SAĞLIK BİLİMLERİ ÜNİVERSİTESİ HEMŞİRELİK DERGİSİ
University of Health Sciences Journal of Nursing
Cilt / Volume 7 • Sayı / Number 3 • Aralık / December • 2025

Araştırma makalesi / Research article • DOI: 10.48071/sbuhemsirelik.1683161

A Complementary Approach to Asthma Treatment: Buteyko Breathing Technique[1]

Astım Tedavisine Tamamlayıcı Bir Yaklaşım: Buteyko Nefes Tekniği

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[1]This study has been presented as an oral presentation in 6th SAYKAD Congress International Health Related Quality of Life Meeting November 21-23, 2019.

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Geliş tarihi / Date of receipt: 25.04.2025
Kabul tarihi / Date of acceptance: 07.08.2025

Atıf / Citation: Beyece İncazlı, S., Aşkınoğlı, F., Üstündağ, S., Göksel, Ö., Hafizoğlu, M., Erdinç, M., ... Akyol, A. (2025). A complementary approach to asthma treatment: Buteyko breathing technique. *UHS Journal of Nursing, 7*(3), 229-236. doi: 10.48071/sbuhemsirelik.1683161

ABSTRACT

Intoduction: The Buteyko Breathing Technique, which focuses on correcting dysfunctional breathing patterns, has been reported to be effective in reducing hyperventilation symptoms and accompanying anxiety that play a role in the onset of asthma symptoms.

Aim: This study aimed to evaluate the effects of BBT training on asthma control, quality of life, and pulmonary function among asthma patients.

Method: Between June 2018 and June 2019, 24 patients were included in this randomized controlled trial conducted at the asthma outpatient clinic of a university hospital. Patients were assigned to the intervention (n = 12) and control (n = 12) groups using the block randomization method. The intervention group received BBT training and daily practice sessions, while the control group received standard breathing education—based on the "Life with Asthma" booklet—including abdominal and diaphragmatic breathing techniques. All participants were evaluated at baseline and week 6 using the Asthma Control Questionnaire (ACQ), Asthma Quality of Life Questionnaire (AQLQ), and pulmonary function tests (FEV_1, FEV_1/FVC, control pause (CP)). Data were analyzed using SPSS 25.0; independent t-tests, Mann–Whitney U tests, and repeated-measures ANOVA were applied.

Results: In the intervention group, mean ACQ scores improved from 2.3 to 1.5; AQLQ total scores increased from 4.2 to 5.6; FEV_1 improved by 0.41 L/s; and CP duration increased from 11.08 seconds to 18.19 seconds (a 64.2% increase). All changes were statistically significant ($p < 0.05$). No significant changes were observed in the control group.

Conclusion: These findings suggest that BBT may be a potentially effective complementary approach. However, given the small sample size and short follow-up duration, larger studies with longer-term follow-up are necessary to confirm and generalize these results.

Keywords: Asthma; asthma/prevention & control; breathing exercises; complementary therapies; nursing.

ÖZ

Giriş: Disfonksiyonel solunum paternlerinin duzeltilmesine odaklanan Buteyko Nefes Tekniği'nin astım semptomlarının ortaya çıkmasında rol oynan hiperventilasyon belirtilerini ve buna eşlik eden anksiyeteyi azaltmada etkili olduğu bildirilmiştir.

Amaç: Çalışmanın amacı, astımlı bireylerde Buteyko Nefes Tekniği eğitiminin astım kontrolü, yaşam kalitesi ve solunum fonksiyon testleri üzerine etkilerini değerlendirmektir.

Yöntem: Haziran 2018–Haziran 2019 tarihleri arasında, bir universite hastanesinin astım polikliniğinde yurutulen bu randomize kontrollu calışmaya 24 hasta dahil edilmiş, hastalar blok randomizasyon yöntemiyle müdahale (n = 12) ve kontrol (n = 12) gruplarına atanmıştır. Müdahale grubuna Buteyko Nefes Tekniği eğitimi ve günlük uygulama yaptırılmış; kontrol grubuna Sağlık Bakanlığı tarafından hazırlanmış "Astımla Yaşam" kitapçığı temel alınarak karın ve diyafram solunumu gibi standart solunum eğitimi verilmiştir. Tüm katılımcılar başlangıçta ve 6. haftada ACQ, AQLQ ve solunum fonksiyon testleri (FEV_1, FEV_1/FVC, CP) ile değerlendirilmiştir. Veri analizi SPSS 25.0 ile yapılmış, parametrik ve non-parametrik testlerle (bağımsız t-test, Mann-Whitney U, tekrarlı ölçümler ANOVA) gruplar arası karşılaştırmalar gerçekleştirilmiştir.

Bulgular: Müdahale grubunda 6. haftada ACQ puanı ortalama 2,3'ten 1,5'e düşmüş, yaşam kalitesi AQLQ toplam puanı 4,2'den 5,6'ya yükselmiştir. FEV_1 değeri 0.41 L/s artış göstermiştir; CP süresi 11,08 saniyeden 18,19 saniyeye ulaşarak %64,2 oranında artış gözlenmiştir. Tüm bu değişiklikler istatistiksel olarak anlamlıdır ($p < 0.05$). Kontrol grubunda anlamlı değişiklik saptanmamıştır.

