

Active Cycle Of Breathing Technique (ACBT) Against Changes in Oxygen Saturation in COPD Patients

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Abstract

Background: COPD is a chronic obstructive disease that causes difficulty breathing, increasing in respiratory frequency. Patients with COPD often experience respiratory problems and this results in unstable oxygen saturation. To overcome this, independent nursing interventions can be carried out, including providing a combination of techniques, such as *Active Cycle Of Breathing Technique* (ACBT).

Aims: This is to know the influence of the active cycle of breathing technique (ACBT) on oxygen saturation in COPD patients.

Methods: This is *Pre Experiment* with an approach *Pre – Posttest*. The population in this study were all COPD patients at Wahidin Regional Hospital, Mojokerto City with a sampling technique using the technique. *purposive sampling* and there are 50 respondents. Data collection techniques by checking the value of oxygen saturation with a *Spirometry tool* before and after administering ACBT. Data analysis used the Paired T-test with SPSS.

Results: Using the Paired T-test, the value was obtained *p-value* of 0.000 with $\alpha = <0.005$ that the average value of oxygen saturation before ACBT was 93% and after it was 98%. This lies in the value of $0.000 < 0.05$. H_0 is rejected and H_1 is accepted, which means there is a technical influence. *Active Cycle Of Breathing Technique* (ACBT) with a strong relationship drag level indicated by the value *correlation coefficient* of 0.046.

Conclusion: The importance of implementing non-pharmacological therapy in COPD patients, one of which is ACBT as an effort to increase oxygen saturation in COPD patients.

Keywords: *Active Cycle Of Breathing Technique* (ACBT), Oxygen saturation, and COPD.

INTRODUCTION

The incidence of COPD is one of the threats that causes high mortality rates. COPD is a progressive disease that attacks the respiratory system. *World Health Organization* WHO (2016), states that COPD is the fourth leading cause of chronic morbidity and death in the United States, and is projected to rank fifth in 2020 as a burden of disease worldwide. It is estimated that 65 million people in the world suffer from moderate to severe COPD, of which more than 3 million people die from COPD, and it accounts for 6% of all causes of death.

COPD is an irreversible airway obstruction disease, consisting of chronic bronchitis and emphysema or a combination of both (V. D. Lestari, 2023). The cause could be due to cigarette smoke irritating the airway, causing hyperexcretion of mucus and inflammation so that the glands that excrete mucus and goblet cells increase in number, cilia function decreases and more mucus is produced so that the bronchioles become narrowed and blocked. Further bronchial narrowing occurs as a result of fibrotic changes that occur in the airways which then cause irreversible lung changes and

result in emphysema and bronchiectasis (Huriah & Wulandari, 2017a). In emphysema, several factors cause airway obstruction, namely inflammation and swelling of the bronchi, excessive mucus production, loss of elastic recoil of the airway and collapse of the bronchioles as well as redistribution of air to functioning alveoli (Mukhtar, 2017). One of the non-pharmacological services that can be provided to COPD patients is method *Active Cycle of Breathing Technique*. This method consists of three subtechniques which can be applied together or one by one and are able to clear the airway and increase oxygen saturation in the blood (Turwanto, 2020). The ACBT technique can clear the airways so that shortness of breath is reduced and breathing patterns improve, carried out with three exercises, namely, Breathing Control which can increase oxygen saturation, provide relaxation which can loosen the airways and be able to clear the airways so as to increase the patient's oxygen needs and reduce shortness of breath. breath (Senthil et al., 2015; Lewis et al., 2012). Research conducted by Huriah & Wulandari (2017) concluded that ACBT has an influence in cleaning sputum and expanding the thorax, and is able to increase oxygen levels in the body which has an impact on reducing symptoms of shortness of breath and making the patient's breathing pattern better. Breathing exercises in ACBT are able to train the flexibility of the respiratory muscles and improve respiratory ventilation, so that the performance of the respiratory muscles and correct decreased gas and oxygen exchange. Other research conducted by Safira & Nahdliyyah (2017) regarding ACBT in pulmonary TB patients found that giving ACBT can reduce shortness of breath, the benefits of the ACBT technique are that it can make breathing patterns better, calmer and reduce fatigue when breathing.

METHOD

The research method used is *pra experiment* with the one group pre-post test design method. Observations were carried out before (*pretest*) and after (*post-test*) respondents were given ACBT therapy. This research was conducted at Wahidin Regional Hospital, Mojokerto City with a sample size of 50 respondents taken using the technique *non probability sampling purposive sampling*. Data collection was carried out using oxygen saturation observation sheets, and analyzed using Paired T Test

RESULTS

1. Characteristics respondent based on age and gender.

Table 1 Frequency Distribution of Respondent Characteristics at Wahidin Hospital in May 2024

No	Age	n	%
1	26-45 th	39	78
2	46-65 th	11	22
	Total	50	100
No	Gender	n	%
1	Male	43	86
2	Female	7	14
	Total	50	100

Table 1 above shows the characteristics of respondents based on age, more than half of the respondents aged 26-45 years, namely 39 respondents (78%). The results showed that the characteristics of respondents based on gender were more than half of the male respondents, 43 respondents (86%). The smoking history results showed that almost all respondents smoked, 43 respondents (76%). The results of the analysis used the Paired T Test, this test was used because the pretest post-test SPO2 data was normally distributed, and this test was used to determine the effect of Active Cycle Of Breathing Technique (ACBT) on oxygen saturation (SPO2) in COPD patients

