

THE BUTEYKO BREATHING TECHNIQUE IN STABILIZING RESPIRATORY RATE AND CONTROL PAUSES IN BRONCHIAL ASTHMA PATIENTS: CASE STUDY



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ABSTRACT

Introduction: Asthma is a chronic inflammatory disease of the airways that causes hyperresponsiveness and narrowing of the airways, with symptoms such as shortness of breath, wheezing, and coughing that can appear suddenly. Asthma management requires a comprehensive approach, including pharmacological and non-pharmacological therapies. The buteyko breathing technique is one of the effective non-pharmacological interventions to control asthma symptoms, reduce the frequency of attacks, and improve quality of life without side effects. This study aims to implement the buteyko breathing technique to stabilize respiratory frequency in patients with bronchial asthma. **Purpose:** This case study is to determine the effectiveness of buteyko therapy in stabilizing respiratory rates and control pauses in bronchial asthma patients. **Methods:** The method used in this study is a case study with 3 asthma patients as subjects. The focus of this study is evidence-based practice in the form of buteyko breathing therapy for 3 days and is carried out 3 times a day. **Discussion:** The results of the study showed that the buteyko breathing technique can stabilize the respiratory rate in bronchial asthma patients. **Conclusion:** Buteyko breathing technique can help stabilize respiratory rate in asthma patients, although the results are not statistically significant. These results indicate that buteyko breathing technique has the potential to prolong the duration of control pauses, which may support improved respiratory control in asthma patients.

Keywords: Asthma, buteyko breathing technique, and control pauses.

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INTRODUCTION

Asthma still a significant global public health problem. The disease affects a wide range of age groups, from children to adults, with varying degrees of severity. In severe conditions, asthma can even be life-threatening (Muttaqin, 2014). The World Health Organization (WHO) states that around 300 million people in the world suffer from asthma, with data showing that around 250,000 cases end in death (Natul & Yona, 2021). Based on data from the Indonesian Ministry of Health (2018), the prevalence of asthma in Indonesia reaches 4.5% of the population, or around 11,179,032 people (Susetha, 2020). Meanwhile, in Central Java province, the percentage is 1.8% or around

132,565 people (Kemenkes RI, 2019).

Asthma is a chronic inflammatory disorder of the airways that causes increased airway hyperresponsiveness. This condition is characterized by symptoms such as wheezing, difficulty breathing, chest heaviness, and coughing that mainly occurs at night or early in the morning, these symptoms appear very suddenly so bronchial asthma disorders generally occur suddenly (Indrawati & Anggiarti, 2021). Individuals with bronchial asthma have more sensitive airways than others. When the lungs are irritated, the muscles of the airways stiffen and make the passages narrow and there will be an increase in phlegm production which makes breathing more difficult (Nawangwulan, 2021).

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Risk factors for bronchial asthma include allergic, non-allergic, psychological, genetic, and environmental factors (Fitria, 2018). Asthma management includes avoiding triggering factors, such as exposure to cigarette smoke, dust, animal dander, and weather changes, as well as wearing a mask when traveling and wearing warm clothes in cold weather (Anggraini, 2019). Therefore, there is a need for therapy that can be given, both pharmacological therapy and non-pharmacological therapy (Harsismanto, et al., 2021). One of the non-pharmacological therapies is breathing exercise which can help control asthma. Breathing exercise is a multi-component intervention that aims to change behavior and involves various breathing exercise methods and techniques such as the buteyko method, yogic breathing, papworth method, and diaphragmatic breathing (Bailey, et al., 2016).

Buteyko breathing technique is a breathing technique to improve diaphragmatic (chest) breathing and learn to breathe through the nose (Prastyanto & Kushartanti, 2019). The advantages of the buteyko breathing technique can reduce the frequency of asthma attacks (recurrence), prevent severity, and reduce the dose of inhaled corticosteroids and improve Peak Expiratory Flow Rate (PEFR). In addition, the buteyko breathing technique can stop coughing, nasal congestion, shortness of breath, wheezing, and improve quality of life. The buteyko breathing technique has no side effects (Hassan, Riad, & Ahmed, 2012). The instrument used to measure the success of buteyko breathing therapy is by using a respiratory rate in the form of a watch for one minute. Based on the description above, researchers are interested in implementing buteyko breathing techniques in stabilizing respiratory rates in patients with bronchial asthma for 3 days in the morning, afternoon and evening.

