

Pursed lips breathing on heart rate and breathing patterns in bronchial asthma patients

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ABSTRACT

Bronchial asthma is an inflammatory disease of the respiratory tract and disrupts air flow to the lungs. The aim of this study was to determine the effect of pursed lips breathing on the heart rate and breathing patterns of bronchial asthma patients. Pre-Experimental research design using a Pre-Test and Post-Test approach. The population of all bronchial asthma patients in the Cendana Room at Kediri District Hospital is 30 people, using the Accidental Sampling technique, a sample of 18 respondents was obtained. Statistical tests use the Paired Test. This independent variable is Pursed lips breathing therapy, while the dependent variable is the heart rate and breathing patterns of patients with bronchial asthma. The results of the study showed that there was a decrease in breathing frequency and heart rate in respondents after being given pursed lip breathing treatment. The statistical test results of the intervention on breathing patterns and heart rate showed a p value: 0.000, which means there was a significant influence between before and after treatment. After implementing pursed lips breathing, it was found that there was a decrease in breathing patterns and heart rate, this was due to an increase in lung volume capacity and strengthening of respiratory muscles.

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INTRODUCTION

Asthma is an inflammatory disease of the respiratory tract that involves inflammation of the respiratory tract and disrupts air flow (Price, Sylvia A; Wilson, 2012). Airway inflammation in asthma includes complex interactions of cells, mediators, cytokines and chemokines (muslina et al., 2022). Bronchial asthma occurs due to inflammation in the airways (bronchi). Inflammation of the bronchi eventually makes the respiratory tract swollen and very sensitive. As a result, the respiratory tract narrows so that air entering the lungs becomes limited. The impact of bronchial asthma can be detrimental for every sufferer, so it needs more appropriate management. Inflammation also causes cells in the respiratory tract to produce more mucus than usual.

Bronchial asthma makes sufferers have more sensitive respiratory tracts. Therefore, when the lungs are exposed to irritation from asthma triggers, the respiratory tract muscles become stiff and narrow (Smeltzer, Suzanne C; Bare, 2013).

According to WHO, the number of asthma sufferers in the world has reached 300 million people, and this figure is expected to continue to increase to 400 million by 2025 (Pollack et al., 2022). Asthma can kill 1000 people every day. The increasing prevalence of asthma throughout the world is related to poor indoor and outdoor air quality and changes in people's lifestyles (Made Michel Kresnayasa, 2021). The number of bronchial asthma patients in Indonesia in 2022, the number of bronchial asthma sufferers in Indonesia is almost 13.2 million people, of which around 23.75% are suffered by children aged 6-12 years, in 2020 the number of bronchial asthma sufferers in Indonesia is almost 17.5 million people, where around 20% are suffered by children aged 6-12 years (Ministry of Health of the Republic of Indonesia, 2022). There are 9 provinces with the highest asthma sufferers, namely, West Java in first place, East Java, Central Java, North Sumatra, Banten, DKI Jakarta, South Sulawesi, South Sumatra and East Nusa Tenggara (Badan Penelitian Dan Pengembangan Kesehatan Republik Indonesia, 2018). Kediri is one of the 10 districts/cities with the highest prevalence of asthma, namely 0.6% of sufferers (Ministry of Health, 2018). From data obtained in the Cendana Room at Kediri District Hospital, in 2022 there were 74 people suffering from asthma, in 2021 there were 68 people. The increase in the number of asthma patients in a year's period, from 68 patients to 74 patients, shows that the incidence of asthma is increasing and the need for self-therapy carried out by patients and their families while at home to prevent and reduce asthma attacks. Based on a preliminary study in July 2023 which was carried out on 3 asthma sufferers in the Cendana Room of RSUD Kediri Regency, the results showed that the patients complained of frequent shortness of breath and various coughs. In the first sufferer, when asthma appeared, the first thing to do to treat the asthma was to use an inhaler, if the patient doesn't have an inhaler, take special cough medicine for asthma, and apply ax oil or eucalyptus oil to speed up mucus expulsion. In the second patient, the treatment that was carried out when asthma appeared was to sit still, control his breathing and take the drug aminophylline. Meanwhile, in the third sufferer, asthma treatment is carried out by using an inhaler and administering fluids that warm the body, such as eucalyptus oil and "fresh care", which can also be another way to treat asthma that occurs in the third sufferer.

