy and disorders or therapy producing immunodeficiency. |
| 9 | Consider pandemic-specific requirements during making plans for employees like extra working hours from wearing or removing PPE. |
| 10 | Considering establishing the employees into groups who can take care of COVID-19 infected v/s non-infected. Reduce or avoid close contact of employee’s b/w groups. |
| 11 | Awareness of and obeying the related international, national, state or hospital based policies and procedures for infection control. Such as, WHO ‘Guidelines for prevention of infection and management control in case of new COVID-19 suspect. |
| 12 | Involve Snr.PT to determine the suitable physiotherapy protocols for COVID-19 infected or suspects by consulting with Snr. medical employee and agreeing to guidelines of referral. |
### Table 3- Assessment guidelines for physical therapy association with COVID-19 [15].

<table>
<thead>
<tr>
<th>Physical therapy management</th>
<th>COVID-19 person appearance (infected or suspects)</th>
<th>Physical therapy recommendation</th>
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<tbody>
<tr>
<td>Respiratory</td>
<td>Slight signs with insignificant respiratory involvement e.g. pyrexia, dry-cough, normal chest x-ray.</td>
<td>Chest Physical therapy is not required. Non-contact physical therapy.</td>
</tr>
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<td>Presentation of symptoms of Pneumonia: ✓ Requiring minimal O2 e.g. O2 flow less than 5 liters per min for SpO2 more than 90 percent. ✓ Dry cough ✓ Coughing and can clear secretions without help.</td>
<td>Chest Physiotherapy is not required. Non-contact physical therapy.</td>
</tr>
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<td>Slight signs of pneumonia with existing respiratory or neuro-muscular conditions e.g. cystic fibrosis, neuro-muscular illness, SCI, bronchiectasis, COPD, along with difficulty in clearing secretions</td>
<td>Referral for chest Physiotherapy to clear airways. Employee should follow airborne precautions. The patients should be wearing face mask during physiotherapy sessions.</td>
</tr>
<tr>
<td></td>
<td>Slight signs of pneumonia along with presence of exudation and consolidation with difficulty in clearing secretions without any assistance e.g. mild, unproductive and humid cough, tactile fremitus on percussion, wet audible sounds on auscultation.</td>
<td>Referral for chest Physiotherapy to clear airways. Employee should follow airborne precautions. The patients should be wearing face mask during physiotherapy sessions.</td>
</tr>
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<td>Serious signs of pneumonia or lower respiratory tract infection e.g. increased O2 supplies; pyrexia; SOB; repeated cough with sputum; changes in chest x-ray, CT scan and US along with presence of lung consolidation.</td>
<td>Referral for chest Physiotherapy to clear airways. Employee should follow airborne precautions. The patients should be wearing face mask during physiotherapy sessions. Recommending optimizing of early care and ICU involvement.</td>
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### Table 4. Suggestions with regard to PPE for physical therapists [15].

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<tr>
<td>1</td>
<td>Each employee should know how to put on and put off PPE in proper manner. Fit checking of N-95 mask should be mandatory. Maintain a register of employees those are trained in PPE use and completed fit checking.</td>
</tr>
<tr>
<td>2</td>
<td>Employees having beards instructed to clean shave for proper mask fitting.</td>
</tr>
<tr>
<td>3</td>
<td>Implement “droplet precautions” for on query or infected patients, employees should use PPE as mentioned below. ✓ Face mask ✓ Water proof gown with long sleeves</td>
</tr>
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During Physiotherapy Session [17]
- Wearing a face mask all the time.
- Always practicing hand cleanliness. Often using soap and water for washing and alcohol-based sanitizer (with at least 70% solution).
- Avoid contacting mouth, nose and eyes.

After Physiotherapy Session [17]
- Disinfect area and equipment used.
- Before every sitting clean hands with soap and water. Observe proper hand-washing techniques. Immediately bathe and soil clothes upon arriving home, especially if the patient/client has comorbidities that may be communicable.
- Make sure you provide a home exercise program in case you are unable to come back for future sessions for whatever reason.

