- *Basic Research*

Comparison of the Effects of Buteyko and Diaphragmatic Breathing Technique on Improving Pulmonary Functions and Asthma Control among Patients with Bronchial Asthma

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Abstract

Background: Asthma is a necessary health condition in both developing and developed countries. Breathing training exercises have been used as a non-pharmacological treatment for asthmatic patients worldwide. ***The aim of the study was*** to compare between the effects of buteyko and diaphragmatic breathing techniques on improving pulmonary functions and asthma control among patients with bronchial asthma (BA). ***Subjects and Method:*** The researchers utilized a quasi-experimental design. Sixty patients participated in this study divided into 2 equal groups; group I, that performed the buteyko breathing technique, and group II, that performed the diaphragmatic breathing technique. Three tools were used for data collection, tool I, the demographic and clinical data sheet, including: Part (1): the demographic data sheet, and Part (2): the health-related data sheet. Tool II: Pulmonary Function Assessment Tests to assess pulmonary function, and Tool III: The Asthma Control Test to assess asthma control symptoms. ***Results***: The study findings showed a significant improvement in pulmonary function and asthma control symptoms in both groups after implementing buteyko and diaphragmatic breathing exercises. ***Conclusion***: Both buteyko and diaphragmatic breathing exercise were effective in improving pulmonary function and asthma control in patients with BA, but buteyko was slightly more effective than diaphragmatic breathing exercise.

Keywords: Asthma Control, Bronchial Asthma, Buteyko, Diaphragmatic Breathing Technique, Pulmonary Function.

1- Introduction:

Breathing is very important for life; it affects all body parts' functions. Asthma disease affects the lungs, leading to frequent episodes of chest tightness, wheezing, breathlessness, and coughing in the morning and at night. It affects all age groups in both developing and developed countries. About 21% of adults suffer from severe wheezing episodes, with varying incidence in different countries ranging between 1%–8% **(Global Initiative for Asthma, 2019)**. The prevalence of BA in Egypt is about 13.4% (**El-Gilany, El Desoky, El-Hawary, & Farrag, 2018**).

The common causes of asthma include smoking, family history, allergies, viral respiratory infections, obesity, and air pollution **(American Lung Association, 2023)**. Asthma management involves pharmacological and physical therapy. Pharmacological treatment is through using bronchodilators and inhaled corticosteroids, while physical therapy is applied to reduce chronic symptoms, prevents exacerbations, maintain normal pulmonary function, reduce the need for hospitalization, and prevent loss of lung function **(Swathi, Kumar, Raghunadh, & Margrett, 2021)**.

Both pharmacological treatment and breathing techniques showed better results in improving pulmonary function and reducing asthma symptoms. Recently, there has been a global concern for the treatment of asthma through physical therapy and complementary alternative medicine (CAM). Buteyko breathing technique is one of CAM techniques that is becoming more prevalent. It was developed by Dr. Konstantin Buteyko in Russia in 1952 **(Villareal, Villazor, Villegas, Visaya, Vista, Tan, & Florendo, 2014)**. This technique is known as a golden cure for asthmatic patients, it aims to teach people how to hold their breathing, causing a decrease in hyperventilation, and integrate shallow breathing with relaxation **(Arora & Subramanian, 2019)**.

Diaphragmatic breathing exercise is considered as the primary breathing technique for patients with asthma. It leads to the release of CO2 from the lungs, reduces the load of breathing, and improves perfusion and ventilation **(Thomas & Bruton, 2014)**. Additionally, it increases inspiratory capacity because weakness of inspiratory muscles affects breathing skills and motor performance **(Moodie, Reeve, & Elkins, 2011)**. Limited studies have discussed the effect of the two methods on pulmonary function and asthma control in asthmatic patients. Therefore, this study was conducted to compare the effects of buteyko and diaphragmatic breathing techniques on improving pulmonary functions and asthma symptoms control among patients with BA.

2- The study aim was to:

Compare between the effect of buteyko and diaphragmatic breathing technique on improving pulmonary functions and asthma control among patients with bronchial asthma.

Research Hypotheses:

H1: There will be a significant improvement in pulmonary functions and asthma control among patients with bronchial asthma between pre- and post-intervention for patients using buteyko breathing technique.

H2: There will be a significant change in pulmonary functions and asthma control among patients with bronchial asthma between pre- and post-intervention for patients using diaphragmatic breathing techniques.

H3: A significant difference will be found between the two groups in pulmonary functions and asthma control among patients with bronchial asthma post-intervention.