Treatment for asthma can be carried out both pharmacologically and non-pharmacologically (Harsismanto et al., 2021). Pharmacological management includes administering drugs, namely bronchodilators which are used to relieve symptoms due to narrowing of the respiratory tract, cromolyn which works by inhibiting mast cell degranulation in releasing histamine as a mediator of allergic diseases, ketolifene which functions to relieve allergic symptoms, and the corticosteroid hydrocortisone which functions to relieve inflammation (Arifin et al., 2022). non-pharmacological, namely Pursed Lip Breathing. The Pursed Lip Breathing technique is effective for patients with bronchial asthma so that people can reduce their consumption of pharmacological drugs such as anti-inflammatory drugs (bronchodilators). Pursed Lip Breathing exercises can be done 3 times a day. The purpose of Pursed lip breathing is to help clients improve oxygen transport, induce slow and deep breathing patterns, help patients to control breathing, prevent collapse and train expiratory muscles to prolong exhalation and increase airway pressure during expiration, and reduce the amount of air who are trapped, Pursed lip breathing technique can reduce drug use because it can help the respiratory muscles become stronger so that asthma symptoms decrease (Smeltzer and Bare, 2013). The aim of this study is to find out the effect of pursed lips breathing on the heart rate and breathing patterns of bronchial asthma patients in the Cendana Room at Kediri District Hospital in 2024.

RESEARCH METHOD

Pre-Experimental research design using a Pre-Test and Post-Test approach (Nursalam, 2015). The population of all bronchial asthma patients in the Cendana Room at the Kediri District Hospital was 30 people. Using an accidental sampling technique, a sample of 18 respondents was obtained. Statistical tests use Paired Tests. This independent variable is Pursed lips breathing therapy, while the dependent variable is the heart rate and breathing patterns of patients with bronchial asthma. To ensure the validity and reliability of the research, the researcher used an observation sheet to measure the respondents' breathing patterns and to measure heart rate using a digital sphygmomanometer. Pursed Lip Breathing therapy uses Standard Operating Procedures (SOP) as a guide so that each respondent gets the same treatment.

RESULTS AND DISCUSSION

Characteristics of Respondents It was found that the majority of respondents in this study were >35 years old, with 15 respondents (83.3%). The gender of the respondents in this study was 9 respondents (10%) male and 9 respondents (10%) female. The education of the respondents in this study was mostly high school with 10 respondents (55.6%). Almost all of the respondents in this study worked, namely 14 respondents (77.8%). And respondents in this study found that 9 respondents (10%) smoked and 9 respondents (10%) did not smoke.

Characteristics of respondents' breathing patterns:

Table 1. Frequency distribution of respondents' breathing patterns during pre and post test

| No | Breathing Pattern | Pre Test | | Post Test | |
|----|-------------------|-----------|----------------|-----------|----------------|
| | | Frequency | Percentage (%) | Frequency | Percentage (%) |
| 1 | Bradypnea | 0 | 0% | 0 | 0% |
| 2 | Normal | 0 | 0% | 2 | 11.1% |
| 3 | tachypnea | 18 | 100.0% | 16 | 88.9% |
| | Total | 18 | 100% | 18 | 100% |

Table 1 showed that all respondents' breathing patterns during the pre-test in this study were tachypnea of 18 respondents (100%), while during the post-test there was tachypnea of 16 respondents (88.9%). Characteristics of respondents' heart rate:

Table 2. Frequency distribution of respondents' heart rate during pre and post test

| No | Heart rate | Pre Test | | Post Test | |
|----|-------------|-----------|----------------|-----------|----------------|
| | | Frequency | Percentage (%) | Frequency | Percentage (%) |
| 1 | Bradycardia | 0 | 0% | 0 | 0% |
| 2 | Normal | 17 | 94.4% | 18 | 100% |
| 3 | Tachycardia | 1 | 5.6% | 0 | 0% |
| | Total | 18 | 100% | 18 | 100% |

From table 2, it showed that the majority of respondents' heart rates during the pre-test in this study were tachypnea, 17 respondents (94.4%), while during the post-test, all respondents' heart rates were normal, 18 respondents (100%). The statistical test results showed that purse lip breathing intervention on breathing patterns and heart rate showed a p value: 0.000, which means there was a significant effect between before and after treatment.

