

The Effect of Buteyko Breathing and Asthma Exercise on Asthma Symptoms among Patients with Asthma

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Abstract

Background and Aim: Asthma is a chronic inflammatory disease of the airways and is on the increasing trend owing to air pollution and urbanization. The use of alternative ways of treatment that are as efficacious as the standard treatment is needed. This study aimed to assess the effect of buteyko breathing and asthma exercise on reducing asthma symptoms.

Methods: A quantitative approach with true experimental design was adopted for the study. Simple random sampling technique was adopted to select 18 samples for the study, 9 samples each for the experimental (buteyko) and control (asthma exercise) groups. The duration of the study was 2 weeks. The effects were assessed using the weekly asthma symptom questionnaire. The dependent T-test was used to see the difference in asthma symptom scores at the initial and final visit of the 2nd week in both groups. Independent T-test was used to determine the difference in the decrease of asthma symptom scores between two groups after 2 weeks of action.

Results: The study showed that there were a significant difference in asthma symptom scores at the initial and final visit of the 2nd week in both groups ($p < 0.05$). However, in experimental group the decrease of asthma symptom scores were more significant (*eta squared 0.99 compared to 0.94*)

Conclusion: So it was concluded that the Buteyko breathing was more effective than asthma exercise in reducing asthma symptoms ($p < 0.00 < 0.05$). Buteyko breathing was found to be more significantly effective on reducing asthma symptoms among patients with asthma.

Keywords: Asthma Exercise; Asthma Symptoms; Buteyko Breathing

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INTRODUCTION

In many countries around the world, asthma is becoming a serious public health problem. Asthma can be mild and does not interfere with activities, but also can be persistent and interfere daily activities (Usman et al., 2015). Productivity decreases due to absenteeism from work or school, and can lead to disability, thereby increasing productivity and quality of life. In urban areas the prevalence of asthma is generally higher than in rural areas, because the lifestyle in big cities increases the risk of developing asthma. The air around us has been polluted by various air pollutants, of which 70-80% of air pollution comes from vehicle exhaust gases, while air pollution caused by industry ranges from 20-30% (Dharmage et al., 2019). Sources of indoor pollutants that can trigger asthma flare-ups include combustion residues, chemicals such as mosquito repellent spray/burn and others, sharp paint odors, other chemicals such as perfume, hairspray. Dust and dust mites from sofas, carpets, curtains can also trigger allergies that lead to asthma (Soetjningsih, 2015).

The global prevalence rates of diagnosed asthma by the doctor, clinical/treated asthma and heezing in adults were 4.3%, 4.5%, and 8.6% respectively, and varied by as much as 21-fold amongst the 70 countries. Amongst those who categorized as clinical/treated asthma, almost 24% were current smokers, 20% had never been treated for asthma and half reported wheezing (To et al., 2012). Based on the Health Profile of Pasuruan Regency, the number of asthma sufferers in Pasuruan Regency reached 7%. From the medical record data at Bangil Hospital, it is known that the visit of asthma patients at the

Asma Polyclinic in 2019 was an average of 38 patients per month. In addition to reducing the quality of life of sufferers, the total cost of treatment for asthma is very high with the largest expenditure on emergency rooms and hospital care (Hassan et al., 2012). Breathing techniques such as Buteyko and breathing exercises such as asthma exercise are effective in reducing weekly asthma symptoms and monthly asthma symptoms in asthmatic patients. This study aims to assess the effect of buteyko breathing and asthma exercise on reducing asthma symptoms among patients with asthma.

METHODS

A quantitative approach with true experimental design was adopted for the study. The population were all asthmatics at the Asthma Polyclinic of Bangil Hospital, amounting to 45 people, with the criteria suffer from asthma for more than one year, aged 20-60 years, suffering from mild intermittent and persistent asthma, not smoking and drinking alcohol. While asthmatic patients who were having severe attacks during the intervention, suffering from other diseases that could interfere with pulmonary ventilation function, using preventive drugs for the last 3 months and during the study and doing other breathing exercises during the study, were not selected as respondents. Simple random sampling technique was adopted to select 18 samples for the study, 9 samples each for the experimental (buteyko) and control (asthma exercise) groups. The duration of the study was 2 weeks. The weekly asthma symptom questionnaire sheet referring to the results of a study conducted by Osman, McKenzie, Cairns, Friend, Godden, Legge, Douglas (Agustningsih et al., 2015)

was used to measure asthma symptoms that occurred for one week, including coughing, shortness of breath, wheezing, chest tightness, disturbed sleep. Asthma symptom scores were measured before and after the patients were given the Buteyko breathing and asthma exercise. The range of scores for each criterion is 0-2. The total score for asthma symptoms ranged from 0-10. The severity of asthma symptoms will be seen based on the total score obtained. The greater the total score obtained, the more severe the asthma symptoms experienced in the measured time span. On the contrary, the smaller the total score for asthma symptoms, the smaller the severity of asthma symptoms experienced in the measured time span. The dependent T-test was used to see the difference in asthma

symptom scores at the initial and final visit of the 2nd week in both groups. Independent T-test was used to determine the difference in the decrease of asthma symptom scores between two groups after 2 weeks of action. This research has received approval from the ethics committee of Bangil Regional Hospital with letter number 445.1/3303/424.202/2019.

RESULTS

Table 1 showed mean of asthma symptom score in both groups. In experimental group mean of asthma symptom score in initial visit score was 7,33 and in control group was 7. In the end of second week, in experimental group mean of asthma symptom score was 2,11 and in control group was 3,67.

