



The influence of buteyko respiratory technique on the decreased degree of shortness in asthma patients in pulmonary poly

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Abstract

Asthma is a chronic inflammation of the airway. The breathing technique developed to control asthma is the Buteyko breathing technique. The purpose of this study was to analyze the effect of Buteyko's breathing technique on decreasing the degree of shortness in asthma patients. The design of this study was the Quasy Experiment. Respondents were 18 divided into control groups and treatment groups by the Consecutive Sampling technique. The independent variable was Buteyko's breathing technique. The dependent variable was the degree of shortness. Data was taken with practice every day for a week and observation sheets. Data were analyzed using the Wilcoxon Signed-Rank statistical test, Paired T-test, Mann Whitney, and Independent T-test. In the treatment group there were differences before and after the intervention in: respiratory frequency ($p = 0.000$), pulse ($p = 0.001$), and degree of shortness ($p = 0.014$), except for the use of respiratory muscles ($p = 1.000$). In the control group, differences were found, respiratory rate ($p = 0.002$), degree of difficulty ($p = 0.046$), except for pulses ($p = 0.908$), use of respiratory muscles (1.000). Independent T-test showed there were differences in respiratory rates (RR) ($p = 0.019$), pulse ($p = 0.001$) in the treatment or control group, while Mann Whitney showed no difference in the degree of shortness ($p = 0.011$) and there was no difference in the use of breathing muscles ($p = 1.000$). The results showed that there was an influence of Buteyko's breathing technique on decreasing the degree of shortness in asthma.

Keywords: asthma, buteyko breathing technique, degree of tightness

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INTRODUCTION

Asthma is a common chronic disease and has the potential to become a serious illness that causes a great burden on patients' families and communities and causes symptoms of the respiratory system, limited activity, and attacks that sometimes require immediate action and maybe fatal (Lumbanraja, 2017; Hassanpour et al., 2019; Nursalam, Hidayati, & Sari, 2017; Reddel et al., 2015; Sims et al., 2020). The main problem in asthma sufferers who are often complained of is shortness of breath. Shortness of breath is caused by narrowing of the airways that occurs due to hyperactivity (Samsuardi, 2012; Wahyuni et al., 2018). The first treatment for shortness of asthma in the hospital is the administration of oxygen, which is then continued with the release of lozenges (Bateman et al., 2008). In this case, drug administration to patients includes the collaborative actions of nurses and doctors (Wahyuni et al., 2018). An independent intervention that nurses can provide in the case of asthma is to teach patients the correct breathing techniques (Bulecheck et al., 2013).

Asthma data acquisition is included in the top five major lung diseases responsible for 17.4 deaths in the world. The results of research in several major cities in Indonesia showed that the prevalence of asthma ranged from 3.8% to 6.9% among the population. The results of the study reported that asthma patients who went to a general practitioner were 73.4% moderate asthma and 9.3% severe asthma (Rahajoe, 2008). Hospital Information System (SIRS) in Indonesia records that the death rate due to asthma is 63,584 people (Depkes, 2014). Baseline Health Research data in 2013 stated that asthma sufferers in East Java were 5.1%. World Health Organization (WHO) data in 2006 stated that there were 300 million people in the world who suffer from asthma, and 225 thousand asthma sufferers died. Eighty percent of asthma is found in developing countries due to poverty, lack of levels of education, knowledge, and health facilities, if this is not well

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Table 1. Results of observations of respondents in the treatment and control groups on the amount of respiratory rate in asthma patients

No Respondent	Treatment			RR category	Control			RR category
	Pretest	Posttest			Pretest	Posttest		
1	25	19	-6	Mild	26	20	-6	Moderate
2	23	22	-1	Moderate	25	24	-1	Moderate
3	23	18	-5	Mild	25	23	-2	Moderate
4	24	21	-3	Moderate	24	22	-2	Moderate
5	23	22	-1	Moderate	25	21	-4	Moderate
6	22	19	-3	Mild	24	24	0	Moderate
7	25	19	-6	Mild	23	20	-3	Moderate
8	23	18	-5	Mild	24	21	-3	Moderate
9	25	22	-3	Moderate	26	24	-2	Moderate
Elementary school	1,118	1,732			1,000	1,691		
Mean	23.67	20.00			24.67	22.11		
Paired T-Test	p = 0.000				p = 0.002			
Independent T-Test	post-pre			p = 0.019				

controlled the death rate from asthma can increase by as much as 20% for the next ten years (Kemenkes, 2013; Baba, et al, 2015).

