

Effectiveness of Buteyko Technique, Pursed-Lip Breathing, and Inhaler Technique Program on Asthma Control for Patients with Asthma

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ABSTRACT

Background: Asthma is a chronic inflammatory disease that affects all ages and is still increasing in prevalence. To achieve control, alternative treatment methods can be used such as breathing exercises and correcting the inhalation technique. This study aimed to implement and evaluate the effectiveness of the Buteyko breathing Technique, Pursed lip breathing, and correct inhalation technique program on controlling asthma.

Methodology: A one-group (pre, post-test) pre-experimental study was conducted at the Allergy and Asthma Center / Al-Diwaniyah Teaching Hospital. The total sample was 85 adult patients with asthma. Data were collected by two tools; the first tool was used to collect patients' demographic data, and the second tool Asthma Control Questionnaire (ACQ).

Results: The results showed that the majority of the participants were poor asthma control before implementing the program, and a significant improvement in the post-test after 3 weeks of implementing the program (p-value >0.001).

Conclusion: The results of this study support the effectiveness of the Buteyko breathing technique, Pursed lip breathing, and inhalation technique program on controlling asthma.

Keywords: Asthma Control, Buteyko Breathing Technique, Correct Inhaler Technique, Pursed Lip Breathing.

INTRODUCTION

Asthma is a chronic disease resulting from an inflammatory disorder of the airway that causes hyperresponsiveness of the airways¹. Inflammation of the narrow passages inside the lungs (bronchioles), which makes the airways of an asthmatic patient more sensitive to any external or internal stimulus². The result of this inflammation occurs repeated episodes of wheezing and coughing at night or early in the morning, chest tightness and shortness of breath³. Globally, asthma is considered one of the most common diseases of the respiratory system, with an estimated 300 million asthmatics⁴. According to reports by the Global Asthma Initiative (GINA) on the global burden of asthma, the prevalence of asthma in different countries ranges from 1% to 18% of the population⁵. It is considered one of the most chronic diseases causing absences from work or school and hospital admissions⁶. Studies have indicated that enhancing patients' knowledge and understanding of self-management is the most important educational responsibility of nurses toward their patients⁷.

Breathing exercises are an important component and aid in medical treatment because they improve asthma control and have been widely used because they are low-cost, easy to apply, and safe⁸. Breathing exercises are a nurse-led intervention⁹. Patient education is the primary role of nursing and an important component of promoting self-care¹⁰. Nurses have a major and indispensable role in public health education initiatives because they have the basic competence in assessing health deficits in people and treating these deficits through nurses in improving the participation of their clients in health promotion and maintenance practices¹¹. The nurse must have specialized knowledge to provide a safe and ideal level of patient care¹².

Buteyko Breathing Technique (BBT): In the fifties of the last century, the Russian Dr. Konstantin Buteyko developed the Buteyko breathing technique as an alternative medicine. He identified the causes of hyperventilation, which is an important destabilizing factor in the physiology of asthma¹³. This technique aims to reduce hyperventilation by holding the breath and combining shallow breathing exercises with relaxation¹⁴.

Pursed-Lips Breathing (PLB): It is one of the effective breathing exercises techniques to manage the symptoms of asthma. This technique is based on holding the air during the exhalation process and effectively curling the lips to empty the lung¹⁵. Through this technique, breathing becomes slower and deeper, and the shift from using the diaphragm muscles to using additional breathing muscles leads to less shortness of breath and improved oxygenation. With regular practice, the lungs can be strengthened and more efficient¹⁶.

Correct Inhaler technique: Administering the drug through inhalers is the main treatment for chronic respiratory diseases¹⁷. Incorrect use of inhalers leads to suboptimal asthma control, disease instability, increased hospital visits, and increased financial burden on health care, as a quarter of inhaler costs, are due to incorrect use technique¹⁸. Adherence to preventive measures can reduce the global burden of disease by 70%¹⁹.

AIMS OF THE STUDY

1. to evaluate the program of Buteyko breathing technique, pursed lips breathing, and correct inhaler technique on asthma control.
2. Find out the relationship between the patients' practice of the

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program and their socio-demographic characteristics (age, gender, educational level,).

Subjects and Method: Pre-experimental (one group pretest-posttest) design was used.

Setting: The study was conducted at the Asthma and Allergy Center in Diwaniyah Teaching Hospital. The study was started from 30th October 2022 to 3rd May 2023.

Subjects: A non-probability (purposive) sample was used to select the study sample which consisted of 85 patients who participated in the study.