METHOD

The method used in this study is a case study with descriptive research. Case study was conducted to stabilize respiratory rate and control pauses in patients with bronchial asthma. This case study was conducted in Banteran Village, RW 07, Sumbang with the implementation time starting on October 7-13, 2024. The criteria for respondents in this study consisted of inclusion and exclusion criteria. Inclusion criteria included: male/female

patients; patients with diagnosed asthma; asthma attacks have resolved or are not relapsing; patients with respiration rate > 20 times/minute; mild-moderate asthma patients; willing to become respondents. The exclusion criteria include: patients in asthma attack; patients have a history of heart attack or hypertension and epilepsy. Case studies were conducted on three elderly people with asthma, namely Mr. Y (M) aged 49 years, Mrs. W (W) aged (48 years), and Mrs. T (W) aged (49 years).

Implementation was given for 3 days in the morning, afternoon and evening. The following are the steps of the buteyko breathing technique intervention: 1) Encourage the patient to sit in a comfortable position, ensure the body should be relaxed, let the shoulders move naturally; 2) In the initial stage, as a warm-up, you should take a breath using your nose first 2 times, then inhale again and then hold it using the diaphragm and then exhale slowly (if the patient does not feel relaxed, they can warm up for 1 minute); 3) Next, take a breath using your nose, do control pauses, close your nose with your thumb and index finger at the end of exhalation. After that, look and count the number of times you can hold your breath (record the results of each control pause). The patient should keep the nose closed until there is an urge to breathe. Counting control pauses using a watch for a maximum of 1 minute. 4) Then do inspiration and expiration as normal again. When exhaling the mouth is closed. 5) Repeat the "control pauses test" - shallow breathing - control pauses test 4 times. 6) Ensure that each patient after performing the control pauses test does not experience shortness of breath or anxiety.

RESULT

The results presented data on respondents' characteristics (age, gender, occupation, medical diagnosis, and vital signs), differences in respiratory rate before and after the administration of buteyko therapy, as well as identifying trends in control pauses from day one to day three.

Characteristics of respondents

The characteristics of respondents in this study include age, gender, occupation, medical diagnosis and vital signs. The following is a comprehensive data presentation.

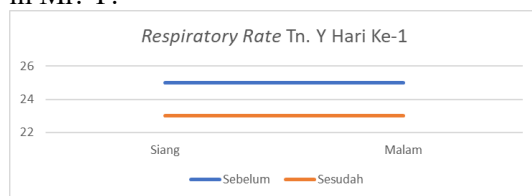
Table 1. Characteristics of respondents

	Tn. Y	Ny. W	Ny. T
Age	49 year	48 year	49 year
Gander	man	woman	woman
Work	labor	house- wife	house- wife
Vital sign:			
Blood pressure	120/80	130/90	127/87
Pulse	67	77	73
Respirati on	25	26	26
Medical diagnosis	Asthma	Asthma	Asthma

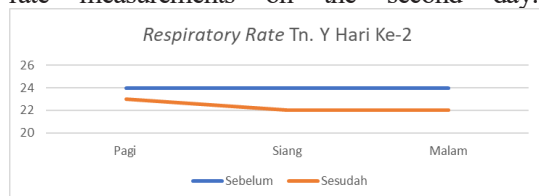
Table 1 shows that the age of the two patients was 49 years old and one patient was 48 years old. The gender of the two patients is similar, namely female and one patient is male. The occupations of the two patients were similar, namely housewives and one patient worked as a daily laborer. Blood pressure in the three patients showed no hypertension, normal pulse, and respiration showed tachypnea and the medical diagnoses of the three patients were similar, namely asthma.

Respiratory rate

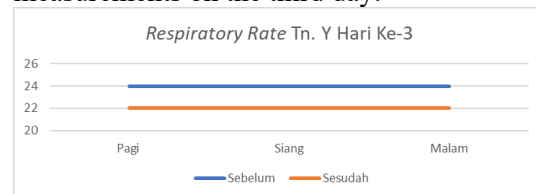
Nursing implementation is carried out for 3 days for 3 times administration (morning, afternoon, night). This respiratory rate measurement was carried out before and after the intervention of the buteyko breathing technique. The following is a presentation of the results of monitoring the respiratory rate in Mr. Y.

