

Comparative Study on Buteyko Breathing Technique and Pranayama on Pulmonary Function and Quality of Life in COPD Individuals

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Abstract

Introduction: COPD is a preventable and treatable clinical condition. The aim of the study was to compare the effectiveness of buteyko breathing technique (BBT) and Pranayama on improving pulmonary function in quality of life among the COPD individuals along with conventional physiotherapy.

Methods: It was a prospective study conducted in the department of Physiology, Mallareddy womens Medical College. Individuals of both gender aged between 40 – 60 years medically stable COPD were included in this research. Study participants were divided into group A and B. Initially FEV1 and FVC were evaluated. Along the conventional physiotherapy, BBT was the option for group A and pranayama for group B for 5 days in week and continued for 6 weeks. At the time of the recruitment the study members were trained with the respective techniques. The time of the session was twice a day, at least 2 hrs before food. Techniques were carried as per guidelines. Finally the outcome was assessed with the help of pulmonary function test, FEV1 FVC ratio. The quality of life was assessed by 36-item short form; t test was used to find the statistical analysis. P<0.05 was considered to be statistically significant.

Results: Total 60 members were included; the Mean±SD values of FEV1/FVC for group A were 58.333±2.26242 and 75.367 ± 1.3472, respectively for pre and post-test; statistically there was significant difference (P = 0.000); whereas for group B, Mean±SD values were 57.267±1.7006 and 65.66 ± 4.0542 respectively for pre and post-test; statistically there was significant difference (P = 0.000). Statistically there was significant difference in SF36.

Conclusion: BBT as well as Pranayama relived the individuals from COPD symptoms; but superior results with BBT. Large samples with long term followup is recommended.

Keywords: Pranayama, COPD, Participants.

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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a treatable clinical condition, characterised by obstruction of air flow due to alveolar abnormality. [1] It is a global issue, disturb the exercise capacity and quality of life. [2] As per one of the reports by WHO, by 2030, COPD will kill > 3 million. [3] There is 6.5 to 7.5% is the prevalence in India and around 1.5 million new cases per annum. [4]

Expiratory flow limitation (EFL) is generally considered to be the pathophysiological hallmark of COPD. [4] Pulmonary rehabilitation, yoga and diet modifications have been incorporated in modern medicine to improve the quality of life among the COPD subjects. [5] At this point, physiotherapy place an important role.

Buteyko breathing is Russian technique practised to correct the hyperventilation in COPD. [6] whereas, Pranayama, part of yoga, help to improve the lung capacity, strength the internal organs and mental ability. [7] with this, a study was conducted to compare the effect of Buteyko breathing technique (BBT) and Pranayama on improving pulmonary function and quality of life among the COPD individuals.

Methods:

It was a prospective, comparative study conducted in the department of Physiology, Mallareddy womens Medical College. Study was conducted from June 2021 to 2022. Study protocol was approved by the Institutional Ethical Committee. Convenient sampling was considered in this research.

Individuals of both gender aged between 40 – 60 years medically stable COPD were included in this research. Individuals with mental disorders, hypertension and non-cooperative individuals were excluded from the study. Study participants were divided into group A and B. Initially FEV1 and FVC were evaluated. Along the

conventional physiotherapy, BBT was the treatment option for group A and pranayama for group B for 5 days in week and continued for 6 weeks. At the time of the recruitment the study members were trained with the respective techniques. [8] The time of the session was twice a day, at least 2 hrs before food. Both the techniques were carried as per the standard guidelines. [9, 10]

Percussion, Postural drainage, coughing active cycle of breathing technique are the airway clearance techniques used in conventional physiotherapy. Breathing techniques such as diaphragmatic breathing and post lip breathing were also practised. Finally the outcome was assessed with the help of pulmonary function test, FEV1/FVC ratio. The quality of life was assessed by 36-item short form health survey (sf36) was used.

Statistical analysis:

Data were analysed using SPSS version 22; t test was used to find the statistical analysis. $P < 0.05$ was considered to be statistically significant.

Results:

Total 60 members were included, 30 members in each group. The Mean \pm SD values of FEV1/FVC for group A were 58.333 ± 2.26242 and 75.367 ± 1.3472 , respectively for pre and post-test; statistically there was significant difference ($P = 0.000$); whereas for group B, Mean \pm SD values were 57.267 ± 1.7006 and 65.66 ± 4.0542 respectively for pre and post-test; statistically there was significant difference ($P = 0.000$).

When SF36 values were considered, the Mean \pm SD values for group A were 46.2 ± 5.1755 and 54 ± 4.1105 , respectively for pre and post-tests; statistically there was significant difference. For group B, the Mean \pm SD values were 45.333 ± 4.3338 and 51.7333 ± 4.1848 , respectively for pre and

post-tests; statistically there was significant difference.

Discussion:

Due to pulmonary dysfunction, there is significant changes in pulmonary function test (PFT). Breath holding exercise and breath control because of BTT. The main function of Butekyo theory is chronic hypoventilation which is the main reason for hypocapnea in blood which can influence the acid alkaline balance leads to bronchospasm and constriction of blood vessels. [9, 11, 12]

BTT group study members showed significant improvement in the FVE1/FVC ratio. The results of this research were similar to the study reported by Rakhi Sharma et al. [8] where the study participants practised the technique for 4 weeks. Where as in this research 6 weeks was the duration. The authors also reported that BTT is more effective compared to pursed lip technique and significant PFT improvement was reported.

