

Awareness about Respiratory Therapy and Prone Positioning Among Physiotherapists and Their Treatment Approaches for Covid-19 Pneumonia Patients

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Author's Contribution

¹⁻³Conception and design, Collection and assembly of data, ²⁻⁴Analysis and interpretation of the data, ³⁻²Critical revision of the article for important intellectual content, ¹⁻³Statistical expertise, ¹Final approval and guarantor of the article.

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A B S T R A C T

Objective: To find out the knowledge of physiotherapists about prone positioning and different respiratory therapy approaches and their application in patients with COVID-19 pneumonia infection.

Methodology: A Cross-sectional study was carried out with 104 physiotherapists from Karachi, Pakistan and the data was collected from August to October 2021. Only those physiotherapists included in the survey who were working in the COVID-19 intensive care unit. Due to the non-availability of the standard questionnaire, a pilot study was conducted before data collection with 6 physiotherapists who had more than 10 years of experience to check the validity of the questionnaire.; a self-designed questionnaire was structured. After that, an online survey was conducted. The data was analyzed by IBM SPSS version 21.

Results: With regards to ventilated patients, 100 (96%) physiotherapists were aware of prone positioning, 94 (90.4%) were familiar with percussion & vibration whereas only 20 (19.2%) were aware of ultra-shortwave therapy. The analysis of the treatment approaches favored by therapists showed that the frequently applied techniques were prone position 94 (90%) and percussions and vibrations 94 (90.4%) in the ventilated patients. In post-extubated patients, physiotherapists were aware of the application of breathing exercise 101 (97%) & incentive Spirometry 100 (96.2%).

Conclusion: It has been concluded that during the pandemic physiotherapist were aware of prone positioning and other respiratory therapy techniques like percussions and spirometry and applied them frequently. Further research is needed for determining what is best practice for this infected population.

Keywords: COVID-19, Respiratory Therapy, prone position, physical therapist, pneumonia

Introduction

COVID-19 had been a terrible pandemic that caused a significant fatality rate daily all across the planet. This lethal COVID-19 has transformed the proportions of the globe, and the issues that the world is confronting are numerous and diverse. COVID-19 is an infectious illness caused by the coronavirus, which is a crown-like enveloped non-segmented positive sense RNA virus that belongs to the huge Corona viridae family.^{1, 2, 3} On March 12, 2020, the World Health Organization labeled it a pandemic.¹ It was initially recorded in December 2019 in the Chinese province of Wuhan.² The first incidence of this was reported to WHO in Pakistan in February 2020. COVID-19 virus can be spread by direct touch as well as aerosol particles created when coughing or sneezing.^{4, 5, 6}

The gold standard for early identification of the COVID-19 virus is RT-PCR (real-time polymerase chain reaction), which detects the virus on respiratory samples.^{7, 8}

Fever, dry persistent cough, sore throat, shortness of breath, dyspnea, headache, weariness, and myalgia are the most prevalent symptoms of the condition.^{9, 10} The most frequent COVID-19 problems in critically sick patients include pneumonia, ARDS, sepsis, septic shock, thrombosis, and multiple organ failure.⁷ Physiotherapy, in parallel to pharmaceutical treatment, is critical in the management of COVID-19, and their combined action leads to faster recovery with better outcomes.² It is thought that pneumonia and

respiratory failure are frequently the causes of morbidity and mortality in COVID-19 patients; in such circumstances, respiratory physiotherapy combined with prone posture helps to reduce symptoms and, to some degree, reverses disease development. Physiotherapists frequently use respiratory treatments with prone positions with mechanically ventilated patients as well as pre and post-extubated patients.^{5, 11}

There is a high risk of ventilator-associated pneumonia in mechanically ventilated patients due to secretion sequestration because the patient is unable to generate a cough reflex, atelectasis due to low oxygen concentration in the basal lobe of the lungs, and other medical conditions caused by the ventilator.^{5, 12} As a result, respiratory physiotherapy techniques are utilized to minimize mechanical ventilation issues since they are particularly useful in treating many respiratory illnesses that are known to cause significant mortality and morbidity in ICU patients.^{2, 11, 13, 14}