Sonuç: Bulgular, Buteyko Tekniğinin potansiyel olarak etkili bir tamamlayıcı yaklaşım olduğunu göstermektedir. Ancak küçük örneklem ve kısa takip süresi nedeniyle sonuçların genellenebilmesi için daha büyük ve uzun vadeli çalışmalar gereklidir.

Anahtar Kelimeler: Astım; astım/önleme ve kontrol; hemşirelik; solunum egzersizleri; tamamlayıcı tedaviler.

Introduction

Asthma impacts over 250 million people globally and leads to more than 1,000 deaths every day, the majority of which could be prevented (Levy et al., 2023). Asthma is a chronic disease that progresses with periods of attack and remission. Asthma attacks are an important problem that starts acutely and requires urgent intervention. Asthma exacerbations can only be prevented by regular treatment and avoidance of triggering factors (Baulet et al., 2021). Simultaneously, patient education is as important as treatment in controlling the disease (Fesci & Görgülü, 2005). Education for patients with asthma improves their quality of life and decreases health expenditures. Dyspnea experienced by patients in exacerbations causes intense anxiety and aggravates existing respiratory problems. Additionally, the symptoms experienced by the patients negatively affect their quality of life (QOL) by causing difficulties in performing daily activities, deterioration in mood, and dependence on others (Bozkurt & Bozkurt, 2015; Hossyny et al., 2017). This shows that non-pharmacologic management methods are important as pharmacologic treatment in controlling the disease and therefore reducing the frequency of exacerbations. Patients often turn to non-drug practices (Huo et al., 2015; George & Topaz, 2013; Tokem, 2006).

Breathing techniques as a complementary therapy in patients with asthma have been of great interest in recent years (Bruton & Thomas, 2011). The Buteyko Breathing Technique (BBT) was first developed in the 1950s (Bowler et al., 1998). This technique includes breath control and breath holding after exhalation. Based on the theory that hyperventilation is the main cause of asthma, this technique has been used in asthmatic patients. The basic of this technique is to reduce breathing in a controlled manner, including periods of control pauses (CP)/ measurement is based on the length of time the breath can be held breath after exhaling. Although studies have examined the effects of BBT in many countries worldwide (Cooper et al., 2003; Prem et al., 2013; Priyalatha et al., 2018). No study on this subject was found in our country. Studies have shown that BBT results in improvement in asthma symptoms, decrease in β2-agonist use, decrease in inhaled steroid dose, decrease in emergency department admissions and hospitalisations due to asthma, and increase in QOL in patients with moderate or severe asthma (Opat et al., 2000; Priyalatha et al., 2018). The British Thoracic Society (BTS) 2021 Asthma Guide stated that the BBT could be used to provide symptom control in asthmatic patients (British Guideline on the Management of Asthma, 2019).

Asthma is a chronic inflammatory airway disease that affects over 250 million people globally and causes more than 1,000 preventable deaths daily (World Health Organization [WHO], 2023). In Türkiye, the prevalence of asthma is reported to be approximately 5–7% among adults and up to 13% in children, making it a significant public health concern (Turkish Thoracic Society [TTS], 2022). Asthma is characterized by periods of exacerbation and remission, and acute attacks often require urgent medical intervention. Effective asthma control depends not only on regular pharmacological treatment and avoidance of triggers but also on comprehensive patient education (Baulet et al., 2021; Fesci & Görgülü, 2005).

Educational and behavioral interventions are critical in supporting patients' ability to manage their symptoms, particularly during exacerbations when dyspnea can induce anxiety and further deteriorate respiratory function. These psychosomatic effects, such as anxiety, reduced quality of life, and increased dependency, highlight the necessity of integrating non-pharmacologic strategies into asthma care (Bozkurt & Bozkurt, 2015; Hossyny et al., 2017). Nurses, who maintain continuous contact with patients, play a key role in delivering these interventions, especially in teaching breathing techniques that foster symptom relief and emotional regulation.

In recent years, breathing-based complementary therapies have gained attention for asthma symptom management (Bruton & Thomas, 2011; van Dixhoorn & Folgering, 2015). One such technique is the Buteyko Breathing Technique (BBT), developed in the 1950s, which focuses on reducing dysfunctional hyperventilation patterns through breath control and extended breath-holding phases called control pauses (CP). While BBT has shown promise in reducing the use of β2-agonists, lowering inhaled steroid dosages, and improving asthma control and quality of life (Opat et al., 2000; Priyalatha et al., 2018), much of the existing evidence stems from small-scale or dated studies. More recent studies have explored the use of other breathing interventions, such as diaphragmatic and pursed-lip breathing, in asthma management with promising results (Holloway & Ram, 2022; McCarroll et al., 2021).

To the best of our knowledge, no study in Türkiye has systematically evaluated the effects of the Buteyko technique in asthma patients. A preliminary literature search was conducted in PubMed, Web of Science, and TR Dizin using keywords such as "asthma," "Buteyko breathing," "breath control," and "complementary therapy." No national studies were identified. This gap underscores the need to assess the technique's applicability and effectiveness in local healthcare settings. This study, therefore, aims to investigate the effects of Buteyko Breathing Technique training on disease control, quality of life, and pulmonary function in individuals with asthma, emphasizing its potential utility in nursing practice.