Several studies have been proved the utility of Pranayama in health care sector. [13–15] The results of this research showed that there is significant improvement of FEV1/FVC values with Pranayama for 6 weeks duration; statistically also there was significant difference ($P < 0.000$). The reason for the improvement in post-test is due to alternate nostril breath and holding the breath following inhalation and exhalation. Any abnormality in respiration will trigger the minute ventilation, fall in CO_2 levels below the normal which leads to respiratory alkalosis. [16] It damages the respiratory mechanism also. The Nadisodhana Pranayama can correct this mechanism by reducing the respiratory rate by equalizing the flow of air through the nostrils, increase the capacity to withstand and endure CO_2 retention. [17]

The present study was conducted with the breathing techniques along with conventional chest physiotherapy to find the effect of supportive technique among

the COPD individuals; this found that there is improvement.

Conclusion:

BBT as well as Pranayama relived the individuals from COPD symptoms; but BBT showed superior results compared to Pranayama. Large samples with long term followup is recommended.

References:

1. https://goldcopd.org/wp-content/uploads/2017/11/GOLD-2018-v6.0-FINAL-revised-20-Nov_WMS.pdf
2. McKay AJ, Mahesh PA, Fordham JZ, Majeed A. Prevalence of COPD in India: a systematic review. *Prim Care Respir J.* 2012; 21(3):313-21.
3. Gudi N, Mahmood A, Roy MP, Ravishankar, Nayak P, Verma A. Burden of COPD among population above 30 years in India: protocol for a systematic review and proposed meta-analysis. *Can J Respir Ther.* 2021; 57: 14 – 17.
4. O'Donnell DE, Webb KA, Neder JA. Lung hyperinflation in COPD: applying physiology to clinical practice. *COPD Res Pract.* 2015; 1: 4.
5. Gupta A, Gupta R, Sood S, Arkham M. Pranayam for Treatment of Chronic Obstructive Pulmonary Disease: Results From a Randomized, Controlled Trial. *Integr Med (Encinitas).* 2014; 13(1): 26 – 31.
6. Sukhdev Singh, Vishaw Gaurav, Ved Parkash. Effects of a 6-week nadi-shodhana pranayama training on cardio-pulmonary parameters. *J Phy Educ and Spor Med.* 2011; 2: 44 – 7.
7. Kaminsky DA, Guntupalli KK, Lippmann J, Burns SM, Brock MA, Skelly J, DeSarno M, Pecott-Grimm H, Mohsin A, LaRock-McMahon C, Warren P, Whitney MC, Hanania NA. Effect of Yoga Breathing (Pranayama) on Exercise Tolerance in Patients with Chronic Obstructive Pulmonary Disease: A Randomized, Controlled

- Trial. *J Altern Complement Med.* 2017; 23(9): 696 – 704.
8. Rakhi Sharma, Niraj Kumar, Nishu Sharma. The study compare the effect of buteyko breathing technique and pursed lip breathing in COPD. *Phsiother. J.* 2019; 12: 103 – 13.
 9. Courtney R. Buteyko breathing method. *Recognizing and Treating Breathing Disorders E-Book.* 2014 Jan 1; 241.
 10. Courtney R. Strengths, weaknesses, and possibilities of the Buteyko breathing method. *Biofeedback.* 2008; 36(2):59-63.
 11. Arora RD, Subramanian VH. To study the effect of buteyko breathing technique in patients with obstructive airway disease. *Int J Health Sci Res.* 2019; 9(3): 50 – 64.
 12. Hassan EEM, Abusaad, FE, Mohammed BA. Effect of the Buteyko breathing technique on asthma severity control among school-age children. *Egypt J Bronchol.* 2022; 16: 45.
 13. Global strategy for the diagnosis, management and prevention of chronic obstructive pulmonary disease 2021 report
 14. COPD: breathing techniques Canadian lung association. <https://www.lung.ca/lung-health/lung-disease/chronic-obstructive-pulmonary-disease-copd>
 15. World health organization chronic obstructive pulmonary diseases COPD fact sheet. [https://www.who.int/news-room/fact-sheets/detail/chronic-obstructive-pulmonary-disease-\(copd\)](https://www.who.int/news-room/fact-sheets/detail/chronic-obstructive-pulmonary-disease-(copd))
 16. Ranjita R, Hankey A, Nagendra HR, Mohanty S. Yoga-based pulmonary rehabilitation for the management of dyspnea in coal miners with chronic obstructive pulmonary disease: a randomized controlled trial. *J Ayur Integrative Med.* 2016; 7(3): 158 – 66.
 17. Espinosa M. F. M., Erazo E. W. V., Villada N. Z., Sánchez D. A. G., García J. S. R., Peña C. A. E., Mejía A. O., Rey J. V., & Pertuz J. G. V. Treatment of Ventral Hernia Laparoscopic or Open Approach? *Journal of Medical Research and Health Sciences.* 2022; 5(4): 1876–1880.