**Figure 1. Respiratory Rate of Mr. Y day 1**

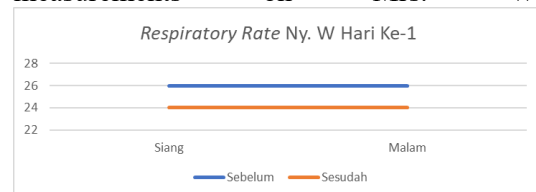
Based on Figure 1, there is a difference in Mr. Y before and after the administration of buteyko therapy. Changes occurred in the frequency of breathing before administration, from 25 times/minute to 23 times/minute. Furthermore, there is a presentation of the results of respiratory rate measurements on the second day.

**Figure 2 Respiratory rate of Mr. Y day 2**

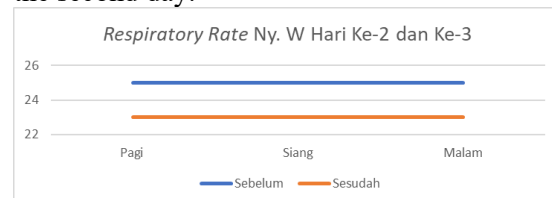
Based on Figure 2, we can see the results of respiration measurements on Mr. Y before and after the administration of buteyko therapy on the second day. Mr. Y before and after giving buteyko therapy on the second day. Changes occurred in the frequency of breathing in the morning before administration, from 25 times/minute to 23 times/minute. In the afternoon and evening had the same value, from 24 times/minute to 22 times/minute. Furthermore, there is a presentation of the results of respiratory rate measurements on the third day.

**Figure 3 Respiratory rate of Mr. Y day 3**

Based on Figure 3, there are results of respiration measurements on Mr. Y before and after the administration of buteyko therapy on the third day. Mr. Y before and after giving buteyko therapy on the third day. Changes occurred in the frequency of breathing changed constantly in the morning, afternoon and night from 24 times/minute to 22 times/minute. Furthermore, there is a presentation of the results of respiratory rate measurements on Mrs. W.

**Figure 4 Respiratory rate of Mrs. W day 1**

Based on Figure 4, there is a difference in Mrs. W before and after giving buteyko therapy. Changes occurred in the frequency of breathing before administration, from 26 times/minute to 24 times/minute. Furthermore, there is a presentation of the results of respiratory rate measurements on the second day.

**Figure 5 Respiratory rate of Mrs. W on day 2 and 3**

Based on Figure 5, the results of respiration measurements on Mrs. W before and after the provision of buteyko therapy on the second and

third days. On these two days Mrs. W had the same measurement results both in the morning, afternoon and evening. Changes occurred in the frequency of breathing in the morning before administration, from 25 times/minute to 23 times/minute. Furthermore, there is a presentation of the results of respiratory rate measurements on Mrs. T.

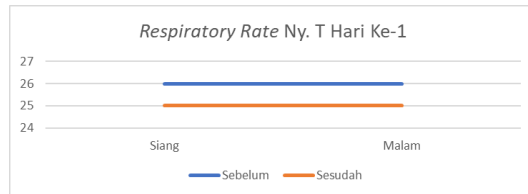


Figure 6 Respiratory rate of Mrs. T on day 1

Based on Figure 6, there is a difference in Mrs. T before and after giving buteyko therapy. Changes occurred in the frequency of breathing before administration, from 26 times/minute to 25 times/minute. Furthermore, there is a presentation of the results of respiratory rate measurements on the second day.

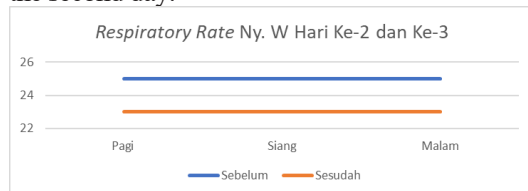


Figure 7 Respiratory rate of Mrs. W day 2 and 3

Based on Figure 7, the results of respiration measurements on Mrs. W before and after the provision of buteyko therapy on the second and third days. On these two days Mrs. W had the same measurement results both in the morning, afternoon and evening. Changes occurred in the frequency of breathing in the morning before administration, from 25 times/minute to 23 times/minute.

Control Pauses

After measuring the respiratory rate, the implementation of the buteyko breathing technique which includes “control pauses test - shallow breathing - control pauses test” is carried out 4 times each session. The following are the results of the control pauses trend in the three patients starting from Mr. Y, Mrs. W and Mrs. T.