3- Methods:

3.1 Study Design: researchers applied a quasi-experimental (pretest-posttest design).

3.2 Setting: This study was conducted at the chest diseases department at Mansoura University Hospital. Data collection for this study lasted for three months

3.3 Sample size: A purposive sampling technique was implemented in this study. There were 60 stable asthmatic patients in the study sample. Estimation of sample size was performed using open Epi (https://www.cdc.gov/epiinfo/index.html) to calculate sample size of two groups. Mean difference module was used; this module calculates sample size by comparing two means. Estimation based on previously reported improvement in pulmonary functions **(Agarwal, Gupta, & Sood, 2017)**.

Each group consisted of 30 participants to achieve 80% statistical power, alpha error level 5% (95% significance), participants were divided randomly into 2 experimental groups, group I (performing Buteyko Breathing Technique) and group II (performing Diaphragmatic Breathing Technique). The subjects were selected based on the following criteria.

Inclusion criteria:

- Both sexes aged from 18-60 years
- Diagnosed with bronchial asthma for more than one year
- Patients who were conscious and cooperative
- Patients who were able to understand and follow instruction

Exclusion criteria:

- Patients who had other chronic respiratory diseases, new or current smoker, and had respiratory tract infection.

3.4 Tools: the researchers used three tools as following;

Tool 1: Demographic and Clinical Data Sheet:

Researches developed this tool based on current literature review (**Abouuelala, Sherif, Elshamy, & Shalabi, 2017**) and it is divided into two parts; ***Part (1): Demographic Data Sheet***: It was used to gather personal data such as gender, age, occupation, marital status, and educational level. ***Part (2) Health related data sheet:*** This part included data such as body mass index, duration of disease, smoking condition, family history, and other chronic diseases.

Tool II: Pulmonary Function Tests:

This tool created by researchers based on reviewed literature (**Hassan, Riad, & Ahmed, 2012)**. The pulmonary function tests were recorded using a spirometer, to measure Forced Vital Capacity (FVC), Peak Expiratory Flow Rate (PEFR) in L/min, Vital Capacity (VC), Forced Expiratory Volume in one second (FEV1), and FEV1/FVC ratio.

Tool III: The Asthma Control Test (ACT):

The ACT was a commonly used tool to assess asthma control; it was adopted from **(Nathan, Sorkness, Kosinski, Schatz, Li, Marcus, Murray, & Pendergraft, 2004)** to assess asthma control in the past 4 weeks. It consisted of 5 items: shortness of breath, limitation of activity, frequency of night symptoms, use of rescue medication, and rating of the overall control of the disease over the past 4 weeks.

Scoring for each item ranged from (1), which indicated the worst, to (5), which meant the best; the highest score is 25, and its levels are categorized as follows:

- Controlled: ACT scored 20 or more.
- Partly controlled: ranged between 16-19.
- Uncontrolled: when scored less than 16**.**

Validity and reliability: The questionnaire was finalized with the assistance of 5 experts from the Nursing and Medical Faculty staff to assess the tools' content validity and make the required modification. Its reliability according to Cronbach's alpha was (0.83), and reliability for ACT was (0.85) according to **(Schatz, Pharmd, James, Marcus, Murray, Nathan, Kosinski, Pendergraft, & Jhingran, 2006).**

A pilot study: was conducted, involving a sample of 10% of the target population of patients, who were subsequently excluded from the study. A pilot study was done to check and ensure clarity and applicability of the tools.

Ethical consideration: Assent from the Faculty of Nursing's Research Ethics Committee was obtained with reference No. (P.0479), as well as consent from hospital administrator to conduct this study, and written informed consents were obtained from participants.
Filed work: was passed in three phases.

Preparatory phase:

- Researchers first met patients and gave them an explanation of the study's goal.
- Participants were assigned randomly into two groups: group I, that was trained to perform Buteyko Breathing Technique, and group II, that was trained to perform Diaphragmatic Breathing Technique.
- An individual interview for each patient was necessary to collect baseline data based on the study tools.

Implementation phase:

- After the pre-assessment, researchers' demonstrated buteyko for group I and diaphragmatic breathing technique for group II through videos on smart phones and a brochure given to patients.
- Each session takes 15–20 minutes until researchers ensure that patients understand how to perform exercises and re-demonstrate them.
- Each group applied it twice per day for a period of 4 weeks.
- Telephone follow-up was used for patients in both groups.

Buteyko Breathing Technique: a type of breathing exercise that used nose with diaphragm not mouth, this improve nitric oxide and carbon dioxide levels in the body, resulting in reduction of blood pressure, activation of parasympathetic nervous system, and strengthening immune system **(Hassan, Riad, & Ahmed, 2012)**.

Patient instructions for the Buteyko Breathing Technique proceed as follows:

- Rested on chair or floor
- Straighten your supine to maintain upright position
- Dangle your respiration muscles.
- Take normal breath for few minutes (2-3 mines).
- Exhale normally, place your fingers over your nose to close it, and hold.
- Record time in seconds
  - ☒ At first, return to normal breathing after liberated nose (Control Pause)
  - ☒ Stay three minutes
  - ☒ As potential hold and renew breath.