Positioning Therapy (seated, semi-orthopneic, and prone), Lung Recruitment Maneuvers, Endotracheal Secretion Drainage, Vibration, Percussion, Postural Drainage Maneuvers, Positive Expiratory Pressure (PEP), Manual Hyperinflation, Ventilator Hyperinflation, Mechanical Insufflation-Exsufflation, Neuromuscular Electrical Stimulation, Ultra Shortwave Therapy (USWT).^{2, 11, 15, 16} These strategies should be used with mechanically ventilated as well as post-extubated COVID-19 pneumonia patients under a negative room pressure to limit aerosol production.^{11, 12}

The purpose of this study was to analyze the knowledge about respiratory therapy among physiotherapists who were treating Covid patients so that it may help novice physiotherapists in dealing with corona-positive patients. Further research is needed for determining what is best practice for this infected population.

Methodology

An online cross-sectional study was conducted with 104 physiotherapists in Karachi, Pakistan, using convenience sampling. The survey was conducted during the COVID-19 pandemic therefore due to the non-availability of the standard questionnaire; a self-designed questionnaire was structured. According to the inclusion and exclusion criteria, only physiotherapists who worked in COVID-19 critical care units and were willing to participate freely in the survey were included in the study. However, those who didn't treat COVID patients or had no ICU experience were excluded. To check the validity of the questions, a pilot study was conducted before data collection by selecting a small sample of 6 senior physiotherapists with experience >10 years to check the

validity of the questions, suggestions from the physiotherapists were considered, and modifications to the questionnaire were made. The questionnaire was created on Google Forms and sent to physiotherapists using online channels. The information was gathered for three months, from August to October 2021. The survey's questionnaire included demographic information, awareness of respiratory physiotherapy and prone positioning, treatment approaches in mechanically ventilated and post-extubated COVID-19 pneumonia patients, prone positioning in mechanically ventilated and post-extubation prone positioning (PEPP) in COVID-19 pneumonia patients, factors influencing the effective use of respiratory physiotherapy, duration and frequency of treatment, and other information. The Ethics Committee of Liaquat National School of Physiotherapy granted ethical approval. The purpose of the study was explained to all participants, and an informed consent form was included with the survey. All information given by participants was kept strictly confidential. IBM SPSS-Based License Version 21 was utilized for data analysis using descriptive statistics for frequency and percentage.

Results

The survey response rate was 104 (74%), with 64 (61.4%) female and 40 (38.5%) male participants from the public 44 (42.3%) and private 60 (57.6%) sectors in Karachi, Pakistan. The highest qualification of respondents was a master's degree (53%) followed by a bachelor's degree (49%) and the lowest was a Ph.D. (2%).

In terms of ventilated patients, all the physiotherapists were familiar with prone positioning 100 (96.2%). However, 94 (90.4%) supported percussion & vibration, while least were familiar with lung recruitment procedure 50 (48.1%) and ultrashort wave therapy 20 (19.2%). We also asked physiotherapists about the most effective and commonly used respiratory physiotherapy techniques for intubated patients with COVID-19 Pneumonia that they use in their clinical setting; the results of their responses revealed that the most effective and commonly used respiratory physiotherapy techniques were Prone Positioning 94 (90%), Percussion and Vibrations 94 (90%). The whole outcome regarding physiotherapist awareness and their treatment techniques for ventilated patients is shown in Table I.

In terms of respiratory therapy in post-extubated patients, 101 (97.1%) physiotherapists were aware of breathing exercises and 100 (96.2%) knew about incentive Spirometry, while 74 (71.2%) therapists had knowledge of PEP devices. The most common treatment approaches used by therapists were incentive Spirometry 100 (96.2%) and breathing exercises 94

(90.4%). The whole outcome regarding physiotherapist awareness and treatment techniques for post-extubated patients is shown in Tables II and III.