Table 1. Mean difference of asthma symptom score between the groups

	Group	N	Min	Max	Std Dev	Mean
Initial Visit Score	Buteyko	9	6	9	0,866	7,33
	Asthma Exercise	9	6	9	1	7
End of 2nd Week Score	Buteyko	9	1	3	0,782	2,11
	Asthma Exercise	9	1	5	1,225	3,67

Table 2. Analysis of asthma symptom score between groups

	Group	Mean	n	SD	t	p value	Eta squared
Initial Visit Score _ End of 2 nd Week Score	Buteyko	5.222	9	0.667	23.500	0.000	0,99
Initial Visit Score _ End of 2 nd Week Score	Asthma Exercise	3.333	9	0.866	11.547	0.000	0,94

Table 2 showed mean difference of asthma symptom score between the experimental and control groups. In experimental group, mean difference of asthma symptom score was 5.222 and in control group was 3.333. However, in experimental group the decrease of asthma symptom scores were more significant (*eta squared 0.99 compared to 0.94*), so it was concluded that the Buteyko breathing was more effective than asthma

exercise in reducing asthma symptoms ($p 0.000 < 0.05$).

DISCUSSION

Buteyko breathing is more effective in asthmatics. It is a method of asthma management that aims to reduce airway constriction or narrowing with the principle of slow and shallow breathing exercises through the nose (Prasanna et al., 2015). By breathing slowly, the normal

level of CO₂ in the blood can be maintained. In accordance with the nature of carbon dioxide which causes dilation of blood vessels and muscles, maintaining a balance of CO₂ levels in the blood will reduce the occurrence of bronchospasm and cause relaxation of smooth muscles in the bronchial walls which then reduces the appearance of wheezing. Thus the Buteyko breathing can improve the physiological state of the lungs in asthmatics accompanied by a decrease in hyperventilation due to the loss of carbon dioxide during an asthma attack (Prem et al., 2013). Breathing techniques are good if done regularly because they can increase lung ventilation of asthmatic patients, so that asthma symptoms can be reduced (Silampari, 2018). Various studies have shown that the Buteyko breathing is effective in asthmatic by reducing the frequency of asthma relapses (Bachri, 2018) and improving control of asthma among patient with asthma (Firdaus & Wahyuni, 2020).

Asthma exercise is a series of exercises to train and strengthen the respiratory muscles so that asthmatics can more easily carry out respiration and expectoration. Asthma exercise able to increase the capacity of people with asthma in carrying out daily activities, such as increasing breathing ability, the work efficiency of the respiratory muscles, blood flow to the lungs so that oxygenated blood flows more, causing slower and more efficient breathing, reducing the rate of breathing, decreased lung function, and shortened the time required for recovery. Its manifestations are increased tolerance to exercise, reduced relapse, decreased depression and anxiety, improved lung function, and decreased risk of premature death (Permatasari, 2015).

Changes in the respiratory system that occur due to exercise include an increase in ventilation as a result of increased tidal volume and respiratory rate, an increase in ventilation efficiency, namely the amount of air that is ventilated at the same level of O₂ consumption will be lower in trained people. Active skeletal muscles get more O₂ from respiratory muscles, and lung volumes are larger in trained people (Arif & Elvira, 2018). Buteyko breathing technique and asthma exercise also improving oxygen saturation and reduction of eosinophil levels among patients with asthma. Breathing exercises also improve respiratory function and maintain the balance of IgE levels in the bronchi and reduce excessive responses from the airway (Pranata & Wulandari, 2021).

There have been many studies comparing the effectiveness of Buteyko with other techniques. The combination of Buteyko breathing and walking exercise increase asthma control through the mechanism of increasing carbondioxide and producing nitric oxide which can cause bronchodilation and decreasing inflammatory mediators that can reduce asthma symptoms (Udayani et al., 2020). Buteyko breathing and upper body exercise has no different effect in increasing peak expiratory flow value. Patients with bronchial asthma, can use buteyko breathing or upper body exercise or both techniques, because it has the same effectiveness to increase peak expiratory flow in assisting the prevention of bronchial asthma (Santoso et al., 2014). Buteyko breathing and blowing balloons exercise also increase the values of peak expiratory flow. The results of measurements peak expiratory flow

values were significant differences with a value of $p = 0.00$ in Buteyko breathing exercises and Blowing Balloons training (Irfan et al., 2019). A clinical study of 46 patients with asthma aged 20-65 years showed that buteyko breathing proves to be more effective in asthmatics (Afle & Grover, 2014). A study conducted by Huidrom, (2016) showed that Buteyko breathing was found to be significantly effective in improving the respiratory physiological parameters among patients with bronchial asthma.

Buteyko breathing technique is good for asthmatic patients because it can improve lung ventilation of asthmatic patients, so asthma symptoms can be reduced (Patel, 2016). The Buteyko breathing technique can reduce asthma symptoms if practiced regularly. By breathing slowly and shallowly through the nose, normal levels of CO₂ in the blood can be maintained. CO₂ causes dilation of blood vessels and muscles thereby reducing the occurrence of bronchospasm and causing relaxation of smooth muscles in the bronchial walls which then reduces the appearance of wheezing. Thus the Buteyko breathing technique can improve the physiological state of the lungs in asthmatics accompanied by a decrease in hyperventilation due to the loss of carbon dioxide during an asthma attack.

CONCLUSION

Buteyko breathing was found to be more significantly effective on reducing asthma symptoms among patients with asthma.

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