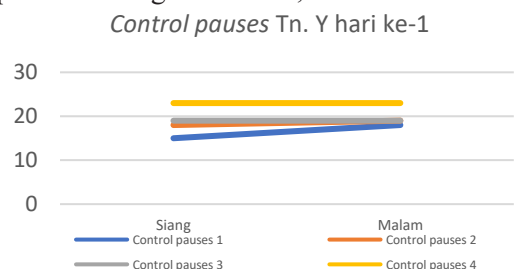


Figure 8 Control pauses Mr. Y day 1

Based on Figure 8, there are the results of Mr. Y's

Control Pauses (CP) measurement. Y during the day and night. From the data obtained during the day the first CP is 15 seconds, the second CP is 18 seconds, the third CP is 19 seconds and the fourth CP is 23 seconds. At night the first CP was 18 seconds, the second CP was 19 seconds, the third CP was 19 seconds and the fourth CP was 23 seconds. From these data it can be concluded that the provision of intervention on the first day there are differences in the first CP to the fourth CP but there are similarities in several CPs.

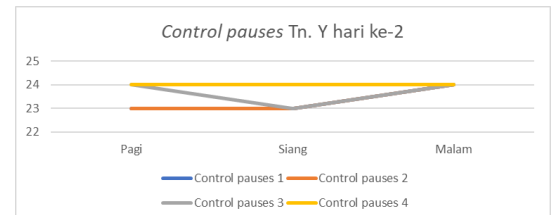


Figure 9 Control pauses Mr. Y day 2

Based on Figure 9, there are the results of Mr. Y's Control Pauses (CP) measurement on the second day. Y on the second day. From the data obtained in the morning the first CP was 23 seconds, the second CP was 23 seconds, the third CP was 24 seconds and the fourth CP was 24 seconds. During the day the first CP was 23 seconds, the second CP was 23 seconds, the third CP was 23 seconds and the fourth CP was 24 seconds. At night the CP performed by Mr. Y has the same time from CP one to four, namely 24 seconds. From these data it can be concluded that the provision of interventions on the first day and the second day there was an increase in CP.

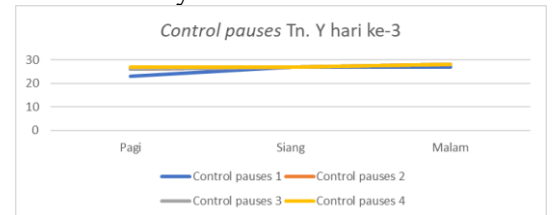


Figure 10 Control pauses Mr. Y day 3

Based on Figure 10, there are the results of Mr. Y's Control Pauses (CP) measurement on the third day. Mr. Y on the third day there was an increase from the previous day. From the data obtained in the morning the first CP was 23 seconds, the second CP was 26 seconds, the third CP was 26 seconds and the fourth CP was 27 seconds. During the day the CP performed by Mr. Y has the same time from CP one to four, namely 27 seconds. At night the first CP is 27 seconds, the second CP is 28 seconds, the third CP is 28 seconds and the fourth CP is 28 seconds. Furthermore, there are the results of the measurement of control pauses on Mrs. W as follows:

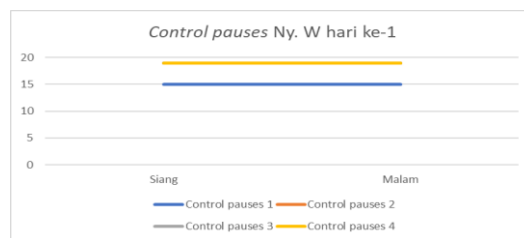


Figure 11 Control pauses of Mrs. W day 1

Based on Figure 11, there are the results of measuring Mrs. W's Control Pauses (CP) on the first day. From this data, the data obtained during the day and night have the same CP value, namely the first CP of 15 seconds, the second CP of 19 seconds, the third CP of 19 seconds and the fourth CP of 19 seconds. Furthermore, the presentation of Mrs. W's CP data on the second day is as follows:

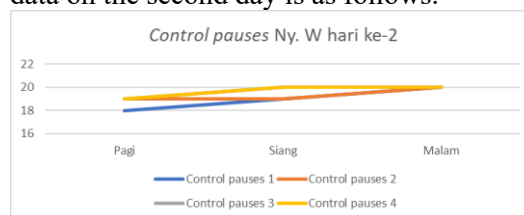


Figure 12 Control pauses of Mrs. W day 2

Based on Figure 12 there are the results of the measurement of Control Pauses (CP) Mrs. W on the second day. From the data obtained in the morning the first CP was 18 seconds, the second CP was 19 seconds, the third CP was 19 seconds and the fourth CP was 19 seconds. During the day the first CP was 19 seconds, the second CP was 19 seconds, the third CP was 20 seconds and the fourth CP was 20 seconds. At night the CP performed by Mrs. W has the same time from CP one to four which is 20 seconds. From these data it can be concluded that the provision of interventions on the first day and the second day there was an increase in CP.