Diaphragmatic breathing Technique: is known as abdominal breathing, it's helpful for improving physical performance. Patient is instructed to perform the following steps:

- Rested into a comfortable position
- Put one hand on the stomach and the other hand on your chest.
- Take a breath through the nose, until feeling your stomach is pushing your hand.
- Breathe out through the nose, observing how your stomach relax.
- As tolerated repeat the previous steps.

Evaluation phase:

- After 4 weeks post assessment was done for both groups by using the same tools, and comparison was done between the two methods to determine which method was more effective for improving pulmonary functions and asthma control symptoms.

Data analysis:

Descriptive statistics in the form of frequencies and percentages. Inferential statistics as Independent't' test for comparing between the two experimental groups pre-intervention. Chi square used to detect relation between studied groups and selected demographic variables. Paired t-test used for comparing between pre& post intervention in each group.

Results

Table (1): Demographic data of the studied groups (N= 30 for each group):

This table showed that about 36.6 and 46.7% of the participants in groups I and II, respectively, were aged 50 to 60 years old, with a mean age of 45.866 ±11.007 and 47.833 ±10.770, respectively. More than half of the sample were males (53.3 in group I and 56.7 in group II). Married patients represented 80.0 % and 70.0%, respectively, in groups I and II. Regarding educational level, basic education predominated among participants in groups I (36.7) and higher education in group II (26.7), and one-third of them were housewives and manual workers in both groups (33.3%). As regard to significant difference between two groups regarding demographic data, no significant difference was observed.

Table (2): Health-related data of the studied groups (N=30 for each group):

This table clarified that, BMI was 27.166±2.547 in group I and 26.833±2.587 in group II (53.3% in group I and 43.3% in group II) had BA for 2–5 years. About 73.3 percent in group I and more than half in group II (63.3%) had no family history. The majority of the studied sample never smoked (60% and 70% in group I and II, respectively). About 70% in group I and 56.7% in group II had no chronic disease. There is no significant difference between the two groups.

Table (3) & Figure (1-2): **Comparison of Spirometry values on pulmonary functions among participants in both groups pre and post interventions (N=30 for each group):**

The findings showed that there was a significant improvement in pulmonary functions based on spirometry values. For these Spirometry values, VC, FVC, FEV1, FEV1/FVC%, and PEFR were noted after 4 weeks of the intervention in both groups. The increases in Spirometry values were greater in group 1 than group II. Consequently, it was concluded that intervention in both groups was helpful in improving pulmonary functions. Likewise, there is a significant change in pulmonary functions by an increase in Spirometry values of FEV1/FVC% and PEFR after 4 weeks of the intervention when compared between two groups; it is noticed that there is a greater increase in the mean score of Spirometry values of FEV1/FVC% and PEFR in group I as compared with group II.

Table (4) & Figure (3): Comparison mean score of Asthma Control Test among participants in two groups pre& post intervention (N=30 for each group):

It revealed that the mean score of the ACT was improved post-intervention in both groups, with a higher mean score post-intervention (20.200±1.349 and 19.833±1.876) than pre-intervention (18.600±2.044 &18.466±1.814) in both groups, respectively, and this improvement was also statistically significant ($p = 0.000$). It was noticed that there was a greater increase in the mean score of the ACT post-intervention in group I (20.200±1.349) as compared with group II (19.833±1.876). Otherwise, there is no significant difference in the mean score of the ACT when compared between the two groups ($p = 0.790$ and 0.389, respectively).

Table (1): Demographic data of the studied groups (N= 30 for each group):

Items	Group (1) Buteyko		Group (I1) Diaphragmatic		Total		X2 test (P)
	No=30	%	No=30	%	No=60	%	
▪ **Age (in years)**							
18≥29	2	6.7	3	10.0	5	8.3	
30≥39	8	26.7	4	13.3	12	20.0	1.893
40≥49	9	30.0	9	30.0	18	30.0	(0.595)
50≥60	11	36.6	14	46.7	25	41.7	
Mean &SD of age	45.866±11.007		47.833±10.770				
▪ **Gender**							
Male	16	53.3	17	56.7	33	55.0	0.067
Female	14	46.7	13	43.3	27	45.0	(0.795)
▪ **Marital status**							
Married	24	80.0	21	70.0	45	75.0	
Single	2	6.7	5	16.7	7	11.7	2.629
Widowed	3	10.0	4	13.3	7	11.7	(0.453)
Divorced	1	3.3	0	0.0	1	1.6	
▪ **Educational level**							
Illiterate	1	3.3	3	10.0	4	6.7	
Read& write	6	20.0	6	20.0	12	20.0	
Basic education	11	36.7	6	20.0	17	28.3	8.974
Secondary education	10	33.3	7	23.3	17	28.3	(0.062)
Higher education	2	6.7	8	26.7	10	16.7	
▪ **Occupation**							
Employee	9	30.0	6	20.0	15	25.0	
Manual work	9	30.0	10	33.3	19	31.7	1.991
House wife	10	33.3	9	30.0	19	31.7	(0.574)
No work	2	6.7	5	16.7	7	11.6	

