



## EFFECTIVENESS OF BUTEYKO BREATHING TECHNIQUE ON LEVEL OF PEAK EXPIRATORY FLOW RATE AND ASTHMA SYMPTOMS AMONG PATIENTS WITH BRONCHIAL ASTHMA.

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### ABSTRACT

This study is intended to determine the effectiveness of Buteyko breathing technique on level of peak expiratory flow rate (PEFR) and asthma symptoms among patients with Bronchial asthma. A quasi-experimental design was chosen to conduct this study, the investigator selected 60 samples by using convenient sampling technique. After the sample selection informed consent obtained, the investigator assessed the PEFR level by using Peak expiratory flow meter and asthma symptoms by using asthma control questionnaire in both experimental and control group. Then the experimental group was trained on buteyko breathing exercises. Repetitive trials were given to the subjects 20-30 minutes twice a day, for duration of 3 weeks. The control group was treated with hospital routine measures. The investigator assessed PEFR Level by using PEFR flow meter and the asthma symptoms by using asthma control questionnaire in both experimental and control group, after three week of buteyko repetitive trials. There was statistically significant improvement in the PEFR level and reduction in the asthma symptoms in the experimental group after Buteyko breathing technique than the control group among patients with Bronchial asthma ( $p < 0.001$ ). Hence the Buteyko breathing technique effective in treatment of Bronchial asthma.

**KEYWORDS:** Peak expiratory flow rate, Buteyko breathing technique, Asthma symptoms, PEFR flow meter.



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## INTRODUCTION

Bronchial Asthma is a serious global health problem. Asthma is a Greek word which means 'breathless' or to breathe with open mouth. The global strategy for Asthma Management and Prevention Guidelines defined asthma as a chronic inflammatory disorder of the airways associated with increased airway hyper-responsiveness, recurrent episodes of wheezing, breathlessness, chest tightness and coughing particularly at night/early morning. Asthma attacks all the age groups. The severity and frequency of attack may vary from person to person.<sup>1</sup> According to World Health Organization (WHO) estimates 300 million people suffer from asthma, 255,000 annual deaths attributed to the disease. The number of people with asthma will grow more than 100 million by 2025.<sup>2</sup> The number of people with asthma continues to grow. One in 12 people (about 25 million, or 8% of the U.S. population) had asthma in 2009, compared with 1 in 14 (about 20 million or 7%) in 2001.<sup>3</sup> Although there is no permanent cure for Asthma, the disorder can be managed in many ways. In olden days 5000B.C people believed Asthma was by the anger of god and people prayed for healing. 1 A.D to relieve asthma they gave fox liver and lungs or drunk wine or milk or massage on the chest.<sup>4</sup> Galen (200AD), an ancient Greek master Clinician described asthma as bronchial obstruction and treated it with owl's blood in wine. At the beginning of the 20<sup>th</sup> century asthma was seen as a psychosomatic disease, with treatment psychoanalysis. Psychoanalysis thought that patient with asthma should be treated with depression. Asthma, as an inflammatory disease, was not really recognized until the 1960 when anti-inflammatory medications started being used. Since the Allergy and Asthma Medical Group and Research center was found in 1969, many therapeutic advances occurred and long and short acting bronchodilators used and inhaled corticosteroids used to reduce the symptom. Today the emphasis on controlling asthma with preventive medicine and using rescue medicine only to treat acute asthma symptoms. Although there is no permanent cure for Asthma, the disorder can be managed in many ways. In asthma management, complementary and alternative medicine is enjoying a growing popularity worldwide. Buteyko Breathing Technique is a form of complimentary or alternative physical therapy that proposes chronic "breathing retraining" as a treatment for asthma as well as other conditions. It is a set of simple breathing exercises to help control asthma and other breathing disorder. At the core of the Buteyko method is a series of reduced- breathing exercises that focus on nasal breathing, breath holding and relaxation.<sup>3</sup> The Buteyko Breathing Technique was originally developed in the 1950s by physiologist Konstantin Pavlovich Buteyko in Russia.<sup>4</sup> This method is based on the assumption that numerous medical conditions including asthma caused by chronically increased respiratory rate (hyperventilation). Normally, when the amount of CO<sub>2</sub> in our blood rises, we breathe. This replaces some of the CO<sub>2</sub> with oxygen, and so lowers the CO<sub>2</sub> level back to