Aim

This study aimed to investigate the effects of 'Buteyko Breathing Technique' training on disease control, quality of life, and to determine the effects on pulmonary function test values.

Research Questions

1. Does the Buteyko Breathing Technique improve asthma control in patients diagnosed with asthma?

2. What is the effect of Buteyko Breathing Technique training on the quality of life of individuals with asthma?

3. How does the Buteyko Breathing Technique influence pulmonary function test (PFT) values in asthma patients?

Method

Study Design

This study was planned as a randomized controlled experimental trial.

Study Setting

The study was conducted with patients attending the asthma outpatient clinic of a state university hospital in İzmir between June 2018 and June 2019.

Study Population and Sample

Study participants included 36 patients who met the inclusion criteria, applied to the asthma outpatient clinic during the study period, and agreed to participate in the study. The sample size was calculated using the G*Power 3.1.3 statistical programme. A priori power analysis was conducted based on a moderate effect size of 0.5 (Cohen's d), with a power of 85% and an alpha level of 0.05. The calculation was based on expected differences in the Asthma Control Test (ACT) scores between groups. According to the calculation, a total sample of 24 participants (12 in the intervention group and 12 in the control group) was required.

To account for potential attrition or ineligibility, 36 patients were initially recruited. However, 12 patients were excluded due to the following reasons: asthma exacerbation before the intervention period (n = 4), failure to attend all sessions (n = 5), and withdrawal of consent before the second assessment (n = 3). These exclusion reasons are also presented in Figure 1.

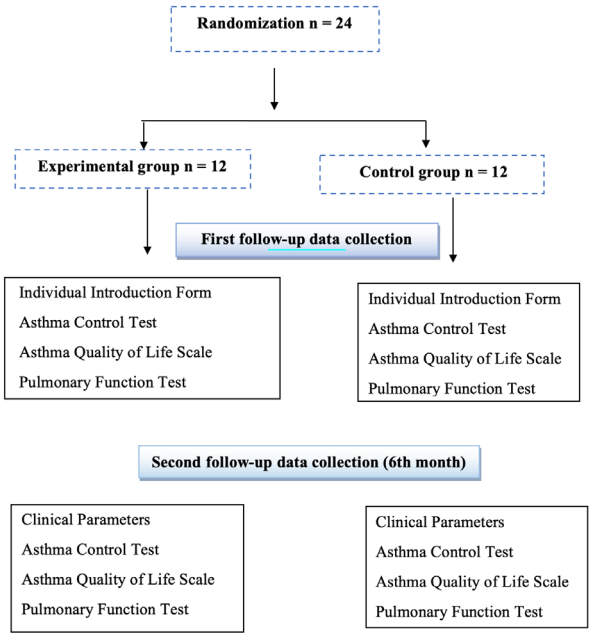

Figure 1: CONSORT flow diagram of study participants

Randomisation was performed using block randomisation (block size of 4) to ensure equal group sizes. The randomisation sequence was generated using a computer-based tool available at www.randomizer.org.

To minimise attrition and ensure full participation during the six-week follow-up, several strategies were employed. Firstly, participants were carefully selected based on their willingness and availability to complete both baseline and follow-up assessments. Clear verbal and written information regarding the study's aim, procedures, and duration was provided during the recruitment phase, and written informed consent was obtained. Secondly, the follow-up assessments were aligned with participants' routine clinic visits to avoid additional burden. Phone call reminders were regularly used to maintain motivation and address any questions or concerns during the study period. Inclusion criteria included patients who: were followed in the asthma outpatient clinic of the university hospital, had stable asthma (no exacerbation in the last 6 weeks), had no communication problems, had no history of smoking, were using inhaled corticosteroids regularly (without dose changes in the past 4 weeks), voluntarily agreed to participate in the study. Exclusion criteria were as follows: presence of another chronic pulmonary disease (e.g., COPD, bronchiectasis), psychiatric illness history or use of psychiatric medications, cognitive impairment or inability to follow instructions, pregnancy or breastfeeding, participation in another clinical trial simultaneously. These criteria were applied to ensure a homogeneous study population and minimise confounding factors.

Data Collection Tools

Personal Information Form: This form contains a total of 19 items: 13 questions are related to sociodemographic characteristics, and 6 questions are about disease characteristics.

Asthma Control Questionnaire (ACQ): Developed by Nathan et al. (2004), the scale is suitable for asthma patients aged 12 and over and includes 5 items assessing symptom severity (day/night symptoms, reliever medication use, and daily activity limitation) over the last 4 weeks. It is rated on a 5-point Likert scale (1 = always, 5 = never). Scores range from 5 to 25, with lower scores indicating better asthma control. The original Cronbach's alpha was reported as 0.85; in this study, the internal consistency was calculated as 0.88.

Asthma Quality of Life Questionnaire (AQLQ): This 32-item scale evaluates asthma-specific QOL across four domains: activity restriction, symptoms, emotional function, and environmental stimuli. Each item is rated on a 7-point Likert scale (1 = severely impaired, 7 = not impaired at all), with total score ranges from 32 to 224, where higher scores reflect better quality of life. The original Cronbach's alpha was 0.93; in our study, it was calculated as 0.91.

Pulmonary Function test (PFT): Performed by a single trained technician using a standardized spirometer in the hospital's pulmonary lab. It includes parameters such as FEV1 and FEV1/FVC. Each patient was tested at baseline and 6 weeks later.

