



EFFECT OF PURSED-LIP BREATHING EXERCISE TO REDUCE DYSPNEA IN PATIENT WITH ASTHMA BRONCHIAL: CASE STUDY

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ABSTRACT

Asthma causes chronic inflammatory disorders of the respiratory tract resulting in the narrowing of the airways so that asthmatics will complain, shortness of breath, heavy chest, and coughing, especially at night or early in the morning. One effort that can be done to overcome shortness of breath and improve oxygenation status is pursed-lip breathing which is a non-pharmacological therapy. This case study was conducted to analyze the application of pursed-lip breathing exercises to asthmatic patients who experience shortness of breath. This study used an evaluative design, namely a case study in asthmatic patients with shortness of breath. After observing the administration of pursed-lip breathing exercise for 3 days of treatment, there were changes in respiration rate, decreased breathing and shortness of breath. Pursed-lip breathing can reduce shortness of breath in asthma patients.

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1. INTRODUCTION

Breathing exercises benefit patients with several respiratory disorders, including adults with Asthma (Coulson, Carpenter, Georgia, & Baptist, 2022). Asthma is characterized by airway inflammation, which causes intermittent symptoms of wheezing, dyspnea, coughing, and deep chest tightness with expiratory airway obstruction (Enilari & Sinha, 2019). In asthma, the bronchial muscles experience hyperirritation, making people living with asthma susceptible to various external and endogenous trigger factors (Mims, 2015).

Asthma is not an infectious disease but is currently a primary chronic disease affecting 334 million people worldwide. Epidemics can occur in any age group, race or ethnicity; however, ethnicity and socioeconomic status influence asthma prevalence, morbidity, and mortality in the United States and various countries worldwide. Moreover, asthma is a significant burden at multiple countries' social, financial, and healthcare levels (Enilari & Sinha, 2019). In 2019, 262 million people with asthma and 455,000 died (WHO, 2022). data from the Ministry of Health for 2020, Asthma is one of the most common types of disease in Indonesian people, until the end of 2020, the number of asthma sufferers in Indonesia is 4.5 percent of the total population of Indonesia or as many as 12 million more (Ministry of health directorate general of health services, 2022).

People with untreated asthma can suffer from sleep disturbances, daytime fatigue, and poor concentration. If symptoms are severe, people with asthma may need emergency health care and be admitted to a hospital for treatment and observation. In the most severe cases, asthma can cause death (WHO, 2022).

Pharmacotherapy is still the mainstay of asthma treatment, but complementary and alternative medicine is still widely used in the treatment of asthma, especially in adults (Ward & Baptist, 2016). Several recent Cochrane reviews found evidence that breathing exercises can improve asthma control and quality of life (Yang et al., 2013);(Santino, 2020). Moreover, a small randomized trial in India showed significant improvement in lung function. After one 10-minute episode of dedicated breathing exercises (Raghavendra, Shetty, Shetty, Manjunath, & Saoji, 2016). Breathing exercise techniques such as pursed-lip breathing (PLB) have become part of pulmonary therapy for patients with COPD (Chronic Obstructive Pulmonary Disease) and asthma. Several studies have shown that breathing exercise reduces the intensity of asthma attacks, reduces drug use, increases physical activity, and improves the quality of life (Wu, Brigham, & McCormack, 2019). Previous research in the general adult population has shown that a program of achievable modified breathing exercises improves the subjective perception of asthma control. This exercise decreases rescue inhaler use and increases daily activity (Karam, Kaur, & Baptist, 2017).

PLB is one of the pulmonary education programs that can be taught to patients with Asthma(Soo Hoo, Roper, & Santiago, 20017); (Rossi et al., 2014) to improve respiratory efficiency and better manage dyspnea during activities of daily living. Respiratory muscles maintain adequate ventilation(Rossi et al., 2014). Purse-lip breathing is a technique that allows people to control their

oxygenation and ventilation. The technique requires a person to inspire through the nose and exhale through the mouth at a slow controlled flow. The expiratory phase of respiration will prolong when compared to the inspiration-to-expiration ratio in normal breathing. The maneuver presents as a controlled breath directed through the nostril, then exhalation directed through the lips making a puckered or pursed appearance. This technique creates back pressure producing a small opening of the airways during exhalation and increasing the excretion of volatile acids in the form of carbon dioxide, preventing or relieving hypercapnia. Through purse-lip breathing, people can get relief from shortness of breath, decrease the work of breathing, and improve gas exchange. They also regain control over their breathing while simultaneously increasing their relaxation (Nguyen & Duong, 2019).

The role of nurses in hospitals and communities can use breathing exercises and pulse lip breathing techniques to help calm patients with asthma to relieve their dyspnea. This method can help reduce the need for non-invasive mechanical ventilation. The nurse should teach PLB and explain to trainees when this technique will be helpful. The risks and benefits of this technique should be thoroughly explained, with all questions and concerns addressed. The nurse must be able to identify patients with respiratory problems—knowledge of common signs and symptoms of Asthma (Nguyen & Duong, 2019).

This study aimed to see the effect of breathing exercises and pursed-lip breathing on acute bronchial adult asthma patients.

2. METHOD

This research uses case studies with data analysis using descriptive analytics in asthma patients who experience shortness of breath. Written informed consent was obtained from the patient.

Patient Information

The research was conducted in 2022. Mrs. R is a 42-year-old woman, the patient has suffered from asthma since childhood, patients come to the clinic with complaints of shortness of breath, asthma often relapses when tired, cold, and has high activity and very cold weather.