Asthma is an airway disease characterized by a narrowing of the bronchi caused by direct or indirect stimulation, causing difficulty in breathing. Asthma is caused by a causative factor, including allergens, pollution, respiratory infections, weather changes, and excessive activity (Samsuardi, 2012; Surachmanto et al., 2018). The duration of treatment will also occur if complications occur. One of the complications that may arise in asthma patients is the status of asthmatics, which is a prolonged state of bronchial spasm that is life-threatening (Yan, 2020). If it continues without proper treatment, it can cause pneumothorax and progress to respiratory acidosis, respiratory failure, and death (Corwin, 2009).

Treatment for asthma is divided into two kinds, namely pharmacological and nonpharmacological (Syamsu et al., 2007). Forms of nonpharmacological treatment are complementary medicine, which includes breathing techniques, acupuncture, exercise therapy, psychological therapies, manual therapies (Beilby et al., 2006). One of the breathing techniques exercises is Buteyko, which, if done regularly, will improve the bad respiratory system in people with asthma so that it will reduce asthma symptoms (Kolb, 2009). Throughout April 2012, data from RCTs mentioned that Buteyko's breathing could improve asthma symptoms (Global Initiative for Asthma, 2014). The principle of this Buteyko breathing technique exercise is shallow breathing techniques (Yawn et al., 2005). Buteyko breathing technique also helps to balance carbon dioxide levels in the blood. Oxygenation is smooth and can reduce hypoxia, hyperventilation, and apnea during sleep in asthmatic patients (Murphy, 2012). Research conducted by Agustini et al. in 2007 states that Buteyko's breathing technique is believed to reduce the number of attacks, the use of bronchodilators, and the use of steroids to a minimum (Agustini et al., 2007). With the background, the researcher wants to examine the effect of Buteyko's breathing technique on the decrease

in the degree of tightness in asthma patients in Lung Polyclinic.

MATERIALS AND METHODS

This study's design was the Quasy Experiment (pre and post control of one group design). Respondents were 18 divided into control groups and treatment groups by the Consecutive Sampling technique. The independent variable was Buteyko's breathing technique. The dependent variable was the degree of tightness (Respiratory Rate/RR, pulse, use of breathing muscles, and degree of tightness). Data were taken with practice every day for a week and observation sheets (Haseeb & Azam, 2020). Data were analyzed using the Wilcoxon Signed-Rank statistical test, Paired T-test and with a significant $\alpha < 0.05$ and also Mann Whitney, Independent T-test with a significance of $\alpha < 0.05$.

RESULTS

Table 1 explains that there were differences in the treatment group before and after Buteyko's breathing training. The results of the Independent T-test statistical test obtained a value of $p = 0.019$ so that $p < 0.05$ means that there was a significant difference in the amount of Respiratory Rate between the treatment and control groups after Buteyko's breathing technique intervention was given.

Table 2 explains that the results of the Paired T-test in the treatment group obtained the value of $p = 0.001$ so that $p < 0.05$ means that there are significant differences in the number of pulse frequencies at pretest and posttest. While in the control group, the results obtained are $p = 0.908$, so that $p > 0.05$ means that there is no significant difference in the number of pulse frequencies at pretest and posttest. The results of the Independent T-test statistic showed that there was a significant difference in the number of pulses between the treatment group and the control group after Buteyko's breathing technique intervention was given.

Table 2. Results of observations of the treatment and control group respondents on the pulse rate in asthma patients

No Respondent	Treatment		Pulse Category	Control		Pulse category		
	Pretest	Posttest		Pretest	Posttest			
1	99	81	-8	Mild	105	101	-4	Moderate
2	96	92	-4	Mild	105	103	-2	Moderate
3	88	82	-6	Mild	96	98	+2	Moderate
4	92	88	-4	Mild	95	94	-1	Mild
5	102	88	-14	Mild	88	92	+4	Mild
6	107	95	-12	Mild	95	98	+3	Mild
7	105	91	-14	Mild	86	88	+2	Mild
8	86	84	-2	Mild	99	96	-3	Mild
9	98	90	-8	Mild	102	102	0	Moderate
Elementary school	7.263	4.726			6.778	4.936		
Mean	97.00	87.89			96.78	96.89		
Paired T-test	p = 0.001			p = 0.908				
Independent T-test	post-pre			p = 0.001				