Table (2): Health-related data of the studied groups (N=30 for each group):

Items	Group (1) Buteyko		Group (I1) Diaphragmatic		Total		X2 test (P)
	No=30	%	No=30	%	No=60	%	
▪ **Mean &SD of BMI**	27.166±2.547		26.833±2.587				T test(p) 0.503 (0.617)
▪ **Duration of BA**							
Less than 2 years	8	26.7	12	40.0	20	33.3	1.201
2-5 years	16	53.3	13	43.3	29	48.3	(0.548)
More than 5 years	6	20.0	5	16.7	11	18.4	
▪ **Family history**							
Yes	8	26.7	11	36.7	19	31.7	0.693
No	22	73.3	19	63.3	41	68.3	(0.405)
▪ **Smoking**							
Never smoked	18	60.0	21	70.0	39	65.0	2.308
Stop smoking	12	40.0	9	30.0	21	35.0	(0.315)
▪ **Chronic disease**							
Yes	9	30.0	13	43.3	22	36.7	1.148
No	21	70.0	17	56.7	38	63.3	(0.284)
▪ **Types of chronic disease (comorbidity).**							
Diabetes	4	44.5	4	30.7	8	36.4	2.421
Hypertension	2	22.2	6	46.2	8	36.4	(0.490)
Heart disease	3	33.3	3	23.1	6	27.2	

Table (3): Comparison of Spirometry values on pulmonary functions among participants in both groups pre and post interventions (N=30 for each group)

Pulmonary Function Test	**Group (1) Buteyko (N= 30)**		**Group (I1) Diaphragmatic (N= 30)**		**Independent t test (P) [1]**	**Independent t test (P)[2]**
	Mean± SD		**Mean± SD**			
	Pre-intervention	**Post-intervention**	**Pre-intervention**	**Post-intervention**		
▪ **VC**	3.380±0.404	3.500±0.398	3.426±0.392	3.483±0.371	0.454 (0.652)	0.168(0.867)
Paired-samples t-test (P) [a]	3.756 (0.001) *		2.664 (0.012) *			
▪ **FVC (L)**	3.490±0.345	3.603±0.461	3.536±0.293	3.576±0.290	0.564 (0.575)	0.268(0.790)
Paired-samples t-test (P) [a]	2.734(0.011) *		2.112 (0.043) *			
▪ **FEV_1(L)**	2.900±0.181	3.143±0.238	2.863±0.180	3.013±0.332	0.783(0.437)	1.738(0.88)
Paired-samples t-test (P) [a]	4.294 (0.000) *		2.768 (0.010) *			
▪ **FEV_1/FVC%**	64.800±2.091	69.400±2.761	65.433±1.501	67.566±2.254	1.348(0.183)	2.817(0.007) *
Paired-samples t-test (P) [a]	7.005(0.000) *		4.646 (0.000) *			
▪ **PEFR (L/min)**	280.23±14.018	329.43±16.289	281.20±12.77	313.23±19.619	0.279(0.781)	3.480(0.001) *
Paired-samples t-test (P) [a]	13.010(0.000) *		7.687 (0.000) *			