Discussions

Analyzing the effect of Pursed lips breathing on the breathing patterns of asthma patients:

The research results showed that all respondents' breathing patterns during the pre-test in this study were 18 respondents (100%) tachypnea, while 16 respondents (88.9%) found tachypnea during the post-test. This shows that there is a decrease in the respondent's breathing frequency as a result of the pursed lip breathing intervention. The statistical test results showed that the purse

lip breathing intervention on breathing patterns showed a p value: 0.000, which means there was a significant effect between before and after the intervention given to asthma patients.

Lip Breathing Exercises are an effective rehabilitation for relaxation and easy to practice, helping to balance vital blood gases and to relieve shortness of breath. The frequency of Pursed lips breathing intervention in COPD patients is 5 minutes, 3 times a day for 5 days (Abhirami & Jeyavantha Santha, 2020). Pursed Lip Breathing is a breathing exercise that aims to regulate breathing patterns, make them more efficient, and reduce shortness of breath. This therapy is non-invasive and can reduce respiratory frequency, increase oxygen levels in the blood, and improve respiratory muscle function. Apart from that, Pursed Lip Breathing also helps increase airway pressure when exhaling and reduces air buildup in the lungs (David & Vincent, 2018). Pursed lips breathing is a method used to breathe effectively and possibly obtain the oxygen needed. Pursed lips breathing exhales more slowly and makes it easier to breathe comfortably when resting or doing activities. Peak expiratory flow rate (PEF) or peak expiratory flow is the achievement of flow, the highest level of air during expiration as well as an illustration of changes in the size of the airway which is getting bigger (Suprayitno, 2018). Based on the research article (Dwi Ananto Wibrata et al., 2019), the results of literature research on the effect of Pursed Lip Breathing on COPD sufferers show that the Pursed Lip Breathing intervention shows an increase in peak expiratory flow and can stimulate a slower, better breathing pattern and help control the rate. respiratory tract with positive effects related to this technique's ability to reduce narrowing of the respiratory tract during disease recurrence. Results of research articles (Endrian et al., 2019). According to (Yuniarti, 2021) Pursed lips breathing exercise aims to provide subjective benefits for sufferers, namely reducing feelings of tightness and anxiety. The advantage of physiotherapy using the Pursed lips breathing technique is that it is an exercise that is easy for patients with shortness of breath to do, and has no side effects.

Pursed lip breathing exercises do not directly reduce residual functional capacity. According to (Budiman & Garnewi, 2021) Shortness of breath is a common complaint that often requires emergency treatment, however, its severity and extent can cause chest pain. Breathing exercises are a therapy to minimize and control shortness of breath in patients. According to (Rozi, 2019) one of the nursing interventions that can be applied to reduce breathing frequency in shortness of breath patients is the Pursed Lip Breathing exercise. The same research conducted by (Isnainy & Tias, 2020) stated that Pursed Lip Breathing is an effective nursing action in reducing respiratory frequency in patients. (Rosyadi et al., 2019) also stated that one of the procedures that can be done to treat patients with shortness of breath is Pursed Lip Breathing. This is in line with research conducted by (Milasari & Triana, 2021) where the application of Pursed Lip Breathing to COPD patients for 3 days was carried out 3 times a day, namely morning, afternoon and evening with the exercise repeated 4-5 times then taking a 1 minute break. then continued again to the next minute for 15 minutes and the results showed a change or decrease in respiratory frequency and an increase in oxygen saturation in the patient. The same research was carried out by (Ramadhani et al., 2022), namely that Pursed Lip Breathing was given to COPD patients for 3 days, given 3 times a day, namely in the morning, afternoon and evening with a duration of 15 minutes. Each time the procedure resulted in a decreased respiratory frequency.