Table I: Respiratory techniques in mechanically ventilated Covid-19 patients.

Techniques	Number of physiotherapists being aware of techniques	Number of physiotherapists using treatment approaches
Prone Positioning	96.2% (100)	90% (94)
Percussion & Vibration	90.4% (94)	90.4% (94)
Open Suctioning	81.7% (85)	80% (84)
Close Suctioning	81.7% (85)	20% (20)
Manual Hyperinflation Technique	71.2% (74)	67% (70)
Ventilated Hyperinflation Techniques	57.7% (60)	48.1% (50)
Lung Recruitment Manoeuvre	48.1% (50)	43.3% (45)
Ultra-Shortwave Therapy	19.2% (20)	0% (0)

Table II: Respiratory techniques in post-extubated COVID-19 patients.

Techniques	Number of physiotherapists being aware of techniques	Number of physiotherapists applying these techniques
Breathing Exercise	97.1% (101)	90.4% (94)
Incentive Spirometry	96.2% (100)	96.2% (100)
Post-Extubation Proning	91% (95)	79.2% (82)
Respiratory Muscle Training	90.4% (94)	83.7% (87)
Stimulated cough	76.9% (80)	75% (78)
Manoeuvre		
PEP Devices	71.2% (74)	48.1% (50)

Table III: Breathing Exercises in Covid-19 post-extubated patients.

Breathing Exercises	Number of physiotherapists being aware of exercises	Number of physiotherapists applying exercises
Active Cycle Breathing Technique	96.2% (100)	96.2% (100)
Pursed Lip Breathing	96.2% (100)	96.2% (100)
Diaphragmatic Breathing	90.4% (94)	90.4% (94)
Autogenic Breathing	89.4% (93)	76.9% (80)
Stacked Breathing	76.9% (80)	71.2% (74)
Alternate Nostril Breathing	75% (78)	71.2% (74)
Segmental Breathing	71.2% (74)	67% (70)

Discussion

COVID-19 has grown into a lethal pandemic that has altered the landscape and presented obstacles to inpatient treatment. Physiotherapy is an important part of the patient's hospitalization and has shown encouraging outcomes with COVID-19 pneumonia patients¹³ The studies supported the application of physiotherapy management for improving lung

function, reducing the risk of ventilator-associated pneumonia, promoting weaning from mechanical ventilation, improving patient functional mobility, and promoting early hospital discharge.^{8, 12}

The findings of this study revealed that 90% of physiotherapists used Prone Positioning, Percussion, and Vibration in mechanically ventilated COVID-19 pneumonia patients, which supports WHO guidelines, while physiotherapists did not use Ultra Shortwave Therapy in comparison to the other respiratory physiotherapy techniques, despite evidence that ultra-shortwave therapy is effective in relieving chest pain, cyanosis, and dyspnea.¹² and can be used in COVID-19 pneumonia patients. According to the findings of this study, 80% of physiotherapists used open suctioning in their clinical practices, which is contrary to WHO recommendations. Close suctioning systems were advised by the recommendations to reduce aerosol formation and the risk of ventilator-associated pneumonia.¹¹ Similarly, ventilated hyperinflation techniques (VHT) are preferred over manual hyperinflation techniques (MHT) in COVID-19 patients because they prevent aerosol generation as the therapist will be in close contact with the patients^{11, 14,17}, which is the main concern in working with COVID-19 patients as an aerosol generation can increase the spread of the virus, but VHT is not a common practice of physiotherapists that were in the study.

The evidence demonstrated that PEP devices help clear secretions in post-extubated COVID-19 pneumonia¹², however, the results showed that 71% (n=74/104) physiotherapists were aware of PEP devices but did not use them in their practice. According to the respondents, the explanation for the poor utilization of this approach in comparison to other techniques was a lack of equipment. According to the suggestions and evidence, which also match the findings of this study, breathing exercises might provide promising effects in post-extubated patients.