Buteyko Breathing Technique Training: Conducted by a certified instructor.

Training format: 4 sessions (2 hours each), delivered over 4 days with a 1-week break after the first day.

Follow-up: Participants were instructed to practice Buteyko breathing for *at least 15 minutes daily over 6 months* in addition to their pharmacologic treatment.

Adherence monitoring: To enhance compliance, participants were contacted weekly by phone. However, no objective daily adherence tool (e.g., video recording) was implemented, which is acknowledged as a limitation.

Control Group Training: In the control group, patient training was not limited to the distribution of the "Life with Asthma" booklet. Based on the content of this booklet, a structured training program was delivered by the outpatient clinic's responsible physician and nurse. The training included interactive sessions covering general

asthma management as well as basic breathing techniques such as abdominal (belly) breathing and diaphragmatic breathing. Each training lasted four sessions (approximately 2 hours per day), paralleling the structure and duration of the Buteyko group's sessions. Thus, the control group also received an active, structured education, albeit with a more general focus and without a specific breathing protocol like the Buteyko method.

Routine care and medication were continued in both groups, and participants were advised to consult their physicians for any changes to their medication. The patients who participated in the training continued their physician control and treatment during the training. They were asked to consult their physicians for drug dose adjustments. Throughout the process, the individuals participating in the research were consulted by the educator by telephone. Patients in the Buteyko group were instructed to perform the exercises at least once a day for 15 minutes for six months with routine pharmacological management.

Ethical Consideration

Before conducting the study, the ethics committee's approval was obtained from Ege University Faculty of Nursing (Date: 11.11.2015 and No: 27344949-516-3007), and written permission was received from Ege University Faculty of Medicine Department of Chest Disease, where the study would be conducted (Date: 13.06.2017 and No: 79299867-100). After patients were informed about the study and their questions were answered, their written and verbal consents were obtained. Permissions to use the scales were obtained via email from the original developers. All principles of the Declaration of Helsinki were complied with during the research process.

Data Collection

Data collection forms were filled out by the researchers using face-to-face interviews for two occasions: baseline and 24th week (second follow-up) visits. For all participants, 4 different study forms, including "Personal Information Form", "Asthma Control Test", "Asthma QOL Questionnaire (AQLQ)", and "Respiratory Function Test" values were filled out for every visit. (Figure 1).

Data Analysis

Research data were analyzed using the SPSS 25.0 package programme. Descriptive statistical techniques (mean, standard deviation, frequency) were used. ANOVA test was used for repeated measurements to evaluate the initial and 6-month repeated measurements. An independent Sample t-test was utilized to compare the values of two samples of two independent groups with normal distribution. The 'Mann-Whitney U' test statistic was analyzed to compare the measurement values of two independent groups that were not normally distributed. Before conducting the statistical tests, the normality of the data was evaluated using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Additionally, skewness and kurtosis values were examined. As all p-values were greater than 0.05 and the skewness and kurtosis values were within the acceptable range of ±1, the data were considered to be normally distributed. Therefore, parametric tests were applied where appropriate.

The dependent variables of the research included Asthma QOL Scale subscale and total scores, and total score from AKT and PFT parameters, which constitute the mean score. The independent variables of the asthmatic individuals participating in the study included the following: to which group do they belong (control and intervention), Buteyko education, age, gender, marital and educational status, occupation, income status, place of residence, chronic disease history, number of admissions to the emergency department due to asthma in the last 12 months, drugs used and the type of inhaler device used.

Results

The patients' mean age was 51.33 ± 7.9 years and 45.41 ± 11.6 years in the intervention and control groups, respectively. In the groups, seven patients (58.3%) were female. The mean duration of disease in the intervention group was 12.82 ± 11.33 years, the frequency of admission to the emergency department due to asthma was 2.08 ± 1.22, and the mean CP values were 11.08 ± 3.94. In the control group, the mean duration of disease was 13.08 ± 6.53 years, the frequency of emergency department admissions due to asthma was 2.33 ± 2.14, and the mean CP values were 9.83 ± 4.73.

No statistically significant difference was found regarding baseline clinical and sociodemographic characteristics, ACLQ, ACQ, pulmonary function tests (PFT) parameters forced expiratory volüme (FEV- lt/s) and FEV/FVC (%) values between the groups ($p > 0.05$) (Table 1).

The second follow-up ACQ scores of the intervention group were found to be statistically significantly lower than those in the control group, indicating improved asthma control. Similarly, AQLQ total, activity restriction, symptoms, and emotional function scores were significantly higher in the intervention group, reflecting better quality of life ($p < 0.05$) (Table 2).

Regarding the mean differences in the pulmonary function tests after six months of post-intervention in both Buteyko and control groups, the FEV1 analysis had a significant increase of 0.41 L/s in the Buteyko group and 0.12 L/s in the follow-up control group. The analysis of FEV1/FVC resulted in a significant decrease of 5.21% in the Buteyko group and an increase of 1.38% in the control group ($p > 0.05$). CP value showed a significant increase of 64% in the Buteyko group and 7% in the control group (Table 3).