Based on research results, theory and previous research, researchers assume that Pursed lips breathing is an effective method to use in training respiratory muscles and makes it possible to obtain the oxygen needed by the lungs. Applying Pursed Lip Breathing first observes the patient's general condition, breathing frequency and oxygen saturation and gives the patient a comfortable position. Next, Pursed Lip Breathing is carried out with one therapy carried out for 10 minutes in a row for up to three days, carried out 3 times a day, namely morning, afternoon and evening. After implementation, carry out an evaluation, including breathing frequency. This action is very good to do as a complementary therapy to medical treatment, so nurses must teach the patient and family so that the patient can continue to do it to increase the strength of the respiratory muscles.

Analyzing the effect of Pursed lips breathing on the heart rate of asthma patients: The research results showed that the majority of respondents' heart rates during the pre-test in this study were tachypnea, 17 respondents (94.4%), while during the post-test, all respondents' heart rates were normal, 18 respondents (100%). This shows a decrease in heart rate in respondents. The statistical test results showed that purse lip breathing intervention on heart rate showed a p value: 0.000, which means there was a significant effect between before and after the treatment of purse lip breathing therapy on heart rate.

An adult's heart rate ranges from 60 - 100 bpm, but the heart rate itself cannot be determined for each individual human being, this depends on physical activity, ambient air temperature, body position (sleeping/standing), age, emotions and medications. that is being consumed (Guna & Purwoko, 2020). Breathing exercises followed by effective coughing exercises. Coughing exercises that can be done are coughing and huffing, but based on the literature, huffing is preferred because it requires less energy expansion and prevents air trapping in the coughing technique. Breathing exercises are effective in increasing chest expansion, to reduce the work of breathing and increase the efficiency of respiratory ventilation. Providing massage therapy, chest mobility, deep breathing exercise and stretching to pleural effusion sufferers can improve lung function and reduce shortness of breath (Yokogawa et al., 2018). The results of the study (Ramos et al., 2009) showed a decrease in heart rate in patients after being given pursed lip breathing, namely the variation in HR between inspiration and expiration was 8.98 bpm, and the variation between HR at rest and HR with PLB was 8.25 bpm. These results are also in line with research (Sutrisno & Nursalam, 2022) showing that relaxation techniques are in principle to help reduce muscle tension so that the body becomes comfortable, relaxed, reduces the intensity of pain and stress, increases lung ventilation and increases blood oxygenation so that the heart's work decreases. The results of research by (Sakhaei et al., 2018) showed that the evaluation in the intervention group of COPD patients in the Peripheral Oxygen Saturation (SpO₂) index with an average difference of 2.05 percent, respiratory rate (RR) -0.65 minutes and heart rate (HR) -1.6 bpm was significant ($p \leq 0.05$), and the systolic blood pressure index in healthy subjects increased (3.35 mmHg). This shows that the use of Pursed-lips Breathing also has a significant effect on reducing heart rate.

Researchers are of the opinion that Pursed Lip Breathing is breathing that can increase oxygen saturation, reduce tachycardia and shortness of breath in patients who experience hypoxemia, tachycardia and shortness of breath, especially patients with bronchial asthma.

CONCLUSION

The results of the study showed that there was a decrease in respiratory frequency and heart rate in respondents after being given pursed lip breathing treatment. The heart rate of the respondents during the pre-test in this study was mostly tachypnea, 17 respondents (94.4%), while during the post-test, the heart rate of all respondents was normal, 18 respondents (100%). And the breathing pattern of respondents during the pre-test in this study was tachypnea as many as 18 respondents (100%), while during the post-test there was tachypnea as many as 16 respondents (88.9%). The statistical test results of the intervention on breathing patterns and heart rate showed a p value: 0.000, which means there was a significant influence between before and after treatment. The results of this study can be used as a reference and given to asthma patients so that the respiratory muscles become stronger so that asthma symptoms decrease more quickly and shorten the length of hospitalization for asthma patients. The decrease in respiratory rate and heart rate indicates that the patient's hemodynamic condition is improving because the symptoms of narrowing of the airways or asthma are reduced so that lung capacity increases and makes shortness of breath decrease and the patient's quality of life improves. This shows that the Pursed Lib Breathing technique is effective for use in reducing breathing frequency and heart rate in asthma patients.

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