***Independent t-test (p) 1** *** Independent t t-test (p) 2** ***Paired-samples t-test (P) [a]**

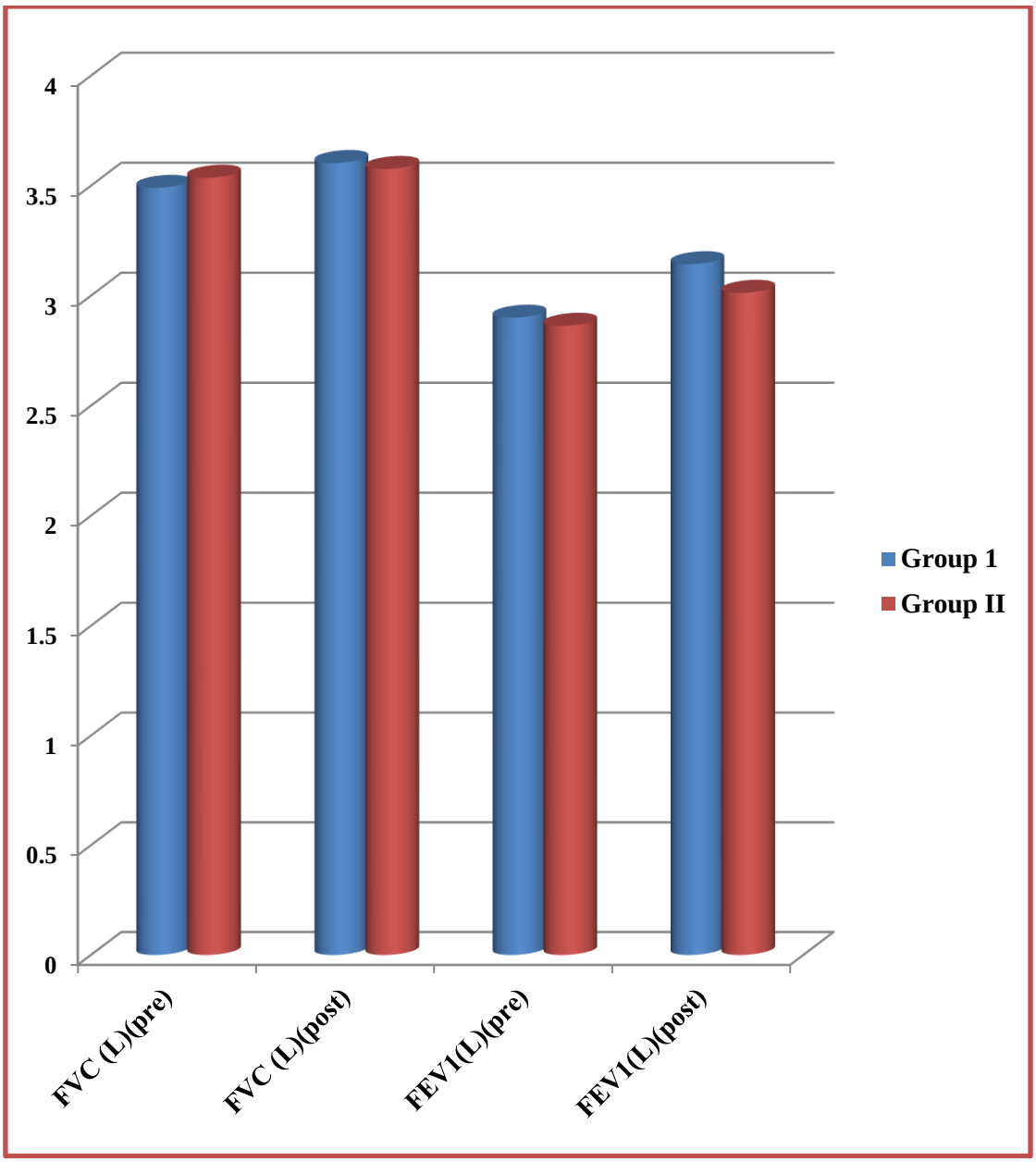

Figure (1): Comparison of mean of FVC & FEV1 (Pre & Post intervention) among participants in both groups (N= for each group)