Table 3. Results of observations of respondents in the treatment and control groups for the use of respiratory muscles in asthma patients

No Respondents	Treatment		Category	Control		Category	
	Pretest	Posttest		Pretest	Posttest		
1	1	1	Mild	1	1	Moderate	
2	1	1	Mild	1	1	Moderate	
3	1	1	Mild	1	1	Moderate	
4	1	1	Mild	1	1	Mild	
5	1	1	Mild	1	1	Mild	
6	1	1	Mild	1	1	Mild	
7	1	1	Mild	1	1	Mild	
8	1	1	Mild	1	1	Mild	
9	1	1	Mild	1	1	Moderate	
Wilcoxon Signed Rank	p = 1.000			p = 1.000			
Mann Whitney	post-pre			p = 1.000			

Table 4. Results of observations of respondents in the treatment and control groups for the degree of shortness in asthma patients

No Respondents	Treatment			Category	Control			
	Pretest	Category	Posttest		Pretest	Category	Posttest	Category
1	2	Moderate	1	Mild	2	Moderate	1	Mild
2	2	Moderate	1	Mild	2	Moderate	2	Moderate
3	1	Mild	1	Mild	2	Moderate	2	Moderate
4	2	Moderate	1	Mild	2	Moderate	1	Mild
5	1	Mild	1	Mild	2	Moderate	1	Mild
6	2	Moderate	1	Mild	2	Moderate	2	Moderate
7	2	Moderate	1	Mild	2	Moderate	1	Mild
8	2	Moderate	1	Mild	2	Moderate	2	Moderate
9	1	Mild	1	Mild	2	Moderate	2	Moderate
Wilcoxon Signed-Rank	p = 0.014			p = 0.046				
Mann Whitney	post-pre			p = 0.011				

Table 3 explained that the Wilcoxon Signed Rank statistical test results in the treatment group for the number of pulses showed a significance value of $p = 1.000 (> 0.05)$. This means that there was no difference between the use of respiratory muscles before and after Buteyko's breathing exercises, whereas, in the control group, the Wilcoxon Signed-Rank statistical test results for the number of pulses showed a significance value of $p = 1.000$ greater than 0.05, meaning that in the control group there was no difference in the use of the respiratory muscles pretest and posttest, then from the results of the Mann Whitney test p -value = 1.000 (> 0.05) which shows no effect of Buteyko's breathing technique on the use of respiratory muscles for asthma patients.

Table 4 explained that the Wilcoxon Signed Rank statistical test results in the treatment group for the number of pulses showed a significance value of $p =$

0.014 (< 0.05). This means there was a significant difference between the degree of shortness of respondents before and after Buteyko breathing exercises. Whereas, in the control group, Wilcoxon Signed Rank statistical test results for the number of pulses showed a significance value $p = 0.046 (< 0.05)$ means that in the control group, there was a difference in the degree of shortness between pretest and posttest (Yusuf et al., 2020). The Mann-Whitney test results obtained a significant value of $p = 0.011 (< 0.05)$, which showed Buteyko's breathing technique influences the degree of shortness of asthma patients.

DISCUSSION

The results showed a change in the number of RR in the treatment and control groups before being treated with the Buteyko breathing technique and according to

standard operating procedures in the hospital (Nebul therapy). Before Buteyko's breathing training was given in the treatment group, all respondents had a moderate category of RR, whereas, in the control group, all respondents also had a moderate category of RR. At the time after Buteyko's breathing training was given, the treatment group experienced a significant increase in that most respondents had a mild RR category, whereas, in the control group, there was no change in that all respondents still had a moderate category RR. Buteyko breathing technique is an effort or method of asthma management to reduce airway constriction with the principle of shallow breathing exercises. This therapy is designed to slow down or reduce the lungs' air intake to reduce interference with the respiratory tract in asthmatics (Dupler, 2005).