Clinical Findings

Based on the study's results, the patient complained of shortness of breath which was felt continuously and got worse when the patient lay down or moved—Compos mentis patient awareness. The patient appeared weak and short of breath. The vital signs measured were blood pressure 120/80 mmHg, respiration 24x/minute, pulse 68x/minute, and temperature 36.5°C. Examination of the respiratory system revealed that the patient had wheezing breath sounds accompanied by a cough with phlegm.

Conjunctiva in anemic patients. The results of percussion found resonance sounds on the left and right chest. The therapy program given to patients included Combivent with nebulizers, 2 mg salbutamol.

Therapeutic/Nursing Intervention

The intervention given was the pursed-lip breathing exercise with the procedure; the first stage is the patient remains calm and comfortable, then position the patient sitting or lying down,

instruct the patient to close his eyes and concentrate fully, then ask the patient to breathe through the nose hold for 4 seconds, hold breath for 2-3 seconds then exhale for 8 seconds with pursed lips. This intervention was carried out for 3 days accompanied by researchers; The activity is carried out for approximately 30 minutes, starting with an explanation of pulse lip breathing, teaching patients and evaluation before pulse lip breathing and after pulse lip breathing by examining the respiration rate and examining breathing using spirometry (in L/minute).

Spirometry is a test to assess lung function. This examination assesses the amount of air that can be inhaled and exhaled by the lungs in milliliters, as well as the airflow of the lungs in milliliters per second. The examination is done by inhaling and exhaling through the mouthpiece.

Follow-up and Outcomes

Respiration rate and depth of respiration measurements were carried out before the PLB intervention was given. After 30 minutes of intervention, measures were retaken to evaluate the changes. The intervention will be stopped if the patient feels a change in a worse direction, such as feeling more congested and anxious.

3. RESULT

After the PLB exercise, there was a change in the respiration rate and the depth of breathing. The evaluation results obtained in patients after PLB were the patient's awareness of compos mentis, still using the respiratory auxiliary muscles. The patient's response to PLB is reduced shortness of breath and feels more comfortable.

Table 1. Observation of RR dan Breath Depth after Intervention Pursed-Lip Breathing Exercise

Days to	Before Pursed-Lip Breathing Exercise		After Pursed-Lip Breathing Exercise	
	RR/min	L/min	RR/min	L/min
1	24x	3,6	20x	6,1
2	24x	3,1	20x	5,2
3	24x	2,5	20x	4,8

Based on the table above, after being given the PLB intervention, the respiratory rate decreased to the normal limit for a decrease in breathing. From these results it can be concluded that nursing problems can be partially resolved, where the patient's response to the interventions given can overcome the symptoms that arise in asthma patients, namely shortness of breath. Shortness of breath felt by the patient is reduced.

4. DISCUSSION

People with Asthma experience chronic inflammatory disorders in the respiratory tract, which causes airways to become blocked and airflow obstructed due to bronchial constriction. Asthmatics often experience recurrent symptoms such as wheezing, shortness of breath, heavy chest, and coughing. Breathing exercises with the PLB technique help improve shortness of breath

and also help a person increase peak expiratory flow, reduce pain, and can lower blood pressure, can even provide a more relaxed feeling (Sulistiyawati & Cahyati, 2019)

In this study, the effect of PLB, carried out for 3 days to reduce dyspnea, was seen from changes in the respiration rate and the ability to take deeper breaths, calculated in liters/minute. The PLB procedure was found to be effective for patients with respiratory problems, especially asthma patients because doing pursed-lip breathing exercises can help induce slow breathing patterns, improve oxygen transport, can control breathing to train respiratory muscles, and help reduce attacks in asthma patients (Ferracini Cabral, Da Cunha D'Elia, De Sousa Marins, Araujo Zin, & Silva Guimarães, 2015), respiration rate decreases after exercise (Garrod, Dallimore, Cook, Davies, & Quade, 2005) normalizes respiratory frequency, heart rate, and peak expiratory flow rate (Ealias & Babu, 2016) reduces the volume of the chest wall (CW) compartment (Mayer, Karloh, dos Santos, de Araujo, & Gulart, 2018).

Changes in the pattern of chest wall muscle indrawing and increased ventilation, indrawing of the ribs and accessory muscles during inspiration and expiration, growing indrawing for the abdominal muscles during the end, decreasing the cycle of work of the inspiratory muscles and respiratory rate, and increasing SaO₂ (Hanafin., 2019) thereby increasing the ability to walking (Stähle & Larsen, 2018).

Pursed-lip breathing, performed during expiration against the pursed lips, can help increase tidal volume (VT), arterial oxygen level, arterial oxygen saturation, and arterial carbon dioxide levels. PLB also helps maintain positive pressure in the airways, keeping them open and increasing ventilation efficiency (Hanafin., 2019).

This breathing exercise is easy to do alone and anywhere for people with asthma because there are no complex or heavy movements, and it doesn't require a lot of money because this exercise can be done in 5 minutes or more. What is very clear is that PLB is easy to use, and no tools are required to practice. Lip breathing can be used every hour, on waking, and with every activity, including walking. Lip breathing can be incorporated into the patient's daily routine. Any dyspnea relief will strengthen its continued use (Soo Hoo et al., 20017).

5. CONCLUSION

The pursed-lip breathing technique effectively reduces shortness of breath in asthma, which is proven by increasing the respondent's expiratory ability.

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