



Shikha Sharma

Sitaram Bhartia Institute of Science and Research
India

Effect of Inspiratory Muscle Training on Cardiac Autonomic Function, Exercise Capacity, and Dyspnea in Individuals with Chronic Obstructive Pulmonary Disease: A Randomized Controlled Trial

Abstract:

Background: The American Thoracic Society (ATS) documented chronic obstructive pulmonary disease (COPD) as a preventable and treatable respiratory disease. Its prevalence has increased globally making it the third leading cause of death. According to a meta-analysis, there is a 6.5%–7.7% prevalence of COPD in India. Among non-pharmacological strategies, pulmonary rehabilitation (PR) is the most beneficial treatment strategy. Even after the proven efficacy of PR, it remains underused across the globe. In developed nations, the estimated availability of the program is around 50%. In India, it is even poor.

Purpose: The primary and secondary objectives are to study the added effect of IMT in PR on CAF, exercise capacity, and dyspnea respectively in individuals with COPD.

Methods: This study is a single-blinded, parallel, two-group RCT. A total of 36 participants with diagnosed COPD were recruited based on the inclusion criteria from the Public health-care institution in India. Participants were randomly allocated using the 1:1 allocation ratio to one of the two groups: The experimental group (Group A) and the Control group (Group B). Group A performed IMT via threshold resistance IMT device with resistance $\geq 30\%$ P_Imax and conventional PR. Group B performed IMT with resistance $< 10\%$ P_Imax and conventional PR. A total of 24 sessions were provided for participants in both groups.

Results: The IBM SPSS statistics software version 21.0 was used for the data analysis. The data of Groups A and B was found to be homogenous using the Shapiro-Wilk test. The between-group comparison was performed using the independent t-test. It showed statistically significant improvements by the change in LFnu, RMSSD parameters of HRV, and change in 6MWD. Furthermore, the within-group comparison was performed using a one-sample t-test to witness statistical changes in the transition dyspnea index post-intervention.

Conclusion: The study concluded that adding IMT to conventional PR is effective in improving CAF and exercise capacity in individuals with COPD. In addition to this, statistically significant improvement was observed for dyspnea in Groups A and B irrespective of the resistance provided for IMT keeping the frequency, duration, and type of exercises in the conventional PR similar for both groups. As the disease has profound effects on the recruitment of diaphragm

muscle, we would recommend using the IMT protocol within the evidence-based PR program to study its effect on dyspnea, CAF, and Quality of life with a short of 3 months and a long follow-up of at least 1 year.

Implications: The emergence of PR as a treatment is evident in the literature on COPD. The paradigm of PR has shifted from peripheral muscle training (PMT) only to combined PMT with IMT. Literature has heterogeneous findings on the effectiveness of combined training. Thus, our work shall add to the current evidence. The effect of IMT and PMT on HRV is shown in fewer studies. Whereas, the effect of the combination of IMT with PMT lacks enough literature. Our study aims to overcome this gap.

Biography

Shikha Sharma is an accomplished cardiorespiratory physiotherapist based in New Delhi, India, with a passion for advancing healthcare in the realm of chronic respiratory conditions. She completed her Master of Physiotherapy (MPT) with a specialization in cardiorespiratory physiotherapy in 2024. Her thesis, titled “Effect of Inspiratory Muscle Training on Exercise Capacity, Dyspnea, and Cardiac Autonomic Function in Individuals with COPD,” showcases her deep interest in Chronic Obstructive Pulmonary Disease (COPD), pulmonary rehabilitation, inspiratory muscle training, heart rate variability, and exercise prescription. Shikha’s academic journey has been marked by exceptional national and international achievements. She earned widespread recognition for her research presentations at the Rehabilitation Research Colloquium in McGill, Ontario, and various International Physiotherapy Conferences. With an unwavering commitment to furthering her expertise, she plans to pursue a Doctorate of Philosophy (Ph.D.) in the field of cardiorespiratory physiotherapy, with the goal of contributing to cutting-edge research and improved clinical practices for patients with chronic pulmonary conditions.