



Effectiveness Active Cycle of Breathing Technique (ACBT) with Pursed Lips Breathing Technique (PLBT) to tripod position in increase oxygen saturation in patients with COPD, West Sumatera[☆]



Zuriati Zuriati^{a,*}, Melti Surya^b, Zahlimar^c

^a Binawan University Jakarta, Indonesia

^b STIKes Alifah Padang, Indonesia

^c Akper Setih Setio Muaro Bungo Jambi, Indonesia

Received 25 September 2019; accepted 11 November 2019

KEYWORDS

COPD;
Tripod position;
Active Cycle of Breathing;
Pursed lips breathing

Abstract Chronic Obstructive Pulmonary Disease (COPD) is a chronic lung disease characterized by obstruction or obstruction of airflow in a reversible or partial nonreversible airway. Dyspnea is a common symptom in COPD sufferers; this can cause problems with oxygen saturation, or the oxygen saturation value is below normal. Non-pharmacological actions given in the form of breathing exercises can be done by a nurse to help reduce shortness of breath in COPD patients. The exercise is given by adjusting the resting position that is comfortable and comfortable so that the extra breath muscles can work well. The position that can do the position of the tripod with Active Cycle of Breathing and Pursed lips are breathing so that shortness of breath is reduced and SaO₂ can have increased so that more oxygen has obtained in Lung Hospital, West Sumatra. This research is quantitative research, with quasi-experimental research methods. They used two pre-test-posttest design groups. The sample in this study amounted to 30 people with quota sampling technique. In this study showed that there was a difference in the increase in oxygen saturation of COPD patients which was effective in the tripod position group with Active Cycle Breathing Technique (ACBT) with a *p*-value of 0.00 while in the tripod position group with the Active Respiratory and Lip Cycle there was a difference of *p*-value 0.023. It has concluded that the tripod position with ACT and PBLT could increase oxygen saturation and nasal breathlessness reduced, but the tripod position with ACT is more effective

[☆] Peer-review under responsibility of the scientific committee of the 3rd International Conference on Healthcare and Allied Sciences (2019). Full-text and the content of it is under responsibility of authors of the article.

* Corresponding author.

E-mail address: zuriati3781@gmail.com (Z. Zuriati).

in COP patients because with chronic respiratory patients who are short of breath due to sputum buildup, then with ACT will clean the airway and the flow of the road effective breathing so that shortness of breath have reduced and oxygen saturation increases. Furthermore, it has recommended that in hospitals, especially nurses, in dealing with COPD patients in addition to the correct position of breathing exercises with ACT to help patients.

Published by Elsevier España, S.L.U.

Introduction

Chronic obstructive pulmonary disease (COPD) is a common disease that is both treatable and preventable.¹ It has characterized by progressive airflow limitation and hyperinflation, associated with shortness of breath or dyspnea and altered respiratory patterns, which become progressively worse and are the main cause of morbidity and mortality globally.²

COPD is a common pulmonary disease worldwide and is characterized by progressively persistent airflow limitation. COPD will be the seventh leading cause of disability-adjusted life years and the fourth leading cause of death in 2030. Daily symptoms such as chronic and progressive dyspnea, cough, and sputum production deserve the blame for the burden and lead to activity limitation and, ultimately, COPD patients' inability to work and take care of themselves. Some of these factors are amenable to exercise training incorporated as a major component of a pulmonary rehabilitation (PR) program.

If it involves extensive damage to the lung parenchyma, the client will usually experience shortness of breath, increased breath frequency, and using breathing muscles. Shortness of breath occurs due to conditions of imperfect lung development (atelectasis) where the affected part of the lung does not contain air or collapse, this can cause problems with oxygen saturation, or the oxygen saturation value is below normal.

Body and breathing positioning techniques are physiotherapy techniques commonly used to relieve dyspnea. Overcoming dyspnea is an important goal of COPD treatment, some conventional treatments that can be given such as bronchodilator therapy, exercise training, oxygen therapy, breathing control exercises, which are also applied to reduce the degree of dyspnea. Breath control is a term that covers all ranges for exercise, active expiration, slow and deep breaths, breathing while pursing lips techniques (PLBT), relaxation therapy, certain body positions, inspiring muscle exercises, and abdominal breathing.³

Handling of the airway cleansing and shortness of breath can have done by administering bronchodilators, supplemental oxygen pharmacologically while as a nurse providing a nursing intervention with non-pharmacology, one of the actions is by adjusting the position and breathing exercises. The exact position given to COPD patients is a tripod position with the addition of Active Cycle of Breathing Techniques (ACBT) and Pursed Lips Breathing Technique (PLBT) with this combination to overcome the airway clearance so that shortness of breath has reduced and oxygen saturation can increase can be increased with oxygen obtained more.

