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ORIGINAL RESEARCH **E-ISSN:**

THE EFFECT OF BREATHING EXERCISES: PURSED-LIPS BREATHING AND DIAPHRAGM BREATHING IN COPD PATIENTS

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ABSTRACT
Background: Chronic Obstructive Pulmonary Disease (COPD) is included in the four major non-communicable diseases that have a high mortality rate, which leads to high morbidity, lung disability and increased medical costs. Symptoms that appear in COPD patients are shortness of breath, coughing with or without phlegm, increased sputum production, and wheezing. An acute exacerbation of COPD event can be seen from the appearance of these symptoms repeatedly.
Objectives: This study aimed to examine the effect of breathing exercises: pursed-lips breathing and diaphragm breathing in reducing the attack frequency of acute exacerbation in COPD patients.
Methods: The method of this research was quasi-experimental: two-group, pretest-posttest design with sample size 16 (8 respondents in each group). Data was analyzed using Mann-Whitney test with significance $\alpha < 0.05$.
Results: Analysis results with Mann-Whitney test was $p = 0.00$ (< 0.05), which means there an effect of breathing exercises: pursed-lip breathing and diaphragm breathing on decrease the attacks in COPD patients.
Conclusion: Therefore, breathing exercise needs to be scheduled as therapy for COPD patients.

Key words: Breathing exercise, pursed-lips breathing, diaphragm breathing.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable, and treatable disease that has the characteristics of persistent respiratory symptoms and limited airflow, due to airway and alveolar abnormalities which are usually caused by exposure to gas or harmful particles (GOLD, 2017).

The prevalence of COPD is expected to increase due to an increase in the life expectancy of the world's population. According to WHO predictions, the COPD which is currently the fourth leading cause of death worldwide is estimated to be the third leading cause of death in the world by 2030 (WHO, 2012). Based on Riset Kesehatan Dasar (RISKESDAS) in 2013, the prevalence of COPD by 3.7%, the incidence of this disease increased with age and was higher in men (4.2%) compared to women (3.3%), and COPD ranked sixth out of ten causes of death in Indonesia. Based on number of COPD patients in Indonesia with a prevalence of 3.6%, the COPD patients in East Java province ranks fifteenth (RISKESDAS, 2013). Meanwhile, the number of COPD patients

in outpatient department in Rumah Sakit Paru Surabaya was 45 patients in January 2018.

The most common symptom in COPD patients is shortness of breath, coughing with phlegm or can also appear without phlegm, sputum production, wheezing and tightness in the chest, including decreased activity, fatigue, decreased weight, anorexia, etc. (GOLD, 2017).

Repeated attacks in patients with COPD can also reappear where it is the degree of frequency of recurrence of COPD symptoms as measured by various symptoms such as phlegm cough, shortness of breath (dyspnea), wheezing, and decreased activity in the form of how often these symptoms recur within weeks, months, and years (Dikrullah, 2013). Recurrent attacks in patients with COPD are mostly caused by failure of treatment programs, sufferers still smoking, the presence of excessive physical activity factors where patients often work hard, respiratory tract infections, allergen factors, pollution and exposure to cigarette smoke, and emotional stress factors (Dikrullah, 2013).

COPD management is by providing education as preventive and promotive effort, giving drugs, oxygen therapy, mechanical ventilation, and nutrition that can minimize the incidence of recurrent attacks of COPD patients. However, there is also proven management of medical rehabilitation or pulmonary rehabilitation from Randomized Controlled Trials (RCTS) on the benefits of pulmonary rehabilitation that can show improvement in shortness of breath, exercise capacity, quality of life and is an additional therapy for relieving symptoms of breathing exercises: pursed-lips breathing and diaphragm breathing (PDPI, 2011). Breathing exercises: pursed-lips breathing and diaphragm breathing are also part of nursing actions in their role as rehabilitators included in nursing treatment (Mangunnegoro, Amin, & Yunus, 2001).

Breathing exercises in patients with COPD are intended to improve respiratory function, also aimed at training patients to regulate breathing if they feel a sudden onset of shortness of breath, and can increase comfort. Therefore, we would like to conduct the research "The Effect of Breathing Exercises: Pursed-lips Breathing and Diaphragm Breathing in COPD Patients".