Discussion

The present randomized controlled study demonstrated that training with the Buteyko Breathing Technique (BBT) led to significant improvements in asthma control, quality of life, and pulmonary function in patients with asthma. The BBT is grounded in the hypothesis that chronic hyperventilation leads to hypocapnia, resulting in airway hyperresponsiveness and diminished carbon dioxide (CO_2) tolerance. By promoting nasal breathing, reduced respiratory rate, and controlled breath-holding, BBT aims to restore optimal CO_2 levels, thereby enhancing respiratory homeostasis. BT'nin parasempatik sinir sistemi aktivasyonunu artırarak bronşiyal düz kasların gevşemesine ve solunum verimliliğinin artmasına katkıda bulunduğu düşünülmektedir (Bruton & Lewith, 2005, Courtney & Cohen, 2008).

Importantly, the change in ACQ scores in the intervention group exceeded the widely accepted Minimal Clinically Important Difference (MCID) of 0.5 points, indicating a meaningful clinical improvement

Table 1: Baseline Characteristics of the Study Groups (n=24)

Characteristics	Buteyko (n = 12)	Control (n = 12)	P-value
Age (years), Mean ± SD	51.33 ± 7.9	45.41 ± 11.6	0.12†
Female/ Male, n (%)	7 (58.3)/5 (41.7)	7 (58.3)/5 (41.7)	1.00‡
Smoking at home (yes/no), n (%)	4(33.32)/8 (66.7)	2(16.71)/10(83.3)	0.34‡
Pet at home (yes/no), n (%)	2(16.71)/10(83.3)	1(8.33)/11 (91.66)	0.11‡
Duration of disease (years), Mean ± SD	12.82 ± 11.33	13.08 ± 6.53	0.96†
Frequency of emergency visits with asthma/ last 6 months, Mean ± SD	2.08 ± 1.22	2.33 ± 2.14	0.11†
CP, duration/second, Mean ± SD	11.08 ± 3.94	9.83± 4.73	0.21†
FEV1 (l/s), Mean ± SD	2.78 ± 0.9	2.3 ± 0.9	0.13†
FEV1/FVC (%), Mean ± SD	92.12 ± 13.15	90.22 ± 11.75	0.39†
Baseline AQLQ, Mean ± SD	4.33 ± 0.77	4.01 ± 1.52	0.12†
Activity restriction	4.12 ± 0.61	3.91 ± 1.33	0.24†
Symptoms	4.66 ± 1.03	5.22 ± 1.21	0.11†
Emotional function	4.33 ± 0.92	3.75 ± 1.75	0.33†
Environmental stimuli	3.91 ± 1.01	3.31 ± 1.71	0.13†
Baseline ACQ, Mean ± SD	17.61 ± 5.4	16.21 ± 2.71	0.64†
Medications			
Long-acting beta agonist, n (%)	2 (16.7)	3 (25.0)	0.27†
Short-acting beta agonist, n (%)	4 (33.3)	3 (25.0)	1.01†
Antileukotrienes, n (%)	7 (13%)	4 (33.3)	0.09†
Combined drugs, n (%)	5 (41.7)	3 (25.0)	0.21†

n: Number; SD: Standard Deviation; CP: Control Pause; FEV1: Forced Expiratory Volume in One Second; FVC: Forced Vital Capacity; AQLQ: Asthma Quality of Life Questionnaire; ACQ: Asthma Control Questionnaire; †: Student T Test; ‡: Fisher's Exact Test. Note: ACQ scoring range is 5–25; lower scores indicate better asthma control. AQLQ scoring range is 32–224; higher scores reflect better quality of life. Data normality was verified using Kolmogorov-Smirnov and Shapiro-Wilk tests (p > 0.05); skewness and kurtosis values were within ±1.

Table 2: Within-Group Mean Differences in Asthma Control Questionnaire and Asthma Quality of Life Between Groups of Buteyko and Control From Baseline to Six Months (n = 24)

ACQ	Baseline ACQ, Mean ± SD	Six-Month ACQ, Mean ± SD	Mean difference, 95% CI	P-value†
Buteyko	22.1 ± 1.7	17.6 ± 5.4	-4.51 (–0.84 to -0.42)	**0.01***
Control	18.8 ± 2.0	17.0 ± 2.7	-1.8 (-4.1 to -0.11)	0.13
AQLQ	**Baseline AQLQ, Mean ± SD**	**Six-Month AQLQ, Mean ± SD**	**Mean difference, 95% CI**	**P-value†**
Buteyko				
Activity restriction	4.1 ± 0.6	5.5 ± 0.8	1.4 (0.76–2.04)	**p < 0.001****
Symptoms	4.6 ± 1.0	6.1 ± 0.4	1.5 (0.82–2.18)	**0.02***
Emotional function	4.3 ± 0.9	5.5 ± 0.9	1.2 (0.39–2.01)	**0.01***
Environmental stimuli	3.9 ± 1.0	4.6 ± 1.1	0.7 (0.25–1.65)	0.11
Total	4.3 ± 0.7	5.6 ± 0.5	1.3 (0.73–1.87)	**0.01***
Control				
Activity restriction	3.9 ± 1.3	4.1 ± 0.8	0.2 (0.11–0.18)	**0.02***
Symptoms	5.2 ± 1.2	4.6 ± 1.2	0.6 (-0.24–0.33)	0.81
Emotional function	3.7 ± 1.7	4.0 ± 0.9	0.3 (0.21–0.42)	0.26
Environmental stimuli	3.3 ± 1.7	3.8 ± 1.0	0.5 (0.43–0.66)	0.24
Total	4.0 ± 1.5	4.3 ± 0.8	0.3 (0.01–0.02)	0.20

n: Number; SD: Standard Deviation; ***p < 0.05; **p < 0.001**; ACQ: Asthma Control Questionnaire; AQLQ: Asthma Quality of Life Questionnaire; †: Mann–Whitney U Test. Note: ACQ scoring range is 5–25; lower scores indicate better asthma control. AQLQ scoring range is 32–224; higher scores reflect better quality of life