normal.<sup>5</sup> During an asthma attack, people panic and breath too quickly. They actually over breathe because they are breathing so rapidly. This over breathing causes the amount of CO<sub>2</sub> in the blood to fall too low, which can subsequently lead to disturbances of the acid- base balance in the blood and lower tissue oxygen level.<sup>6</sup> The body reacts by causing the airways in the lungs to narrow and reduce the amount of air inhaled in each breath, which panics the patient into trying to breath even harder. Buteyko Breathing Technique will break this "negative feedback" cycle and to breath more shallowly and to tolerate a higher concentration of CO<sub>2</sub> in our blood. In current scenario due to the urbanization and pollution many respiratory problems common among the general population in all age groups. In that one of the main respiratory illness is Bronchial Asthma, urbanization appears to be correlated with an increase in this disease. Asthma is a complex, multi-dimensional condition that affects patients in many ways. Even though patient can get many pharmacological intervention, in real-life poor control of asthma symptoms is common. Prevalence of Asthma has risen, which leads to long term hospitalization, increase mortality, and affects the quality of life of the patient. Having Asthma inherently stressful and psychological problems are common and associated with a poor asthma outcomes. The human and economic burden associated with this condition is severe. Asthma cannot be cured but could be controlled. Medication is not the only way to control Asthma. In asthma management, complementary and alternative medicine is enjoying a growing popularity worldwide. Breathing Exercises have been widely used worldwide as a complementary therapy to the pharmacological treatment of people with Asthma.<sup>7</sup> Buteyko Breathing Technique is a form of complimentary or alternative physical therapy that proposes chronic "breathing retraining" as a treatment for asthma. It is a set of simple breathing exercises to help control asthma and other breathing disorder.<sup>8</sup>

### Objectives

- To assess the level of peak expiratory flow rate and the level of asthma symptoms among Bronchial asthma patients in experimental and control group.
- To determine the effectiveness of Buteyko breathing technique on peak expiratory flow rate and asthma symptoms among Bronchial asthma patients in experimental group.
- To associate the demographic variable and the post test level of peak expiratory flow rate and asthma symptoms among Bronchial asthma patients in the experimental group.

## MATERIAL AND METHODS

### Research design

A Quasi-Experimental pretest posttest design was used to assess the Effectiveness of Buteyko breathing technique on peak expiratory flow rate and Asthma symptoms among Bronchial asthma patients.

**Table1**  
**Schematic Representation of the Research Design**

Group	Pre test	Intervention	Post test
I	O <sub>1</sub>	X	O <sub>2</sub>
II	O <sub>3</sub>	-	O <sub>4</sub>

Group I- The patients with Bronchial Asthma in Experimental group.

O<sub>1</sub> -Pre test assessment of level of Peak expiratory flow rate (PEFR) and Asthma symptoms

X – Buteyko Breathing technique

O<sub>2</sub>- Post test assessment of level of Peak expiratory flow rate (PEFR) and Asthma symptoms.

Group II: Control group

O<sub>3</sub> – Pretest assessment of level of Peak expiratory flow Rate (PEFR) and Asthma symptoms.

O<sub>4</sub> - Post test assessment of Peak expiratory flow Rate (PEFR) level and asthma symptoms.

#### **Variables**

- **Independent variable**

Buteyko Breathing Technique.

- **Dependent variable**

Pulmonary functions in terms of peak expiratory flow rate (PEFR), and asthma symptoms.

#### **Setting**

The study conducted at Saveetha Medical college and Hospitals, Thandalam. It is a 1200 bedded Multi speciality Hospital.

#### **Population**

The population was the clients suffering from bronchial asthma.

#### **Target population**

All patients admitted in Chest Medicine and Medicine Ward.

#### **Accessible Population**

All the patients with Bronchial Asthma admitted in Chest Medicine and Medicine ward in Saveetha Medical College and Hospital.

#### **Sample**

The samples in the study were the clients suffering from asthma who fulfills the inclusion criteria of the study and were admitted in Chest Medicine (Male and Female)and Medicine(Male and Female) ward at Saveetha Medical College and Hospitals, Thandalam.

#### **Sample size**

The sample size was 60. Out of 60 samples, 30 samples were assigned in experimental group and 30 samples in control group.

#### **Sampling technique**

Non Probability - Convenient Sampling was used to select the samples for this study.

#### **Sample selection criteria**

##### **Inclusion criteria**

- Patients 20-60 years of age suffering from Bronchial asthma admitted in Chest Medicine Ward and Medicine ward in SMCH.
- Patients who were on regular treatment (Medication, Inhalers) for Bronchial asthma.
- Patients who were willing to participate in the study.