METHODS

Study Design

A quasi-experimental, two-group, pretest-posttest design was used.

Setting

This research was conducted in the outpatient department of Lung Hospital, Surabaya.

Research Subject

Population for this study was 45 COPD patients in outpatient department in Lung Hospital, Surabaya. Inclusion criteria were 40-75 years of age, lives around the hospital, and commit to receive the treatment. Exclusion criteria were having complications of COPD and received such this treatment before. Purposive sampling technique was used to selected participants. Sample size was 16 that divided to experimental group (8 respondents) and control group (8 respondents). Researchers collected data before and after intervention.

Instruments

The researchers collected first data using observations form that include characteristics and frequency of breathing pattern. The experiment group received breathing exercise: pursed-lip breathing and diaphragm breathing for 4 weeks from

the researchers as per the manual of breathing exercise, and the control group received regular program from hospital. The last data was collected at the fourth week using the observations form as same as the first one.

Data Analysis

Data was analyzed using the Mann-Whitney test with significance $\alpha < 0.05$.

Ethical Consideration

Data collection procedure were started with approved by the Institutional Review Board of Lung Hospital, Surabaya (No. 003/05/EC/KEPKRS/2018), and all participants signed consent forms indicating their willingness to participate in this study.

RESULTS

The experiment group had a greater reduction in attack frequency (mean pretest 7.88 and mean posttest 5.88) than the control group did (mean pretest 7.38 and mean posttest 7.88). The difference between the groups statistically significant $p = 0.00$ (<0.05) that there was effect of breathing exercises: pursed-lips breathing and diaphragm breathing on reducing the attack of frequency in COPD patients.

DISCUSSION

This study result on the experiment group (mean pretest 7.88 and mean posttest 5.88) consistent with some previous researches that breathing exercise significantly ($p = 0.00, < 0.05$) improves the breathing pattern of patients with COPD (Ellida, 2006; Widowati, 2010). The similar study conducted with COPD patients in Surakarta showed significant difference among the control group (mean 359.7 ± 75.53) and treatment group (mean 270.47 ± 57.69) (Widowati, 2010). The effectiveness of breathing exercise: pursed-lips breathing and diaphragm breathing indicated in increasing Peak Expiratory Flow Rate (PEFR) (mean 236.67), decreasing pulse (mean 64.00), decrease of respiratory rate (mean 21.56) and decreasing of subjective symptoms and the patients feel better (Ellida, 2006). Breathing exercise needs to be understood and applied especially to patients with respiratory problems. The absences of changes in conditions and reduction in symptoms in the control group (mean pretest 7.38 and mean posttest 7.88) due to some factors such as lack of knowledge regard to the breathing exercise, excessive physical activity, emotional stress factors, and treatment failure.

Pursed-lips breathing aims to increase end expiratory volume and increase final inspiration, and achieve more controlled and effective ventilation. Breathing exercise: pursed-lips breathing for COPD patients can stimulate a slow, better breathing pattern, and help control the respiratory rate in turn this positive effect is related to the technique of the ability to reduce channel narrowing air during recurrence of the disease (Muttaqin, 2014). Diaphragm breathing trains the main muscles of breathing that works during expiration, as the most important component of the respirator pump. The process helps to reduce the release of trapped air, and controls expiration on emptying of the alveoli with the result there is an increase in vital lung capacity (Dachman & Wilson, 2014). Pursed-lips breathing can be done and trained separately with diaphragm breathing, but the functions of both exercises can be used to help produce effective ventilation and respiratory control in order to improve quality of life by preventing acute exacerbations, relieving symptoms, and slowing the progressive deterioration of lung function (Singh & Singh, 2012).

CONCLUSION

Breathing exercises: pursed-lips and diaphragm breathing reduce the frequency of attacks in COPD patients, which can be seen from the decrease chronic cough, chronic phlegm, shortness of breath, and wheezing. During to routine check in outpatient department, this exercise could be taught as pulmonary rehabilitation treatment in order to patient be able to manage breathing properly and decrease the attack frequency of acute exacerbation.

SUGGESTION

Further research is needed regarding breathing exercise especially in relation to decreasing the frequency of attacks with the addition of various other symptoms and larger sample.

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