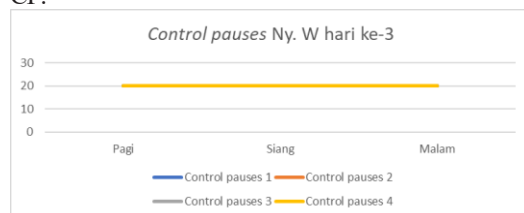


Figure 13 Control pauses of Mrs. W day 3

Based on Figure 13 there are the results of the measurement of Control Pauses (CP) Mrs. W on the third day has the same time from morning, afternoon and evening measurements of both CP one to four, namely 20 seconds. Furthermore, there are the results of measuring control pauses on Mrs. T as follows:

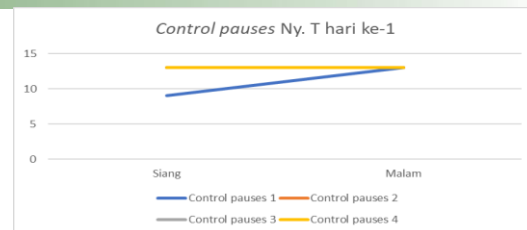


Figure 14 Control pauses of Mrs. T day 1

Based on Figure 14 there are the results of the measurement of Control Pauses (CP) Mrs. T on the first day. From this data, it is obtained that during the day the first CP value is 9 seconds, the second CP is 13 seconds, the third CP is 13 seconds and the fourth CP is 13 seconds. At night Mrs. T has the same CP value from CP one to four which is 13 seconds. Furthermore, the presentation of Mrs. T's CP data on the second day is as follows:

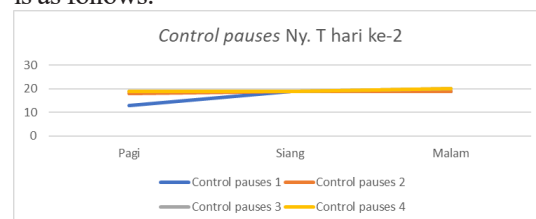


Figure 15 Control pauses of Mrs. T day 2

Based on Figure 15 there are the results of the measurement of Control Pauses (CP) Mrs. T on the second day. From the data obtained in the morning the first CP was 13 seconds, the second CP was 18 seconds, the third CP was 19 seconds and the fourth CP was 19 seconds. During the day it has the same CP value from the first to the fourth CP, which is 19 seconds. At night the first CP was 19 seconds, the second CP was 19 seconds, the third CP was 20 seconds and the fourth CP was 20 seconds. From these data it can be concluded that the provision of interventions on the first day and the second day there was an increase in CP.

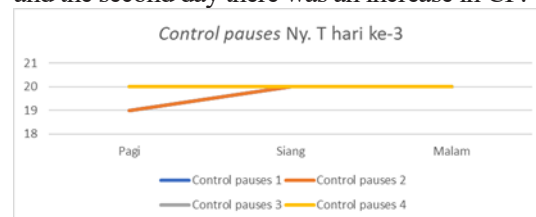


Figure 16 Control pauses Mrs. T day 3

Based on Figure 16 there are the results of the measurement of Control Pauses (CP) Mrs. W on the third day has the first CP value of 19 seconds, the second CP is 19 seconds, the third CP is 20 seconds and the fourth CP is 20 seconds. During the day and night have the same CP value from the first to the fourth CP, which is 20 seconds.

DISCUSSION

From the results of the explanation above, it

is obtained that the buteyko breathing intervention that has been given for 3 days with 3 times a day (morning, afternoon and evening) can reduce and stabilize breathing in patients with bronchial asthma. This is indicated by a decrease in respiratory frequency by 3 times/minute in each patient. These results are in line with research conducted by Pratiwi & Chanif (2021) There was a change before giving the respiration, which was 30 times/minute and after buteyko therapy the respiration became 25 times/minute. This statement is reinforced by Widodo & Kristinawati (2024) that there were changes before and after the provision of buteyko breathing therapy, from 30 times/minute to 23 times/minute.