#### **Exclusion criteria**

- Patients those who were practicing Buteyko Breathing Technique.
- Patients with Mental illness.
- Patients with acute problem (cardio –pulmonary problem)
- Antenatal mothers.
- PEFR level (Green zone-Good control) were excluded.

#### **Tool and scoring procedure**

##### **Part I Demographic Data**

It consists of age, sex, occupation, residence, habits of smoking, Treatment(Alternative medicine treatment) duration of Asthma.

##### **Part II**

Peak Expiratory Flow Rate was checked by using Peak Expiratory Flow Meter. PEFR flow meter has three zones. According to the zones the asthma control was assessed.

#### **Score**

- Green zone-good control
- Yellow zone-caution
- Red zone-medical emergency

#### **Modified Asthma control Questionnaire**

#### **Score**

- Good Control ( $\leq 15$ )
- Better Control (16-20)
- Poor Control (21-30)

#### **Buteyko breathing technique**

Buteyko breathing technique is a set of simple breathing exercises to help and control asthma symptoms. At the core of the Buteyko method is a series of reduced-breathing exercises that focus on

- > Nasal breathing,
- > Breath holding
- > Relaxation.

#### **Ethical clearance**

The research proposal was approved by the scientific review board and it was reviewed by institutional human ethical committee (REF.No.004/12/2015/IEC/SUS) recommended by Saveetha University.

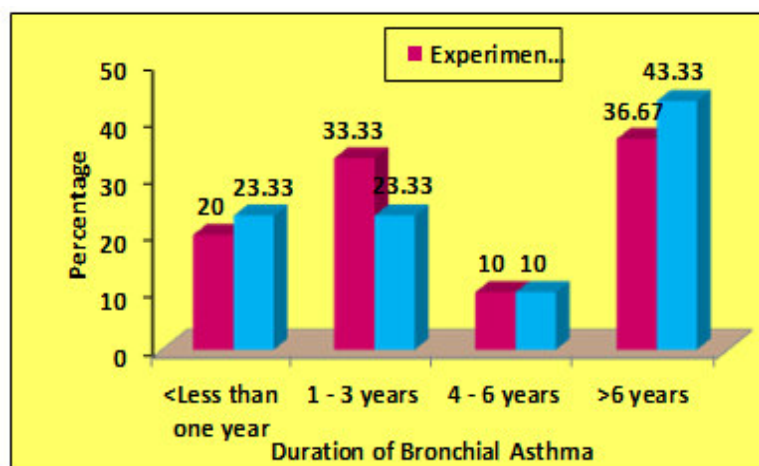
#### **Data collection procedure**

The main study was conducted in at Saveetha Medical college and Hospital, Chennai. Formal permission was obtained from the Scientific Review Board and Institutional Human Ethical committee of Saveetha University. After obtaining the permission from the Chest medicine H.O.D the investigator first selected the samples by using inclusion criteria. 60 samples were selected by using convenient sampling technique. Chest Medicine ward patients kept as experimental group(30 samples) and Medicine ward patients kept as control group(30 samples). PEFR level (Green zone-good control) were excluded from the study. After the sample selection informed consent was obtained from each sample and after the general instructions the investigator collected the demographic data by

structured interview schedule. The investigator assessed the PEFR level by using Peak expiratory flow meter and asthma symptoms by using asthma control questionnaire both experimental and control group. Then the experimental group was trained on Buteyko breathing exercises on the next day. Repetitive trials were given to the subjects 20-30 minutes twice a day, for duration of 3 weeks. The control group was treated with Hospital routine measures. The investigator assessed the PEFR Level by using Peak expiratory flow meter and asthma symptoms by using asthma control questionnaire in both experimental and control group, after three week of buteyko repetitive trials. The Data were analysed by using descriptive and inferential statistics(SPASS 21 version).