Recommendations for patient on room air or with Ventilator [14]

Conventional Oxygen Therapy
It is not recommended to use nasal cannulas, which may cause a higher dispersion of droplets than other systems. Rather use mask with O2 up to five liters per min. or a reservoir Face-mask up to O2 10 liters per min or a Venturi mask with FiO2 up to 60%. It is also suggested to add surgical-mask which covers the patient’s face where more dispersion of droplets can be observed. It has to be correctly positioned and it has to be changed every 6-8 hours [18, 19].

High Flow Nasal Oxygen (HFNO)
The use of a flow of at least 50 liters per min and FiO2 up to 60% is suggested. The nasal cannula must be properly placed in the nose and a face-mask must be placed on the nasal cannulas covering patient’s mouth and nose as with the conventional oxygen therapy. The surgical mask should be changed at least every 6 to 8 hours [20]. For subjects who adopt an open-mouth breathing pattern, a non-vented non-invasive ventilation (NIV) mask having T-tube connection could be utilized in order to improve oxygen saturation (SpO2).

Continuous Positive Airway Pressure/ NIV
A single attempt of noninvasive support for a maximum duration of 1 hour to be made. If no substantial improvement is observed, notify the team and switch to appropriate (invasive ventilator) support [21].
Interface
To minimize the risk of nebulization of infected material, the safest interface is the helmet, which is relatively closed to the environment in comparison with a mask. Also, as the helmet acts as a reservoir, the addition of antiviral filters to the expiratory port in order to decrease the droplets may produce less resistance to the patient breathing effort in comparison to a mask. When using a face mask, the best choice is to join it with a double circuit having an expiratory valve. In the case there is need to combine a face mask with a single circuit, we suggest using a circuit equipped with combined exhalation port in place of vented masks. In addition, an antimicrobial and antiviral filter should always be installed [20].

Posture Changes
The posture assumed by the patients is crucial in this context. We recommend favoring an extended semi sitting or sitting position avoiding a slumped position. When possible and in close collaboration with the team, favor alternations of the lateral decubitus, consider whether the semi-prone or prone position might be indicated. It is necessary to minimize the patient effort even in maintaining postures. Hence, it is recommended to use cushions/aids that allow a stable position without active muscles work from the patient [21].

Procedures NOT to be applied in the Acute Phase
In the presence of acute respiratory failure that determines a reduction of lung compliance, the increase of respiratory breathing work and alteration of blood oxygenation leads to a rapid and shallow respiratory pattern [22]. This pattern is usually spontaneously adopted by the subject representing a strategy to minimize inspiratory effort and maximize mechanical efficiency of breathing. Furthermore, in such clinical conditions, the strength of the respiratory muscles can also be reduced. It is important that treatments and procedures used by physical therapists do not cause a further burden on the work of breathing, patient exposr to greater respiratory distress risk. Following physical therapy treatment methods are not recommended in acute phase for COVID-19 patients:

✓ Abdominal breathing exercises.
✓ Incentive spirometer.
✓ Pursed-lips breathing exercises.
✓ Manual mobilization/ rib cage stretching.
✓ Respiratory muscle training.
✓ Nasal cleaning.
✓ Mobilization during clinical instability like multidisciplinary assessment required.
✓ Exercise training.

Advice
In order not to increase the work of breathing, it is necessary to limit bronchial hygiene techniques to limited cases, always taking into strong consideration the risk of contamination of the environment and providing appropriate PPE for health personnel.

Conclusion
Individuals infected with Covid-19 requiring admission, presenting with viral pneumonia usually get complicated to ARDS. To deal with such situations, whole hospital wards are converted into Intensive Care Unit and High Dependency Units to accommodate patients who require ventilator support. Appropriately qualified employees are needed for efficiently managing such units. All healthcare workers have been reacting with incredible commitment and willingness and of course, physiotherapists are also being called to contribute. This recommendation to provide a quick respiratory physiotherapist reference guide to set up treatments for the management in acute stages of patients suffering from severe COVID-19. The primary aim of this management is to decrease adverse effects in this patients’ population, as well as maximally protecting health-care specialists.
Conflict of Interest
There is no conflict of interest stated.

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7. www.who.int/emergencies/mers-cov/en/


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