Table 3: Mean Differences in One-Second Forced Expiratory Volume (FEV1), FEV1/FVC, and CP

	FEV_1 (L/s) Mean ± SD	FEV_1/FVC Mean ± SD	CP Mean ± SD
Buteyko	-0.41 (± 0.12)	5.21 (± 3.90)	-7.12 (± 2.81)
Control	-0.12 (± 0.18)	-1.38 (± 1.41)	-0.65(± 0.11)
P-value †	**0.02***	**0.03***	**0.001***

SD: Standard Deviation; ***p < 0.05**; CP: Control Pause; FEV1: Forced Expiratory Volume in One Second; FVC: Forced Vital Capacity; AQLQ; †: Mann-Whitney U test.

in symptom control and daily functioning (Juniper et al., 1999; Wyrwich et al., 2011). Specifically, the intervention group's ACQ scores decreased, reflecting enhanced asthma control. Likewise, the increase in AQLQ total scores surpassed the MCID threshold of 0.5, showing a clinically significant improvement in patients' perceived quality of life (Juniper et al., 1999; Wyrwich et al., 2011). Statistically significant and clinically meaningful changes were observed across key domains of activity limitation, emotional function, and symptom burden, underscoring a holistic enhancement in patients' disease experience. The findings of the study show that the BBT can improve asthma control in patients with asthma. The findings of the study are similar to the results of the studies by Cowie et al. (Cowie et al., 2008) and Hassan et al. (Hasaan et al., 2012). Cowie et al. (2008) showed that the outcome of BBT asthma control, which was 40% at the first follow-up, increased to 70% after intervention (Cowie et al., 2008). Parallel to our research, McHugh et al. (2003) have reported that BBT positively affects the symptom scores of patients and is a safe and effective method in disease control (McHugh et al., 2003). Opat et al.'s (2000) study results support the research results, and the QOL of asthmatic patients who have learned BBT through video training has been demonstrated to improve significantly (Opat et al., 2000).

Additionally, the increase in Control Pause (CP) by 64% in the intervention group aligns with previous findings and reflects improved ventilatory efficiency and reduced hyperventilation responses (Hassan et al., 2012). Regarding pulmonary function, improvements in FEV_1 and FEV_1/FVC ratios were observed post-intervention. While some previous studies reported inconsistent effects of BBT on PFT parameters (McHugh et al., 2003; Azab et al., 2017), our findings contribute to emerging evidence suggesting respiratory physiological benefits associated with structured breathing training. Prasanna et al., in their study with newly diagnosed asthmatic patients, similarly to Cahavda and Shah, who studied obese asthmatic children, and Udayani et al., found that walking exercise together with Buteyko breathing increased the FEV1 value (Chavda & Shah, 2016; Prasanna et al., 2015; Udayani et al., 2019). However, studies concluding that the intervention does not affect respiratory parameters were also found (Azab et al., 2017; McHugh et al., 2003).

Furthermore, the literature includes several studies investigating the efficacy of breathing exercises in asthma management. Anshu et al. (2023) examined the potential benefits of yoga techniques in asthma management and emphasized the need for larger and longer-term studies. Additionally, Prem et al. (2013) compared the effects of Buteyko and pranayama breathing techniques on the quality of life in asthma patients and found that both techniques showed positive effects. Studies have also demonstrated that diaphragmatic breathing exercises improve the quality of life in asthma patients (Hamasaki, 2020; Karam et al., 2017). These findings suggest that breathing exercises can be considered a potential complementary therapy in asthma treatment. However, the effectiveness of each technique may vary depending on individual differences and the duration of application. Therefore, further research is needed on the use of breathing exercises in asthma treatment.

From a clinical perspective, exceeding the MCID thresholds indicates that patients likely perceived less symptom burden, improved functional status, and enhanced well-being, factors known to contribute to better treatment adherence and reduced exacerbation risk. Thus, BBT may serve as a cost-effective, non-pharmacologic adjunct to standard asthma care, particularly when delivered under the guidance of trained healthcare professionals.

The Buteyko Breathing Technique (BBT) represents an effective non-pharmacological approach that complements pharmacological treatments in asthma management and holds significant potential within nursing practice. Nurses, as primary health professionals responsible for patient education and adherence support, play a pivotal role in the implementation of BBT. When combined with nurses' therapeutic communication skills, this technique enables patients to improve respiratory control and enhance quality of life.. Therefore, incorporating BBT education into nursing practice is critical not only for optimizing asthma control but also for providing cost-effective contributions to healthcare systems. Systematic integration of BBT into nursing care models will strengthen holistic approaches that promote both physical and psychosocial improvements in patients.

Nevertheless, the study's small sample size (n = 24) and short follow-up period (6 weeks) call for cautious interpretation and highlight the need for larger, multi-center trials with extended follow-up to validate generalizability and sustainability of these results.