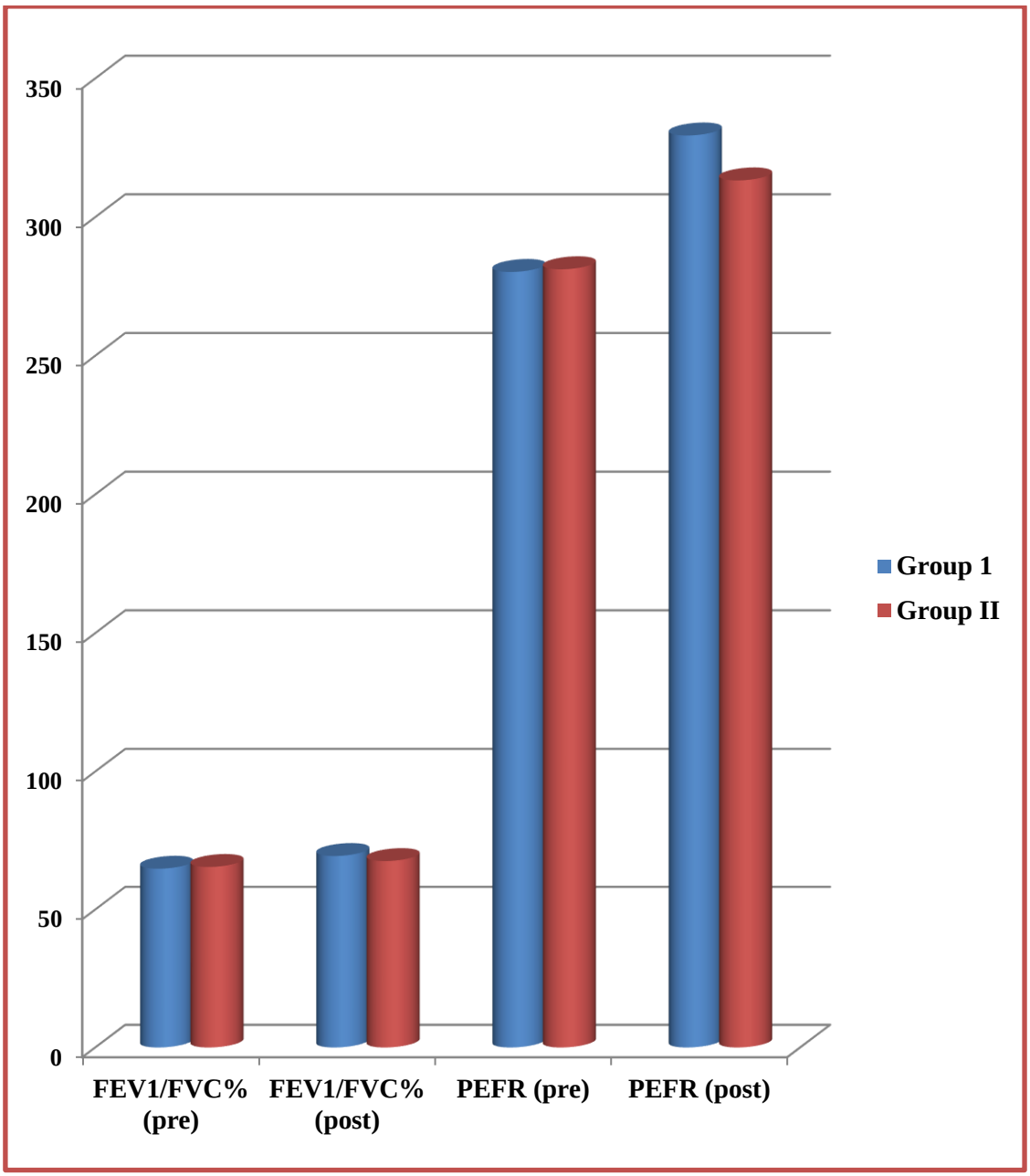

Figure (2): Comparison of mean of FEV1 /FVC % & PEFR (Pre & Post intervention) among participants in both groups (N= 30 for each group)

Table (4): Comparison mean score of Asthma Control Test among participants in two groups pre- and post-intervention (N=30 for each group)

Asthma Control Test	Group (1) Buteyko (N= 30) Mean±SD	Group (I1) Diaphragmatic (N= 30) Mean±SD	Test of significant (independent sample t test)	(P)[1] value
Asthma Control Test (Pre- intervention)	18.600±2.044	18.466±1.814	0.267	0.790
Asthma Control Test (Post- intervention)	20.200±1.349	19.833±1.876	0.869	0.389
Test of significant(P)[2]	4.436(0.000)*	5.882(0.000)*		

Independent sample t test (P[1]. **Paired-samples t-test (P[2]).**

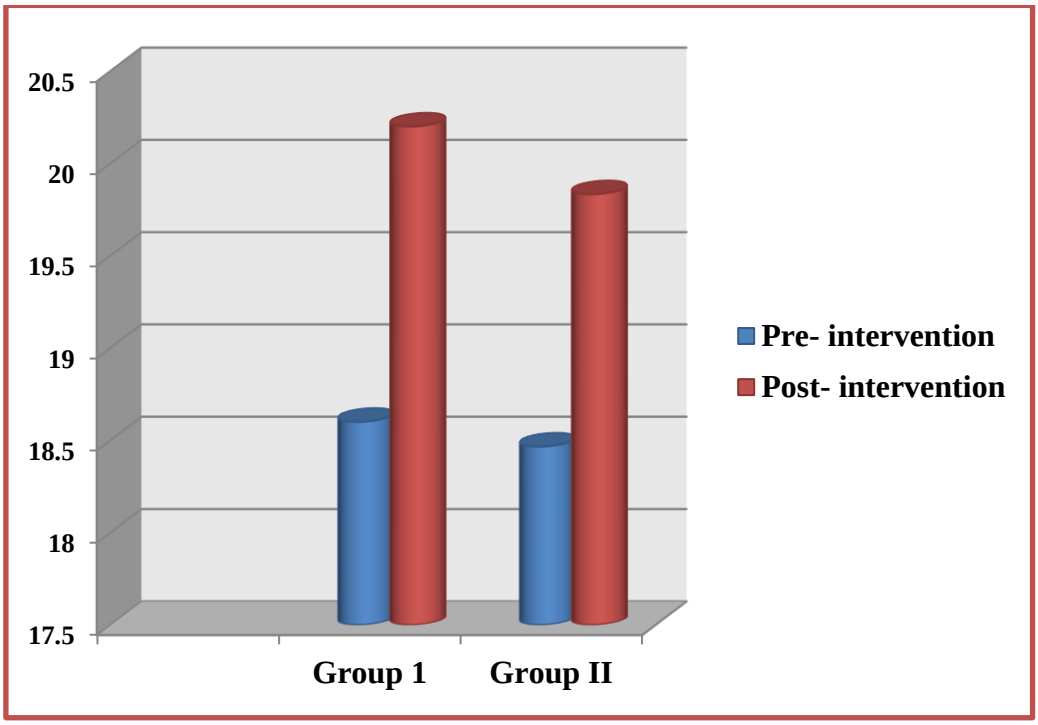

Figure (3): Comparison of mean score of Asthma Control Test among participants in two groups pre& post intervention (N=30 for each group)