Breathing exercises such as diaphragmatic breathing, pursed lip breathing, Alternate Nostril Breathing, Breath Stacking Exercise, and Deep Breathing^{2, 5,19, 20} be very effective, and alternate nostril breathing is regarded to be very helpful in promoting ventilation and overall mental health of the patients^{21, 23}, 71.2% (n=74/104) of the physiotherapists in this study were aware and using them.

Prone positioning is a notable therapeutic strategy in COVID-19 pneumonia patients, particularly those with ARDS in both mechanically ventilated and post-extubated patients.^{16, 18, 22} The physiotherapists in this study used prone positioning in mechanically ventilated COVID-19 patients and obtained promising results in treating ARDS. Prone positioning is also important in decreasing hypoxia, improving lung recruitment

and V/P ratio, improving PaO₂/FiO₂, reducing the chances of ventilated associated lung injury, and lowering the risk of mortality.² Respondents were also questioned about the time length for prone positioning, and their answers ranged from 12 to 16 hours per day, which is consistent with the findings concerning the effective time duration of prone positioning.² According to the findings of this study, 79% of physiotherapists used prone posture in post-extubated patients, which is extremely beneficial in reducing the risk of reintubation, enhancing lung elasticity, and clearing mucosal secretions, as indicated by previous studies.^{22, 24} The results of this survey can aid present and future physiotherapists with respiratory physiotherapy approaches and prone positioning in patients with covid pneumonia. This will also provide them dimensions to enhance quality in practices and improve health care.

There were some limitations while conducting the survey, as the approach of this survey was online, there was a high chance of biased and inaccurate responses by the respondents, the data was collected over a period of 3 months, so, due to the small sample size and time constraints, it was challenging to fully capture the treatment approaches of the physiotherapists related to COVID-19 pneumonia management, and the sampling was convenience, so there was a chance of segregation. Further experimental studies are necessary to completely examine physiotherapy techniques to find the best effective treatment plan in dealing with mechanically ventilated as well as post-extubated COVID-19 pneumonia patients in the future.

Conclusion

The purpose of this study was to analyze the awareness and treatment plans of physiotherapists in the management of patients with COVID-19 pneumonia. Based on the findings of this study, it is concluded that there was awareness of different respiratory physiotherapy techniques and prone positioning among the physiotherapists in this research; however, the physiotherapy treatment varies for mechanically ventilated and post-extubated patients with COVID-19 pneumonia.