CRITERIA OF THE SAMPLE:

Inclusion Criteria:

1. Asthma patients who come to the Allergy and Asthma Center in Al-Diwaniyah Teaching Hospital
2. patients from the age of ≥ 18 males and females.
3. patients undergoing treatment with Metered-Dose Inhalers.

Exclusion Criteria:

1. Patients newly diagnosed.
2. Patients with any disability physically or mentally.

ETHICAL CONSIDERATIONS:

Obtaining approval of the Council of the Nursing College / University of Baghdad and the Committee of Ethics and Sobriety of Scientific Research, and the Diwaniyah Health Directorate to obtain official permission to conduct the study at Diwaniyah General Hospital / Allergy and Asthma Center. In addition to the official consent of the participants

TOOLS OF DATA COLLECTION

Tool I: Patient assessment questionnaire: developed by the researcher based on a review of the relevant literature. It includes patients' demographic data.

Tool II: the Asthma Control Questionnaire (ACQ), was developed by²⁰ to assess the level of control. Consists of 6 questions related to patients' experiences during the previous week (night awakenings, morning symptoms, activity restriction, shortness of breath, wheezing, and bronchodilator use). Asthma control levels were categorized into the following levels: Low (<2.5), Moderate (2.5-3.75), (High >3.75).

PROCEDURE:

1. Assessment phase: before implementing the program included documenting patients' demographic data. And assess the level of control of asthma in patients.
2. Implementation phase: the researcher presented a training program consisting of 3 sessions, which included a demonstration presentation, a simplified explanation of asthma, its causes and symptoms, the importance of breathing exercises, the inhalation technique and its steps (based on a review of relevant literature), videos and a booklet in Arabic as educational media for patients. Each session lasted 30 minutes, the first session to teach BBT and the second to teach PLB and the third to teach the correct technique of inhalation.
3. Evaluation phase: was conducted at the end of the program implementation, after 3 weeks of implementation, the level of asthma control was evaluated.

RESULTS:

The demographic characteristics of the patients indicated that the majority (23.52 %) of the age group (28 – 37 years) with mean age (41 + 14.33), (56.5%) of the study subject were females, (69%) were married. In relation to the educational level; the figure demonstrates that (25%) of the patients have Bachelor's degree and most of them (48.2%) been employees. The majority (65%) lived in the City and the majority (77.6%) were not smoking (Table 1).

Table 1: The demographic characteristics of the patients

Demographic Characteristics	n	%
Age	18-27	18.8 %
	28-37	23.52%
	38-47	21.17%
	48-57	22.35%
	58-67	10.588%
	68-77	3.52%
	Mean + SD: 41 + 14.33	
Gender	Male	43.50%
	Female	56.50%
Level Of Education	Read And write	4%
	Primary	14%
	Intermediate	23%
	Secondary	15%
	Diploma	19%
	Bachelor's student	25%
Occupation	Housewife	4.7%
	Employee	28.2%
	Retired	48.2%
	Free Work	11.8%
Residence	city	7.1%
	Rural	65%
Smoking	smoking	35%
	Non-smoking	22.4%
		77.6%

Table 2: Patients' responses toward Asthma Control Questionnaire

No.	ACQ	Pre-test		Post-test	
		Mean ACL		Mean ACL	
1	On average, during the past week, how often were you woken by your asthma during the night?	1.94	L	4.56	H
2	On average, during the past week, how bad were your asthma symptoms when you woke up in the morning?	2.89	M	4.84	H
3	In general, during the past week, how limited were you in your activities because of your asthma?	4.18	H	4.95	H
4	In general, during the past week, how much shortness of breath did you experience because of your asthma?	2.29	L	3.90	H
5	In general, during the past week, how much of the time did you wheeze?	2.30	L	3.61	M
6	On average, during the past week, how many puffs of short-acting bronchodilator (e.g. Ventolin) have you used each day?	3.69	M	4.38	H
7	Total Asthma Control questionnaire	17.31	L	26.27	H

ACL: Asthma control level, L: Low (< 2.5), M: moderate (2.5-3.75), H: High (> 3.75)

This table 2 demonstrates poor asthma control in pre-test specially in items (1, 4, and 5) there is dramatic enhancement in asthma control in post-test, the overall questionnaire records low control and high control in pre-test and post-test respectively.

Table 3: Pretest – Posttest differences of Asthma Control Questionnaire

Paired t Test					
Items	Mean	Std. Deviation	t	Df	Sig. (2-tailed)
Pre-test	17.31	3.57	-29.1	84	0.0001
Post-test	26.27	2.25			

t: paired t test, sig: significance, df: degree of freedom

This table 3 showed that highly statistically significant differences (p-value > 0.001) between pre-test and post-test of patients' asthma control.