The results showed that there was a change in the number of pulses in the treatment and control groups before being given Buteyko breathing exercise treatment. Whereas in the control group, after being given treatment according to the standard operating procedures in the hospital (nebulizer therapy), there were no significant changes, most of them were in the mild category of pulses and a small portion were still in the medium category. Buteyko's breathing technique is done by calculating the pulse rate. When calculating the pulse for one minute, if after performing the Buteyko breathing technique, then the pulse is the same or lower, it indicates that the person doing the technique is relaxed (Brindley, 2010). The decrease in the respondent's pulse rate could be due to the respondent feeling relaxed while doing Buteyko breathing exercises. In breathing exercises, Buteyko takes a breath and then breathes it in so that the respondent feels relaxed, which makes the pulse more stable (Shah et al., 2016). Buteyko breathing exercises help balance the levels of carbon dioxide in the blood loss due to hyperventilation. It helps release hemoglobin levels in the blood to release oxygen so that oxygen transport to the tissues runs smoothly (Rakhimov, 2005).

Based on the results of the study, the majority of nurses respondents have less action in fulfilling the needs of patients' self-care and the fulfillment of self-care needs in physical immobilization patients that are not fulfilled. Orem explains that the theory of the nursing system which describes and explains how the patient's self-care is fulfilled by the nurse or the patient himself is based on Orem by expressing about the fulfillment of self needs, patient needs, and the ability of patients to perform care independent (Aligood, 2014). The act of assisting the fulfillment of personal hygiene and self-care needs is a skill that can be learned in a short time with good habits, but experience and communication are also needed. Nurses who always get used to taking personal hygiene measures will be more skilled in providing services and will get maximum results (Sandyarman & Gede, 2014). This is consistent with

research on the fulfillment of self-care carried out by nurses on immobilized patients. The act of providing personal hygiene services will be maximized if nurses are skilled in providing services (Dewie & Has, 2017).

The results showed that there were changes in the degree of tightness in the treatment and control groups before being given Buteyko breathing exercise treatment and according to standard operating procedures at the hospital. The results showed that before Buteyko breathing exercises, most of the respondents in the treatment group had difficulty in the moderate category and experienced changes in the degree of difficulty in the mild category after being given Buteyko breathing exercises. The above thing, in line with research conducted by Nurdiansyah (2013), states that Buteyko's breathing technique affects decreasing asthma symptoms in asthma patients (Nurdiansyah, 2013). Buteyko's breathing technique is a natural technique to reduce asthma symptoms and the severity of asthma (Siswanti, 2019). There are many symptoms of asthma, including shortness. Shortness occurs in asthma patients due to hyperventilation due to bronchospasm. The diameter of the bronchioles will be more reduced during expiration than during inspiration due to increased pressure in the lungs during forced expiration, which presses on the outside of the bronchioles. Because the bronchioles are partially blocked, the subsequent blockage is a result of external pressure, which causes severe obstruction, especially during expiration (Musliha, 2010).

In the Buteyko breathing technique, Control Pause is performed, which is a mechanism of holding the breath. When holding long breaths such as extended pause, there will be a decrease in oxygen saturation, which reaches maximum saturation when first taking breath (Brindley, 2010). Stopping breathing and starting again when there is intense stimulation of breathing can help restore abnormal breathing rhythms, in the same way, to stop cardiac arrhythmias from returning to normal. The cerebral vasodilation results from a decrease in O₂ or an increase in CO₂ after holding breath, it might also help to reset pattern breathing through changes in input to the center and peripheral chemoreceptors (Courtney, 2014). This is in line with the research conducted by Adha (2013) states that there is an effect of Buteyko's breathing on improving control pause in asthma patients (Adha, 2013).

Reduce breathing is also one of the methods in Buteyko's breathing technique, which decreases the flow of breathing a few minutes (Brindley, 2010). Reducing the flow of breathing is one way to stabilize CO₂ levels in the lungs, where when asthma low CO₂ levels in the lungs are inversely proportional to CO₂ levels in the blood and cells (Novozhilov, 2007). Hyperventilation that occurs in asthma patients is due to excessive loss of CO₂. The principle of this exercise after the Buteyko breathing technique, the amount of

RR, pulse, use of the muscles of breathing aids, and the degree of shortness to be decreased because hyperventilation that occurs can be overcome. Following the results of research conducted by researchers after applying Buteyko breathing techniques to asthma patients.

CONCLUSION

The results showed that there was an influence of Buteyko's breathing technique on decreasing the degree of shortness in asthma in Pulmonary Polyclinic so that Buteyko's breathing technique could be recommended to treat shortness in asthma patients.

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