**Table 2**  
**Frequency and percentage distribution of demographic variables of bronchial asthma patients in the experimental and control group.**  
**n = 60 (30+30)**

Demographic Variables	Experimental Group		Control Group	
	No.	%	No.	%
<b>Age</b>				
20 - 30 years	8	26.67	9	30.00
31 - 40 years	10	33.33	9	30.00
41 - 50 years	8	26.67	8	26.67
51 - 60 years	4	13.33	4	13.33
<b>Gender</b>				
Male	18	60.00	18	60.00
Female	12	40.00	12	40.00
<b>Occupation</b>				
Profession	5	16.67	0	0.00
Semi professional	1	3.33	0	0.00
Clerical, Shop owner, Farmer	0	0.00	0	0.00
Skilled worker	8	26.67	13	43.33
Unskilled worker (Industry, Factory, Cotton mill)	5	16.67	9	30.00
Unemployed	11	36.67	8	26.67
<b>Residence</b>				
Urban	2	6.67	5	16.67
Semi urban	15	50.00	12	40.00
Rural	13	43.33	13	43.33
Slum	0	0.00	0	0.00
<b>Habits of smoking</b>				
Yes	8	26.67	14	46.67
No	22	73.33	16	53.33
<b>Treatment (Alternate medicine treatment)</b>				
Yes	6	20.00	6	20.00
No	24	80.00	24	80.00



**Figure 1**  
**Duration of Bronchial Asthma**

**Table 3**  
**Effectiveness of Buteyko breathing technique on peak expiratory flow rate among patients with bronchial asthma in the experimental group.**  
*n = 60(30+30)*

	Test	Experimental Group		
		Mean	S.D	't' value
Level of peak expiratory flow rate	Pretest	33.0	6.05	4.951***
	Post test	44.10	12.10	P=0.001, S

\*\*\*  $p < 0.001$ , S – significant

**Table 4**  
**Effectiveness of Buteyko breathing technique on level of asthma symptoms among patients with bronchial asthma in the experimental group.**  
*n = 60(30+30)*

	Test	Experimental Group		
		Mean	S.D	't' value
Level of asthma control	Pretest	23.13	1.04	14.293***
	Post test	19.43	1.16	P=0.001, S

\*\*\*  $p < 0.001$ , S – significant

**Table 5**  
**Effectiveness of Buteyko breathing technique on level of peak expiratory flow rate between the experimental and control group.**  
*n = 60(30+30)*

	Test	Experimental Group		Control Group		Unpaired 't' value
		Mean	S.D	Mean	S.D	
Level of Peak Expiratory Flow Rate	Pretest	33.0	6.05	30.40	5.95	1.676 P=0.099, N.S
	Post test	44.10	12.10	32.06	7.62	4.608 P=0.001, S***

N.S – Not Significant, \*\*\*S- Significant

**Table 6**  
**Effectiveness of Buteyko breathing technique on level of asthma symptoms between the experimental and control group.**  
*n = 60(30+30)*

	Test	Experimental Group		Control Group		Unpaired 't' value
		Mean	S.D	Mean	S.D	
Level of Asthma Control	Pretest	23.13	1.04	23.50	1.79	-0.967 P=0.338, N.S
	Post test	19.43	1.16	22.23	1.89	8.371*** P=0.001, S

\*\*\* $p < 0.001$ , S – Significant, N.S – Not Significant

**Table 7**  
**Association between demographic variables and the post test level of peak expiratory flow rate among patients with bronchial asthma in the experimental group .**  
*n = 30*

Demographic Variables	Medical Emergency		Caution	
	No.	%	No.	%
AGE				
20 - 30 years	2	6.7	6	20.0
31 - 40 years	6	20.0	4	13.3
41 - 50 years	8	26.7	0	0
51 - 60 years	4	13.3	0	0

Chi-Square Value  $\chi^2 = 12.450$ , d.f = 3,  $p = 11.34$ , S\*\*

## DISCUSSION

The main focus of this study was to assess the effectiveness of Buteyko breathing technique on level of peak expiratory flow rate among patients with Bronchial asthma. A total of 60 samples were selected by convenient sampling technique, out of them 30 for experimental and 30 for control group were selected. The study findings were discussed based on the following objectives. The first objective was to assess the level of peak expiratory flow rate and asthma

symptoms in experimental and control group. Asthma is the chronic inflammatory disorders of the airway characterized by frequent attacks of wheezing, chest tightness and cough particularly at the night and early morning. Asthma can be differentiated from chronic pulmonary diseases by checking spirometry and peak expiratory flow meter and asthma symptoms. Severe uncontrolled asthma can be life threatening to the patient. Drugs are used in the management of asthmatic patients. Still it wont improve the quality of life of the asthmatic clients. Long time use of medications