Method

This research is a quantitative study with a quasi-experimental design. Two experimental groups were classified; the first group used a tripod position with thrust lip breathing exercises and the two tripod position groups with an active breathing cycle, and then the authors conducted a pretest and posttest after the intervention given, this research conducted at the Lung Hospital in West Sumatra in 2019. The population in this study were all patients with accidental sampling COPD, totaling 30 respondents. Data collection have done through direct observation. The dependent variable in this study was an increase in oxygen saturation, and the independent variable was the position of a tripod with pursed lips and an active breathing cycle. Data analysis was carried out univariately in each variable and bivariate with a parametric paired *T*-test.

Result

Based on [Table 1](#), it has shown that mean score of pre-tests in *Tripod ACBT* group is 88.27 and post-test 90.13. The result of statistical test with *t*-independent test is $p = 0.000$ ($p > 0.05$), meaning that there is significant difference between Oxygen Saturation before treatment both in the *Tripod ACBT* group.

Discussion

The results of the study proved that there was a difference in the increase of SaO_2 between before and after the administration of the tripod position with the Active Cycle of Breathing Techniques (ACBT) p -value = 0.00 and the tripod position with the Pursed Lips Breathing Technique (PLBT) p -value 0.023. *T*-test results, which mean giving a tripod position with The Active Cycle of Breathing Techniques (ACBT) in COPD patients, can reduce tightness and increase oxygen saturation. Giving this intervention is carried out for three consecutive days with 5 min.

Based on research conducted (Zuriati & Suriya, 2018),⁴ The Effectiveness of Walking Exercise and Yoga Training Effect Comparison to Increase Expiration Peak Toward Sleep Quality for COPD. The results of the average difference between walking practice and Yoga treatment; it has known that Yoga training is more effective than walking exercise to improve the sleep quality of COPD patients.

Chronic obstructive pulmonary disease (COPD) is a common disease that is both treatable and preventable.¹ It has characterized by progressive airflow limitation and hyperinflation, associated with shortness of breath or dyspnea and

Table 1 Effectiveness Active Cycle of Breathing Technique (ACBT) with Pursed Lips Breathing Technique (PLBT) to tripod position in increase oxygen saturation in patients with COPD.

Group	Variable	N	Mean	Min-max	SD	t	p-value
Tripod ACBT	PreTest	15	88.27		1.223	6.088	0.000
	Post Test	13	90.13		1.125		
Tripod PLBT	PreTest	15	84.27		1.335	2.553	0.023
	Post Test	13	85.47		1.407		

altered respiratory patterns, which become progressively worse and are the main cause of morbidity and mortality globally.²

A technique for positioning the body and breathing is a physiotherapy technique commonly used to relieve dyspnea.⁵ Giving the tripod position in COPD patients will increase the diaphragm and external intercostal muscles in a position of approximately 45 degrees. The diaphragm is the main inspiration muscle, and the external intercostal muscle is also the inspiration muscle. The diaphragm muscle, which is at a 45-degree position, causes the earth's gravity force to work adequately on the main inspirational muscle, making it easier for the muscle to move downward, increasing the volume of the thoracic cavity by increasing its vertical length. The enlarged thoracic cavity causes pressure in the thoracic cavity to expand and forces the lungs to expand. An increased ventilation process in patients with shortness of breath that have positioned in a tripod will increase the release of carbon dioxide and increase oxygen intake into the intra-alveolar so that saturation in the body increases.⁶