Discussion:

Asthma is a chronic health problem that affects both adults and children all over the world, according to WHO **(Hassan, Riad, & Ahmed, 2012)**. Until now, this disease has received little concern and care and will remain a challenge in the future if untreated appropriately (**Abdelakher, Mohammed, Safaa, & Shokry, 2020)**.

Breathing training exercises have been used as a non-pharmacological treatment for asthmatic patients worldwide. They aim to control asthma symptoms and can be performed as diaphragmatic breathing technique, buteyko technique, papworth methods, yogic breathing, or any other intervention that improves breathing patterns **(Harper & Trayer, 2022).** The present research was conducted to compare between the effects of buteyko and diaphragmatic breathing exercises on improving pulmonary functions and asthma control among asthmatic patients.

Regarding demographic data, more than one third of the studied sample were aged between 50 and 60 years; these results are supported by **(Mohamed, Elderiny, & Ibrahim, 2019)** who reported that above half of subjects were aged more than 50 years old, whereas **(Prasanna, Sowmiya, & Dhileeban, 2015)** proved that the majority of subjects age distribution was between 31 and 40 years old. About gender, more than half of the current study participants were males; this finding is in agreement with **(David & Patil, 2022)** who illustrated that male gender represented the largest proportion, while **(Abouelala, Sherif, Elshamy, & Shalabi, 2017)** stated that over half of participants were females. This may be related to the fact that asthma was more common in females after puberty as attributed to sex hormones (**Zein, & Erzurum, 2015)**.

In current study, three quarters of participants were married; this is in line with **(Abouuelala, Sherif, Elshamy, & Shalabi, 2017**) who illustrated that more than half of the participants were married. The current study results denoted that more than one third in group I had basic education, and more than one quarter in group II had higher education. This may be related to the reality that the majority of the study subjects came from rural areas with low education levels. On the other hand (**Uchmanowicz, Panaszek, Uchmanowicz, & Rosiczuk, 2016)** who illustrated that the majority of the sample had high school.

Concerning occupation, approximately one third in group I were housewives, while in group II the same percentage had manual work. This may relate to the fact that manual workers in many jobs may be exposed to allergens in the work environment. In contrast, (**Abouuelala, Sherif, Elshamy, & Shalabi, 2017)** found that more than half of the subjects were unemployed.

The current study detected that BMI was 27.166±2.547 in group I and was 26.833±2.587 in group II. In the same point **(Arora, & Subramanian, 2019)** illustrated that BMI was 21.76±3.675 in experimental buteyko group. About the duration of BA, less than half had BA since 2 to 5 years, in this same line (**Huidrom, Shiroor, & Ray, 2016)** reported that the majority of experimental group had BA since 2 to 5 years.

Concerning family history of BA, more than half of study participants had no family history, while **(Burke, Fesinmeyer, Reed, Hampson, & Carlsten, 2003)** mentioned that family history of asthma is a strong predictor of asthma risk. In relation to smoking habits, more than half of the study sample never smoked; this is in harmony with **(Huidrom, Shiroor, & Ray, 2016)** who reported that more than half of subjects were non-smokers. Regarding comorbid chronic disease, the majority didn't have chronic disease; less than half in group I suffered from DM, while in group II, they suffered from hypertension. In the same point **(Jo, Lee, Kim, Park, & Kim, 2023)** reported that asthmatic patients with co-morbid chronic disease differed based on age and sex, the cost of treatment was higher in patients suffering from five or more chronic diseases.

The findings of this study proved that both buteyko and diaphragmatic breathing technique had a significant effect on the improvement of pulmonary function results, but buteyko technique was more effective than diaphragmatic in some parameter such as FEV1/FVC % and PEFR. This is in harmony with **(Afle, & Grover, 2014)** who illustrated that buteyko was more influential for asthmatic patients than diaphragmatic breathing technique.

The findings of group I proved that there was a significant difference in spirometry values (VC, FVC, FEV1, FEV1/FVC%, and PEFR) after implementing buteyko breathing technique for 4 weeks. This result is supported by (**Hassan, Riad, & Ahmed, 2012**) who reported that after performing buteyko values of PEFR and control pause were improved. Also **(David & Patil, 2022),** found that the Buteyko breathing technique protocol for 4 weeks have led to change into the PEFR and dyspnea level, the purpose of buteyko exercise is to decrease minutes of ventilation and readjust the breathing center to greater CO2 values. A control pause increases CO2 concentration, which penetrates the blood-brain barrier. This penetration resets the respiratory center into the medulla.