can lead to many adverse effect to the patient. To solve these problem Buteyko breathing technique found to be practiced in the other countries. A study was conducted at Saveetha medical college and hospital, Chennai. All the Bronchial asthma patients who met the inclusion criteria was selected as a sample for the study. The pretest level Peak expiratory flow rate was checked by peak expiratory flow meter and asthma symptoms were checked by asthma control questionnaire in both experiemetal and control group. The Peak expiratory flow rate level in the pretest almost all 30(100%) were in red zone i.e., they were in medical emergency in both experimental and control group. Whereas after the administration of Buteyko breathing technique in post test majority 20(66.67%) were in medical emergency and 10(33.33%) were in caution in experimental group. The pretest level asthma symptoms almost all 30(100%) were under poor control. But in control group in pretest majority 27(90%) were under poor control and 3(10%) were under better control in control group. Whereas after the administration of Buteyko breathing technique in the post test majority 28(93.33%) were under better control and 2(6.67%) were under poor control among bronchial asthma patients in the experimental group. This study was supported by Prasanna.et.al done the study on Buteyko breathing technique,<sup>9</sup> the Peak expiratory flow rate checked in the beginning of the study all patient shown PEFr level in redzone and asthma symptoms was poor in both experimental and control group. This study also supported by Bowler SD et.al done a study to assess the Buteyko breathing technique in asthma:<sup>10</sup> a blinded randomized controlled trial done 39 subjects and pretest level of (PEF or FEV1) checked, significant reduction in the use of chronic rescue inhalers, but no change in the lung functions. After 2 month of Buteyko breathing technique there was an increase in PEFr values for 56% of people in the interventional group and 30% in the control group and there was a good improvement in their asthma control in experimental group. Another study conducted by Narwal Ravinder et.al on 30 Bronchial Asthma patients.<sup>11</sup> Both groups were given treatment 6 days a week for 6 weeks. The pretest level and post test level of Pulmonary function test and dyspnea scale was checked and after administration of Buteyko breathing technique. It is concluded that, majority of the Bronchial asthma patients will have PEFr level in red zone and poor asthma control. It should be managed by non-pharmacological measures like Buteyko breathing technique. The second objective of the study was to determine the effectiveness of Buteyko breathing technique on peak expiratory flow rate and asthma symptoms among Bronchial asthma patients in experimental group. The Increasing prevalence of asthma is a global phenomenon. It is mainly due to hyper responsiveness to the various stimuli results in inflammation on bronchial walls and increased mucus production. This can lead to broncho constriction, difficulty in breathing, cough, chest tightness, etc., Different kind of individual react differently to various triggering factors like house dust mites in bedding, carpets and stuffed furniture, pollution, smoke, chemicals, dust and pollens and pets, etc., Bronchial asthma can be managed by medication even though the quality of life is poor. Now a days Non- pharmacological

interventions play a mojour role in the controlling asthma. In that one of the Non-pharmacological intervention is Buteyko breathing technique. This method was found by Russian physician Mr.Konstantin pavlovich Buteyko to reduce the chronic hyperventilation. This method will help to improve the quality of life of the patients and cost effective. When practicing Buteyko breathing technique is to breath in a very controlled and shallow manner. It should be gentle rhythm of breathing in and out. The steps are Nasal breathing, control pause(breath holding time) and relaxation. Patient can do this exercise by sitting comfortably. This method can be done twice a day for 20 minutes for 3 weeks.Since the researcher has done a study at Saveetha medical college and Hospitals, Chennai with 60 samples were selected. Chest Medicine ward patients kept as experimental group(30 samples) and Medical ward patients kept as control group(30 samples). PEFr level (Green zone-good control) were excluded from the study. The investigator assessed the asthma symptoms by using asthma control questionnaire and PEFr level by using Peek expiratory flow meter in both experimental and control group. Then the experimental group was trained on Buteyko breathing exercises on the next day. Repetitive trials were given to the subjects 20-30 minutes twice a day, for duration of 3 weeks. The investigator assessed the asthma symptoms by using asthma control questionnaire and PEFr Level in both experimental and control group, after three weeks of Buteyko repetitive trials. The findings of the present study showed that effectiveness of Buteyko breathing technique on post test level of peak expiratory flow rate and asthma control. It was found statistically significant at  $p<0.001$  level which indicates that Buteyko breathing technique was found effective in increasing the peak expiratory flow rate and asthma control among bronchial asthma patients in the experimental group. Whereas in the control group, It was found statistically significant at  $p<0.05$  level. There was an increase in the level of peak expiratory flow rate and asthma control among the patients in the control group who had undergone normal hospital routine measures. Hence Buteyko breathing technique is effective. This study was supported by (Prasanna et.al(2015) who was conducted a study on the effects of Buteyko breathing exercise on the newly diagnostic asthmatic patients. The results shows overall subjective improvement of asthma symptoms and peak expiratory flow rate. This study was also supported by Ravinder Narwal,et.al.,(2013) who found out that there was a significant improvement in the PEFr level, and decrease in the levels of dyspnea. This study was also supported by Zebra Mohammed Hassan et.al(2012) who assessed the effectiveness of Buteyko breathing technique on patients with bronchial asthma.<sup>12</sup> The results showed that there was significant increase in Peak expiratory flow rate and decrease in asthma symptoms which was statistically significant. The findings of the study showed that there was a significant association between age and Peak expiratory flow rate. There is a significant difference in the level of peak expiratory flow rate and in the level of asthma symptoms between experimental and control group. Hence the Null hypothesis is accepted.