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References

- Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *The Lancet*. 2020;395(10223):497-506.
- Shah SZA, Nasb M, Lu M, Huang L, Wang Y, Chen HJR, et al. Scaling the need, benefits, and risks associated with COVID-19 acute and postacute care rehabilitation: a review. *Rehabil Res Pract*. 2020;2020.
- Liu D, Liang J, Fung T. Human Coronavirus-229E,-OC43,-NL63, and-HKU1. Reference Module in Life Sciences. Elsevier Encyclopedia of Virology. B978-0-12-809633-8.21501-X; 2020.
- Francis AI, Ghany S, Gilkes T, Umakanthan SJPMJ. Review of COVID-19 vaccine subtypes, efficacy, and geographical distributions. *Postgrad Med J*. 2022; 98:389–394
- Thomas P, Baldwin C, Bissett B, Boden I, Gosselink R, Granger CL, et al. Physiotherapy management for COVID-19 in the acute hospital setting: clinical practice recommendations. *J Physiother*. 2020;66(2):73-82.
- Guo Y-R, Cao Q-D, Hong Z-S, Tan Y-Y, Chen S-D, Jin H-J, et al. The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak—an update on the status. *Mil Med Res*. 2020;7(1):1-10.
- Aytür YK, Köseoğlu BF, Taşkıran ÖÖ, Ordu-Gökkaya NK, Delialioğlu SÜ, Tur BS, et al. Pulmonary rehabilitation principles in SARS-COV-2 infection (COVID-19): A guideline for the acute and subacute rehabilitation. *Turk J Phys Med Rehabil*. 2020;66(2):104.
- Goudouris ESJJdp. Laboratory diagnosis of COVID-19. *J Pediatr (Rio J)*. 2021; 97:7-12.
- Borges do Nascimento IJ, Cacic N, Abdulazeem HM, von Groote TC, Jayarajah U, Weerasekara I, et al. Novel coronavirus infection (COVID-19) in humans: a scoping review and meta-analysis. *J. Clin. Med*. 2020;9(4):941.
- Gloeckl R, Leidl D, Jarosch I, Schneeberger T, Nell C, Stenzel N, et al. Benefits of pulmonary rehabilitation in COVID-19: a prospective observational cohort study. *ERJ Open Res*. 2021;7(2).
- Battaglini D, Robba C, Caiffa S, Ball L, Brunetti I, Loconte M, et al. Chest physiotherapy: An important adjuvant in critically ill mechanically ventilated patients with COVID-19. *Respir Physiol Neurobiol*. 2020;282:103529.
- Abdullahi AJFim. Safety and efficacy of chest physiotherapy in patients with COVID-19: a critical review. *Front Med (Lausanne)*. 2020:454.
- Righetti RF, Onoue MA, Politi FVA, Teixeira DT, Souza PNd, Kondo CS, et al. Physiotherapy care of patients with coronavirus disease 2019 (COVID-19)-a Brazilian experience. *Clinics (Sao Paulo)*. 2020;75.
- Pathmanathan N, Beaumont N, Gratrix AJCEiA, Critical Care, Pain. Respiratory physiotherapy in the critical care unit. *BJA Open*. 2015;15(1):20-5.
- Keenan JC, Formenti P, Marini JJJCoicc. Lung recruitment in acute respiratory distress syndrome: what is the best strategy? *Curr Opin Crit Care*. 2014;20(1):63-8.
- Ng JA, Miccile LA, Iracheta C, Berndt C, Detwiller M, Yuse C, et al. Prone positioning of patients with acute respiratory distress syndrome related to COVID-19: a rehabilitation-based prone team. *Phys Ther*. 2020;100(10):1737-45.
- Berney S, Haines K, Denehy LJcptj. Physiotherapy in critical care in Australia. *Cardiopulm Phys Ther J*. 2012;23(1):19.
- Ghelichkhani P, Esmaeili MJAOaem. Prone position in the management of COVID-19 patients; a commentary. *Arch Acad Emerg Med*. 2020;8(1).
- Shakerian N, Mofateh R, Rezaei N, Saghaizadeh A, Rezaei NJABMAP. Potential prophylactic and therapeutic effects of respiratory physiotherapy for COVID-19. *Acta Biomed*. 2021;92(1).

20. Zhu F, Zhang M, Gao M, Zeng C, Wang D, Hong Q, et al. Effects of respiratory rehabilitation on patients with novel coronavirus (COVID-19) pneumonia in the rehabilitation phase: protocol for a systematic review and meta-analysis. *BMJ Open*. 2020;10(7):e039771.
21. Eaton T, Young P, Zeng I, Kolbe JJCRD. A randomized evaluation of the acute efficacy, acceptability, and tolerability of Flutter and active cycle of breathing with and without postural drainage in non-cystic fibrosis bronchiectasis. *Chron Respir Dis*. 2007;4(1):23-30.
22. Karpov A, Mitra AR, Crowe S, Haljan GJCCR, Practice. Prone position after liberation from prolonged mechanical ventilation in COVID-19 respiratory failure. *Crit Care Res Pract*, 2020;2020.
23. Ernst E, JERJ. Breathing techniques--adjunctive treatment modalities for asthma? A systematic review. *Eur Respir J*. 2000;15(5):969-72.
24. van der Lee L, Hill AM, Patman SJJoEiCP. A survey of clinicians regarding respiratory physiotherapy intervention for intubated and mechanically ventilated patients with community-acquired pneumonia. What is current practice in Australian ICUs? *J Eval Clin Pract*. 2017;23(4):812-20.

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