Table 2. The Influence of ACBT on Change Oxygen Saturation In COPD Patients

No	Oxygen Saturation	Mean	SD	P Value
1	Pre-Test	93,22	0,582	0,000
2	Post-Test	98,22	0,544	

Based on the results of statistical tests in table 2 above, the mean value before the intervention was given was 93.22 and increased to 98.52, and it is known that the p value was $0.000 < \alpha = 0.05$

DISCUSSION

Based on the results of this study, it shows that the largest gender was male at 867% and the largest age category was the early adult age group at 39%, and the Oxygen Saturation (SPO2) before being given the intervention was an average of 93.22 and experienced a change after being given the intervention to average 98.22.

The results of the analysis using the Paired T Test showed that the mean value before the intervention was given was 93.22 and increased to 98.22 and it is known that the p value is $0.000 < \alpha = 0.05$. Which means there is an influence of Active Cycle Of Breathing Technique (ACBT) on oxygen saturation (SPO2) of COPD patients. This research is in line with research conducted by Suryati, Primal, & Putri (2018) which states that there is an influence of Active Cycle Of Breathing Technique (ACBT) on the patient's breathing frequency and increasing oxygen levels in the blood or oxygen saturation.

Research conducted by Pratama (2021) stated that Active Cycle Of Breathing Technique (ACBT) therapy is effective in widening the chest cavity and reducing shortness of breath, clearing the airway, and increasing lung functional capacity in post-TB bronchiectasis patients so that it can increase oxygen levels or saturation. in

blood. In line with research by Pakpahan (2020) which stated that there was an effect of ACBT on patient oxygen saturation after being given the intervention, it was also supported by research by Lamuvel et al., (2016) which showed that there was an increase in patient oxygen saturation after being given intervention using the ACBT technique.

The results of research conducted by Derakhtanjani and Jaberi (2019) regarding the application of ACBT for 2 days in coronary bypass graft patients showed that the average pre-test oxygen saturation was 91.72, while the average post-test oxygen saturation was 95.59. The results of statistical tests can be concluded that there is a significant influence on the return of lung function (oxygen saturation) after coronary bypass graft ($p = 0.001$; $p < 0.05$).

According to Djamaludin (2021), after being given the Cycle of Breathing Technique, the patient felt that his shortness of breath began to decrease and he felt more relaxed with an oxygen saturation of 98%. This research is in line with Ardiansyah et al., (2021) who stated that the Active cycle of breathing technique can be used as a nursing intervention in the management of airway clearance, able to restore lung function and increase oxygen saturation in the body.

Non-pharmacological or therapeutic interventions that can be carried out include active cycle breathing techniques and lip breathing techniques. Active cycle of breathing technique training is one of the breathing exercises to control breathing to produce a calm and rhythmic breathing pattern so as to maintain the performance of the respiratory muscles and stimulate the release of sputum to open the airway, facilitate and increase the oxygen content in the blood. (Suryati et al., 2018).

According to (Dharmayanti et al., 2021) Pursued lips breathing produced after the Active cycle of breathing technique can improve oxygen gas exchange in the body. This improvement in oxygen gas exchange can be assessed by increasing and improving the oxygen saturation value in the body.

Because the Active cycle of breathing technique is a short-term airway clearance technique using forced expiration which includes breathing control, chest expansion exercises, and forced expiration by saying "huffing" (Ardiansyah et al., 2021). The forced expiratory or huffing phase in ACBT is in the form of dynamic compression and collapse of the air passage to the mouth from the same pressure point. This phase can help remove retained sputum and stimulate the cough reflex.

In a study, it was concluded that ACBT training really helped respondents to expel sputum that had accumulated and was sticky in the airways without causing discomfort in the chest or throat. (Huriah & Wulandari, 2017). Based on the discussion above, we can conclude that there is an increase in oxygen saturation in COPD patients because after being given Active cycle of breathing technique (ACBT) therapy the patient is able to control breathing and produce a calm and rhythmic breathing pattern, Active cycle of breathing technique therapy causes dilation. patient's chest cavity thereby reducing the occurrence of shortness of breath and increasing oxygen saturation in the body.

CONCLUSION

Based on the results of this study, it can be concluded that there is an influence of Active cycle of breathing technique (ACBT) therapy on the oxygen saturation (SPO₂) of COPD patients. The results of this research can be used as evaluation material for hospital management to add

ACBT as a non-pharmacological therapy for COPD patients

Conflict of Interest

In the preparation of research and publication of journals, there are no "conflicts of interest". Everything went well because of good collaboration between researchers and support providers, namely Bina Sehat PPNI University

Authors' Contribution (if any)

In this research, the main author acts as a correspondent who is responsible for the research process, from conception to publication by writing articles that have been adapted to journal guidelines. The main author also played a role in literature search, data analysis, translation and the research process, but in data collection the main author was assisted by a research assistant, namely one student

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realizes that in preparing this journal there are still many shortcomings, therefore the author hopes for corrections in the form of

constructive criticism and suggestions. The author hopes that this journal can be useful in making a contribution to nursing science.

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