### **Major findings of the study**

1. Major findings show that there is a difference in the level of peak expiratory flow rate (PEFR) and asthma symptoms before and after administration of Buteyko breathing technique among patients with bronchial asthma in experimental group. It was statistically significant at ( $p < 0.001$ ). It was significant.
2. There was a significant association between age and the post test level of Peak expiratory flow rate, other demographic variables are not significant.
3. There was significant improvement in the peak expiratory flow rate (PEFR) level and reduction in the asthma symptoms in the experimental group after Buteyko breathing technique than the control group among patients with Bronchial asthma. ( $p < 0.001$ ). Hence the stated hypothesis was accepted.

### **Nursing implication**

Nurses predominantly play a vital role of primary care giver in the hospitals setting patient with Bronchial asthma. The nurses are well aware of the symptoms experienced by the patients with bronchial asthma and affects the quality of life of the patient and also nurses aware that breathing exercise improves the lung capacity in the asthmatic patients. Hence, the nurse has to implement complementary therapy like Buteyko breathing technique which reduces the hyperventilation in the asthmatic patients. The implication drawn from the present study is that the Buteyko breathing technique was effective and can be used by health team members Staff nurses, Nurses educators, Nurse practitioners, Nurse administrators and researchers.

### **Nursing practice**

Today, there is an increasing need for quality and holistic care. Buteyko breathing technique will reduce the adverse effects of steroids, and patient quality of life could be improved and most importantly this can be cost effective. Buteyko breathing technique is effective in improving the PEFR level and reducing the asthma symptoms. The study creates awareness among the public and the nurses. Continuous practicing Buteyko breathing technique can reduce the medicine usage.

### **Nursing administration**

Nursing administrators can conduct an inservice education programme on alternative therapies for bronchial asthma patients. Posters of Buteyko breathing technique in the ward can improve the knowledge and attitude regarding buteyko breathing technique. The nurse administrators can formulate policies and procedures regarding Buteyko breathing technique and utilize this strategy for better quality care.

### **Nursing education**

Complimentary therapies like Buteyko breathing technique need to be included in the curriculum. Nurse educator should provide adequate training to the nursing

students regarding Buteyko breathing technique. The subjective nature of the bronchial asthma patients PEFR level and asthma symptoms should be explored during the education process. Students may be given chances to practice and give health education. Workshops, seminars and conferences on this subject can be organized.

### **Nursing research**

It is also observed that the published research studies and trials on Buteyko breathing technique in the Indian setting is very limited. Research should emphasis on non-pharmacological measures of asthma management. The findings of the research need to be disseminated through publications so that the utilization of research findings is encouraged. This findings will help to motivate the nurses to do more research studies in the future in alternative therapies in order to provides comprehensive care to the patient. The findings of the study would help to expand the professional knowledge upon further researches can be conducted.

### **Recommendations**

- A similar study can be conducted as a true experimental study.
- The information regarding the usage and advantage about Buteyko breathing technique can be educated to the public and other health professionals through the conference, seminars, workshop and health education.
- The study can be done on a large number of samples.
- A comparative study can be conducted with other breathing exercises and pranayama.
- A longer period of intervention can be studied for more reliability and effectiveness.
- The Buteyko breathing technique can be considered as one of the primary prevention methods for asthma.

## **CONCLUSION**

This present study shows that Buteyko breathing technique found to be effective improvement of peak expiratory flow rate level and control of asthma symptoms. Hence it is effective in the treatment of bronchial asthma. The Buteyko breathing technique can be considered as primary prevention for asthma. In future this technique can be educated to the public and health professionals through the conference, seminar, workshop and health education. More research can be conducted based on this technique.

## **CONFLICT OF INTEREST**

Conflict of interest declared none.

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