Respiratory muscle training, especially Inspiratory Muscle Training (IMT), in patients with COPD induces an increase in inspiratory muscle strength and endurance, functional exercise capacity, dyspnea, and quality of life. As for breathing exercises with Pursed-lips breathing consists of a soft exhalation per-formed for 4–6 against the resistance of partially closed lips and clenched teeth. It is frequently adopted spontaneously and voluntarily by some subjects with COPD to control and relieve dyspnea and can be performed at rest or during exercise. Several studies have shown that the benefits of pursed-lips breathing in subjects with COPD include decreased breathing frequency and lung hyperinflation, improvements in the P_{CO_2} and oxygen in the blood, and increased tidal volume and oxygen saturation. However, dyspnea relief remains poorly consistent, because this response is different among subjects.⁷

Based on the results of the study with the title Breathing Exercise to Lung Capacity Improvement on Clients with Chronic Obstructive Pulmonary Disease, Obtained the results of the study aimed at the average value of lung capacity increases with the average difference before and after average practice 133.33 ml/min, and there are differences breathing value p -value (0.00) after 6 min of walking breathing exercise.⁸

Other breathing exercises is the Active Cycle of Breathing Techniques (ACBT) is one way to help you to clear sputum from your chest. ACBT is a set of breathing exercises that loosens and moves the sputum from your airways. It is best to be taught ACBT by a physiotherapist. The ACBT exercises are breathing control, deep breathing, and huffing, which are performed in a cycle until your chest feels

clear. People with lung problems often cough and produce more phlegm (*sputum*) than is usual. It is important to remove sputum from your lungs to help you breathe more easily, prevent chest infections and reduce bouts of coughing. Leaving sputum in your chest can make your condition worse.

Based on the results of research and theories that can have concluded can be drawn with patients with chronic lung disease with symptoms of shortness of breath due to one of them is the accumulation of secret so that the flow of air has obstructed so that oxygen reaches the alveoli a little. So this study will help patients to increase their oxygen saturation, which is characterized by reduced shortness of breath, and saturation can have increased so that it can have applied by giving a tripod position with The Active Cycle of Breathing Techniques (ACBT).

Based on the results of research and theories that can have concluded can have drawn with patients with chronic lung disease with symptoms of shortness of breath due to one of them is the accumulation of secret so that the flow of air has obstructed so that oxygen reaches the alveoli a little. So, this study will help patients to increase oxygen saturation, which is characterized by decreased shortness of breath, and saturation can have increased.

Conflict of interest

The authors declare no conflict of interest.

References

1. Global Strategy for Chronic Obstructive Lung Disease. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease (updated 2015); 2015. Available at: https://www.mscbs.gob.es/organizacion/sns/planCalidadSNS/pdf/GOLD_Report_2015_Apr2.pdf [accessed 26.10.19].
2. Varga J. Mechanisms to dyspnoea and dynamic hyperinflation related exercise intolerance in COPD. *Acta Physiol Hung*. 2015;102:163–75.
3. Gosselink R. Controlled breathing and dyspnea in patients with chronic obstructive pulmonary disease (COPD). *J Rehabil Res Dev*. 2003;40:25–33.
4. Zuriati, Suriya M, Yuanita A, Novrianti A. The effectiveness of walking exercise and yoga training effect comparison to increase expiration peak toward sleep quality for COPD (respiratory) patients in respiratory hospital West Sumatera. *Adv Sci Lett*. 2018;23:12613–5.
5. Morrow B, Brink J, Grace S, Pritchard L, Lupton-Smith A. The effect of positioning and diaphragmatic breathing exercises on

- respiratory muscle activity in people with chronic obstructive pulmonary disease. *S Afr J Physiother.* 2016;72:6.
6. Dwi I, Sri PK. Supriyadi. Perbedaan posisi tripod dan posisi semi fowler terhadap peningkatan saturasi oksigen pada pasien asma di rs paru Dr. Ario Wirawan Salatiga. *JIKK [Internet Series]*. 2015:10. Available at: <http://ejournal.stikestelogorejo.ac.id/index.php/ilmukeperawatan/article/viewFile/469/468> [accessed 26.10.19].
 7. Mendes LP, Moraes KS, Hoffman M, Vieira DS, Ribeiro-Samora GA, Lage SM, et al. Effects of diaphragmatic breathing with and without pursed-lips breathing in subjects with COPD. *Respir Care.* 2019;64:136–44.
 8. Zuriati MS. Latihan pernapasan terhadap peningkatan nilai kapasitas. *Paru pada Klien Penyakit Paru Obstruksi Kronik.* 2016;1:48–54.