Based on the results of measuring the respiratory rate, there were differences before and after giving buteyko therapy to the three patients. This is in line with research Putri, Kristinawati & Hidayat (2019) that the application of the buteyko breathing technique showed significant results, as evidenced by the frequency of breathing getting better. This change can be a benchmark to determine whether breathing exercises are performed correctly or not (Dupler, 2005).

Buteyko breathing technique whose basic principle is nasal breathing, the effect of turbulence in the airway caused by airway narrowing will be reduced so that ventilation-perfusion in the lungs will increase and conditions that cause the body to store excess carbon dioxide in the body can be reduced (Firmansyah, Furqon, Wibowo & Rohita, 2023). The advantages of this study are that the buteyko breathing technique exercises provided do not require cost expenditure, this intervention can be done easily and independently at home which certainly benefits the patient if the intervention is safe to do and has proven benefits (Mendonca, et al. 2021).

Based on the comparison between the time of control pauses and the frequency of breathing is inversely proportional where, when the control pauses are longer, the frequency of breathing is lower or stable. In the results of monitoring control pauses, it was found that when control pauses were carried out on buteyko breathing, there was an increase in the length of seconds the patient held his breath in all three patients. This is in accordance with the statement Kolb (2009) Regular practice of the buteyko breathing technique will improve the

poor respiratory system in asthmatics so that it will reduce asthma symptoms and improve control of pauses. This statement is reinforced by Dupler (2005) that low control pauses mean that the respiratory center in the body and carbon dioxide are also at a low level, so that the volume of air at this level increases, by doing breathing exercises regularly and regularly, the body can hold its breath or achieve control pauses for 40-60 seconds. The increase in the value of control pauses is due to the buteyko breathing technique in the relaxation stage, the body posture is relaxed, especially the upper body, because by relaxing the respiratory muscles and ribs slowly, namely stretching outward during inspiration and pulling the ribs inward during expiration.

Based on the results of the study in the three patients, the respiratory rate value was repeated before the administration of buteyko breathing therapy and the value was repeated in control pauses. According to the researcher's assumption, buteyko therapy has a momentary effect. This is influenced by several factors such as body adaptation that has not been maximized, implementation techniques that are not consistent, the physiological condition of the patient and the duration or frequency of training that is not optimal (Esraa, *et al.* 2022).

According to the researcher's assumption, the administration of the buteyko breathing technique did not result in a significant change in time due to things that could not be controlled by the researcher such as allergic factors, lifestyle, and environmental factors. This statement is in line with the statement Novita (2023) Environmental factors that can affect asthma include weather changes, air pollution and exposure to cigarette smoke. Other asthma-causing factors include indoor allergies such as house dust, mold, pet dander and cockroach droppings. Outdoor allergies such as pollen and mold can trigger asthma symptoms, especially in sensitized individuals (Clarisse, Gautier., & Denis, 2017). In addition, asthma patients require dietary modifications to improve nutritional patterns and not cause relapse (Isobel, et al. 2019). In asthma patients, physical activity such as regular exercise is needed to improve lung function and quality of life (Yasemin, et al. 2017). Poor lifestyle choices, such as smoking and exposure to pollutants, contribute to oxidative stress, worsening asthma symptoms and increasing the risk of

severe asthma (Serena, et al. 2023).

CONCLUSION

Buteyko breathing technique can help stabilize respiratory frequency in asthma patients, although the results are not statistically significant. The implementation of this technique was carried out for 3 days and showed changes in breathing frequency in all three patients, which decreased from around 25-26 times/minute to 22-23 times/minute. In addition, there was an increase in the duration of control pauses (breath holding time) in all three patients. In Mr. Y, the duration of control pauses increased from 15 seconds to 28 seconds, Mrs. W from 15 seconds to 20 seconds, and Mrs. T from 9 seconds to 20 seconds. From the results of the assessment, it was found that there was the same time when the first to fourth control pauses were carried out and in the respiratory rate there was a repetition of the same number of respirations, indicating that in this study buteyko therapy had a momentary effect. However, these results indicate that the buteyko breathing technique has the potential to extend the duration of control pauses, which may support improved respiratory control in asthmatic patients.

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