Concerning group II, there was a significant change in the mean score of spirometry values VC, FVC, FEV1, FEV1/FVC%, and PEFR after implementing diaphragmatic breathing technique. This is consistent with **(Wedri, Yasa, Sulisnadewi, Sipahutar, Lestari, & Hendrajaya, 2018)** who found that there was a statistically significant difference in peak expiratory flow in patients with asthma after performing diaphragmatic breathing exercise. This may be related to the fact that diaphragmatic breathing exercises can decrease the release of air by reducing intrathoracic volume using abdominal muscles.

The abdominal muscles were deflated, strongly pushing the abdomen inward, pushing the diaphragm into a resting state, leading to the release of air during normal expiration with exceeded capacity in asthmatic patients.

The findings clarified that, no significant difference in the mean score of ACT, when compared between the two groups. A significant improvement in mean score of ACT in group I after implementing buteyko exercise for 4 weeks was observed, these results supported by **(Prasanna, Sowmiya, & Dhileeban, 2015**) who reported that there was a significant difference in the daily asthma symptoms in buteyko group. Also (**Hassan, Riad, & Ahmed, 2012)** proved that buteyko helped to decrease the severity of essential symptoms of BA and its occurrence. In the same line **(Mohamed, Elderiny, & Ibrahim, 2019)** reported that there was a positive effect for practicing buteyko breathing technique on reducing asthma symptoms severity.

There was also a significant difference in the mean score of the ACT in group II after performing diaphragmatic breathing exercises for 4 weeks. This is in accordance with a study carried out by (**Grznar, Suchan, Labudova, Odraska, &Matus, 2022)** which highlighted that adding exercises to pharmacological treatment would improve asthma symptoms.

Conclusion:

The current study concluded that both buteyko and diaphragmatic breathing techniques were effective and beneficial for improving pulmonary functions and ACT among asthmatic patients, but buteyko is slightly more effective than diaphragmatic breathing technique.

Recommendation:

- Enrollment of buteyko and diaphragmatic breathing techniques along with the treatment plan for asthmatic patients.
- Further studies should be conducted with a larger sample and in multi-centers.
- A replicated study can be done for more extended duration of follow up.
- Training nurses who handle asthmatic patients on how to perform buteyko and diaphragmatic breathing techniques.

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الملخص العربي

مقارنة بين تأثير تقنية بوتيكو والتنفس الحجابي على تحسين وظائف الرئة والتحكم في الربو بين مرضى الربو الشعبي

الخلفية: التنفس مهم جدا للحياة فهو يؤثر على وظائف جميع أجزاء الجسم. يصيب مرض الربو الرئتين، مما يؤدي إلى نوبات متكررة من ضيق التنفس والسعال في الصباح والليل. كما إنه يؤثر على جميع الفئات العمرية في كل من البلدان النامية والمتقدمة. أظهر كل من العلاج الدوائي بالإضافة الي تمارين التنفس لمرضى الربو نتائج أفضل في تحسين وظائف الرئة وتقليل أعراض الربو.

الهدف من الدراسة: تقييم تأثير تقنية بوتيكو مقارنة بتقنية التنفس الحجابي على تحسين وظائف الرئة والسيطرة على الربو بين مرضى الربو الشعبي.

تصميم البحث: تم استخدام تصميم شبه تجريبي لإجراء الدراسة

عينه البحث: تكونت العينة من 60 مشاركًا، تم تصنيفهم في مجموعتين متساويتين: المجموعة الأولى التي نفذت تقنية تنفس بوتيكو، والمجموعة الثانية التي نفذت تقنية التنفس الحجابي.

أدوات الدراسة: تم استخدام ثلاث أدوات في هذه الدراسة. الأداة الأولى: ورقة البيانات الديموغرافية والسريرية. الأداة الثانية: اختبارات وظائف الرئة لتقييم وظيفة الرئة. الأداة الثالثة: اختبار السيطرة على الربو لتقييم أعراض السيطرة على الربو.

النتائج: أظهرت النتائج تحسنًا ملحوظًا في وظائف الرئة والتحكم في الربو في كلا المجموعتين بعد تنفيذ تمارين بوتيكو والتنفس الحجابي.

الخلاصة: كلا من تمارين البوتيكو والتنفس الحجابي له دور فعال في تحسين وظائف الرئة والتحكم في الربو لدى مرضى الربو الشعبي، لكن البوتيكو كان أكثر فاعلية بقليل من تمرين التنفس الحجابي.