Limitations of the Study

The study was conducted in a university hospital, following up on asthma patients for a certain period of time. In order to be generalisable and applicable, it can be suggested that research on the subject (which may include the effect on peak expiratory flow rate and evaluation of the difference from other respiratory techniques) should be performed in larger patient groups. The technique was applied to only asthma patients who met the inclusion criteria, not all who applied to the clinic. Although both groups received equal-duration active training, the Buteyko group was exposed to a specific technique with daily practice, while the control group received general education, including basic breathing techniques. This distinction should be taken into account when interpreting the results.

Conclusion

In conclusion, this study demonstrated that the Buteyko Breathing Technique (BBT) contributed significantly to disease control, reduced symptoms, and improved quality of life in patients with asthma. The findings indicate clinically meaningful improvements in asthma control and quality of life, supported by effect size calculations. However, due to the small sample size and single-center design, these results should be interpreted with caution and further validated in larger, multi-center studies. BBT, as a complementary approach, incorporates breath control and breath-holding exercises that aid in asthma symptom management. Nurses play a pivotal role in implementing such non-pharmacological interventions through patient education, counseling, and monitoring of home exercises. Future research should explore the effectiveness of BBT across diverse age groups, long-term follow-up outcomes, and comparative studies with other breathing techniques to better understand its clinical applicability.

Ethical Considerations: Ethical approval for the study was obtained from the Ege University Faculty of Nursing Ethics Committee (Date: 11.11.2015 and No: 27344949-516-3007).

Author Contribution: Study Idea (Concept) and Design – SBİ, ÖUY, AA, ME; Data Collection / Literature Review – SBİ, SÜ, MH; Analysis and Interpretation of Data – SBİ, SÜ, FA; Preparation of the Article – SBİ, SÜ, MH, ÖG; Approval of the Final Version to be Published – SBİ, SÜ, FA, MH, ÖG, ME, ÖUY, AA.

Peer Review: External independent.

Conflict of Interest: The author report no conflicts of interest.

Sources of Funding: This study has been supported by the Ege University Aliye Üster Foundation (Project no: 5-2018).

Acknowledgements: The researchers thank to Ege University Planning and Monitoring Coordination of Organizational Development and Directorate of Library and Documentation for their support in editing and proofreading service of this study. The researchers would like to thank Ms. Funda Aşkınoğlu for the patient education and counselling she has provided and Ms. Hatice Uluer for the statistical analysis. The researchers are grateful to all the patients who took part in the study.

References

Anshu, Singh, N., Deka, S., Saraswati, P., Sindhwani, G., Goel, A., & Kumari, R. (2023). The Effect of yoga on pulmonary function in patients with asthma: A meta-analysis. *Complementary Therapies in Clinical Practice, 50,* 101682. doi: 10.1016/j.ctcp.2022.101682

Azab, A., Moawd, S., & Abdulrahman, R. (2017). Effect of Buteyko Breathing Exercises versus yoga training on pulmonary functions and functional capacity in children with bronchial asthma: A Randomized controlled trial. *Journal of Rehabilitation Medicine, 6*(1), 148. doi: 10.5455/ijtrr.000000234

Boulet, L.P., Reddel, H.K., Bateman, E., et al. (2021). The Global Strategy for Asthma Management and Prevention (GINA): 2021 update. *European Respiratory Journal*, *57*(6), 2004082. doi: 10.1183/13993003.04082-2020

Bowler, S.D., Green, A., Mitchell, C.A. (1998). Buteyko breathing techniques in asthma: A Blinded randomised controlled trial. *Medical Journal of Australia,* 169(11- 12), 575–578. doi: 10.5694/j.1326-5377.1998.tb123422.x

Bozkurt, N., Bozkurt. A.İ. (2015). Relationship between symptom control and life quality in asthma. *Dicle Medical Journal*, *42*(2), 208-213. doi: 10.5798/diclemedj.0921.2015.02.0559

British guideline on the management of asthma, a national clinical guideline (2019) .https://www.brit-thoracic.org.uk/quality-improvement/guidelines/asthma/ Accessed 12 July 2023.

Bruton, A., & Lewith, G. T. (2005). The Buteyko breathing technique for asthma: a review. *Complementary Therapies in Medicine, 13*(1), 41–46. https://doi.org/10.1016/j.ctim.2005.01.003

Bruton, A., & Thomas, M. (2011). Breathing therapy for asthma: A review of complementary and alternative therapies. *Journal of Asthma, 48*(6), 629–639. doi:10.3109/02770903.2011.580067

Chavda, M.V. & Shah, H.M. (2016). To compare the efficacy of pursed lip breathing and Buteyko breathing technique to reduce the symptoms of exercise-induced asthma in obese children. *International Journal of Current Research, 8*(7), 35058-35064. doi: 10.24941/ijcr.2017

Cooper, S., Oborne, J., Newton, S., Harrison, V., Thompson, C.J., Lewis. S., et al. (2003). Effect of two breathing exercises (Buteyko and pranayama) in asthma: A Randomised controlled trial. *Thorax, 58*(8), 674–679. doi: 10.1136/thorax.58.8.674

Courtney, R., & Cohen, M. (2008). Investigating the claims of Konstantin Buteyko, M.D., Ph.D.: the relationship of breath holding time to end tidal CO2 and other proposed measures of dysfunctional breathing. *Journal of Alternative and Complementary Medicine, 14*(2), 115–123. doi: 10.1089/acm.2007.7204

Cowie, R.L., Conley, D.P., Underwood, M.F., Reader, P.G. (2008). A randomised controlled trial of the Buteyko technique as an adjunct to conventional management of asthma. *Respiratory Medicine, 102*(5), 726–732. doi: 10.1016/j.rmed.2007.12.012

Fesci, H., & Görgülü, Ü. (2005). Asthma and life. *Journal of Hacettepe University School of Nursing,* 77- 83.