DISCUSSION

The demographic distribution of the patients' data showed that the majority of the age group ranged from 28-37, It agrees with²¹ that showed the demographic distribution of age that the majority of patients are between the ages of (28-37) years. According to the patient's gender, more than half of the patients were female. About (65%) live in urban areas this is consistent with²² the results of the study showed that the majority of patients were females (53%), and lived in urban areas (60%). As for the education level, most patients have a bachelor's degree (25%), and about half of the patients are employed (48.2%). It agrees with²³ the results showed that about (24%) of patients graduated with a bachelor's degree, and the majority of them were employed, 48%. Regarding smoking habits, the majority of patients are non-smokers (77.6%), this is consistent with²⁴ that most of the participants were non-smokers (94%).

The main goal of asthma management is to achieve optimal control of the disease. The results of this study showed poor control in the pre-test in relation to symptoms upon waking up in the morning, shortness of breath and wheezing, and a significant improvement in asthma control through ACQ in the post-test after the program, as shown in Table (2). Agrees with²⁵ who conducted a study in Barbados to estimate the proportion of asthmatics who use MDI correctly and to evaluate the control of asthma as a result of the MDI technique. The results showed that 28% of subjects suffered from wheezing in the previous week, while no symptoms appeared in the post-evaluation of patients and there were no symptoms when waking up in the morning, shortness of breath and wheezing. Also agree with²⁶ who conducted a quasi-experimental design study in Egypt to measure the effectiveness of BBT on 50 patients with asthma using ACQ. The study found improvement in all items of asthma control after applying BBT by one month. Also, consistent with²⁷ who conducted a study to evaluate the effectiveness of a short program that includes breathing exercises such as PLB on asthmatic patients, and the results showed improvement in the asthma control test after the program.

The results of the study showed that there were highly statistically significant differences (p-value > 0.001) between the pre and post-test for controlling asthma in patients It is consistent with²⁸ who conducted a study to evaluate the effect of aerobic exercise in improving asthma control and quality of life in adult asthmatic patients. The results showed an improvement in ACQ scores after 6 weeks of the intervention (p-value = 0.02).

Regarding the correlation between Asthma Control Questionnaire with socio-demographic information, the results showed a correlation between asthma control with age and educational level as shown in Table (4). This agrees with²⁹ The results showed a strong correlation

Table 4: Correlation between Asthma Control Questionnaire with socio-demographic information

		Age	Gender	Educational Level	Occupation	Residence	Smoking	ACQ Total
Age	Correlation Coefficient	1.000	-.053	-.119	.152	.145	-.036	-.239*
	Sig. (2-tailed)	.	.629	.276	.166	.185	.742	.028
	N	85	85	85	85	85	85	85
Gender	Correlation Coefficient	-.053	1.000	-.296**	-.653**	-.152	.440**	-.187
	Sig. (2-tailed)	.629	.	.006	.000	.165	.000	.087
	N	85	85	85	85	85	85	85
Educational Level	Correlation Coefficient	-.119	-.296**	1.000	.229*	.205	-.046	.343**
	Sig. (2-tailed)	.276	.006	.	.035	.060	.677	.001
	N	85	85	85	85	85	85	85
Occupation	Correlation Coefficient	.152	-.653**	.229*	1.000	.123	-.330**	.099
	Sig. (2-tailed)	.166	.000	.035	.	.262	.002	.370
	N	85	85	85	85	85	85	85
Residence	Correlation Coefficient	.145	-.152	.205	.123	1.000	-.160	.130
	Sig. (2-tailed)	.185	.165	.060	.262	.	.144	.234
	N	85	85	85	85	85	85	85
Smoking	Correlation Coefficient	-.036	.440**	-.046	-.330**	-.160	1.000	-.027
	Sig. (2-tailed)	.742	.000	.677	.002	.144	.	.804
	N	85	85	85	85	85	85	85
ACQ Total	Correlation Coefficient	-.239*	-.187	.343**	.099	.130	-.027	1.000
	Sig. (2-tailed)	.028	.087	.001	.370	.234	.804	.
	N	85	85	85	85	85	85	85

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Significant correlations were found between Asthma control with age and educational level.

between age and educational level with uncontrolled asthma, where the increasing age and decrease educational level relate to uncontrol of asthma. Patients with a lower level of education have less information about the prevention and control of asthma and a lack of self-management education.

CONCLUSION

The current study showed that the nurse-led educational program consisting of breathing exercises (BBT, PLB) and the correct use of inhalers significantly improved patients' asthma control levels after implementing the program.

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Competing Interest: None

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