George, M., & Topaz, M.A. (2013). Systematic review of complementary and alternative medicine for asthma self-management. *Nursing Clinics of North America*, *48* (1), 53-149. doi: 10.1016/j.cnur.2012.11.002

Hamasaki, H. (2020). Effects of diaphragmatic breathing on health: A Narrative review. *Medicines (Basel, Switzerland), 7*(10), 65. doi: 10.3390/medicines7100065

Hassan, Z.M., Riad, N.M., & Ahmed, F.H. (2012). Effect of Buteyko breathing technique on patients with bronchial asthma. *The Egyptian Journal of Chest Diseases and Tuberculosis*, *61*(4), 235-241. doi:10.1016/j.ejcdt.2012.08.006

Hossyny, E., Caraballo, L., Casale, T., El-Gamal, Y., Rosenwasser, L. (2017). Severe asthma and quality of life. *World Allergy Organization Journal*, 10-28. doi: 10.1186/s40413-017-0159-y

Huo, N., Ray, G.E., Mehta, S., & LoBello, S.G. (2015). Complementary and alternative medicine use among people with asthma and health-related quality of life. *Journal of Asthma, 52*(3), 308-313. doi: 10.3109/02770903.2014.963867

Karam, M., Kaur, B. P., & Baptist, A. P. (2017). A modified breathing exercise program for asthma is easy to perform and effective. *The Journal of Asthma: Official Journal of The Association for the Care of Asthma, 54*(2), 217–222. doi: 10.1080/02770903.2016.1196368

Juniper, E. F., O'Byrne, P. M., Guyatt, G. H., Ferrie, P. J., & King, D. R. (1999). Development and validation of a questionnaire to measure asthma control. *European Respiratory Journal*, *14*(4), 902–907.

Levy, M.L., Bacharier L.B., Bateman, E., Boulet, L.P, Brightling, C., Buhl, R., Brusselle, G., ... Reddel, H.K. (2023). Key recommendations for primary care from the 2022 Global Initiative for Asthma (GINA) update. *Nature Partner Journals Primary Care Respiratory Medicine, 33*(1), 7. doi: 10.1038/s41533-023-00330-1

McHugh, P., Aitcheson. F., Duncan, B., Houghton, F. (2003). Buteyko Breathing Technique for asthma: An effective intervention. *The New Zealand Medical Journal, 116*(1187), 710-716. doi:10.1016/j.rmed.2007.12.012

Nathan, R.A., Sorkness, C.A., Kosinski, M., Schatz, M., Li, J.T., Marcus, P., et al. (2004). Development of the asthma control test: A survey for assessing asthma control. *The Journal of Allergy and Clinical Immunology, 113*(1), 59-65. doi: 10.1016/j.jaci.2003.09.008

Opat, A.J., Cohen, M.M., Bailey, M.J., Abramson, M.J. (2000). A clinical trial of the Buteyko Breathing Technique in asthma as taught by a video. *Journal of Asthma*, *37*(7), 557–564. doi: 10.3109/02770900009090810

Prasanna, K.B., Sowmiya, K.R., & Dhileeban, C.M. (2015). Effect of Buteyko breathing exercise in newly diagnosed asthmatic patients. *International Journal of Medicine and Public Health*, *5*(1), 77-81. doi:10.4103/2230-

8598.151267

Prem, V., Sahoo, R.C. & Adhikari, P. (2013). Comparison of the effects of Buteyko and pranayama breathing techniques on quality of life in patients with asthma - a randomized controlled trial. *Clinical Rehabilitation, 27*(2), 133–141. doi: 10.1177/0269215512450521

Priyalatha, G., Geetha, C. & Renuka, K. (2018). Effectiveness of buteyko breathing exercise (BBE) on respiratory outcome among children with bronchial asthma admitted in the paediatric unit of mgmcri, Puducherry. *International Journal of Applied Research, 4*(10), 413–418.

Tokem, Y. (2006). Astımlı hastalarda tamamlayıcı ve alternatif tedavi kullanımı. *Tüberküloz ve Toraks Dergisi, 54*(2), 189-196.

Udayani, W., Amin, M. & Makhfudli, M. (2019). The effect of the combination of buteyko breathing technique and walking exercise on forced peak expiratory flow ın adult asthmatic patients. *Jurnal Keperawatan Padjadjaran*, *7*(2), 190-199. doi.org/10.24198/jkp.v7i2.1193

Wyrwich, K.W., Khan, S.A., Navaratnam, P., Nolte, H., Gates, D.F. Jr. (2011). Validation and agreement across four versions of the asthma control questionnaire in patients with persistent asthma. *Respiratory Medicine,105*(5), 698–712