

Effectiveness of Buteyko Breathing Exercise on Respiratory Outcomes among patients with Obstructive Airway Disease.

*Ms. Jaculine Jemima.P, *II M.Sc Nursing,*

Prof. Nirmala. M, M.Sc Nursing, HOD Medical Surgical Nursing,

Dr. Jayasudha. A, PhD, Principal,

PSG College of Nursing, Coimbatore-641 004.

Abstract

As of 2015, 235–330 million people worldwide are affected by Obstructive Airway Disease, and approximately 250,000–345,000 people die per year from the disease. Although there is no permanent cure for OAD, the disorder can be managed by various complementary and alternative therapies. The study was conducted to assess the effectiveness of Buteyko Breathing Exercise on Respiratory Outcomes. True Experimental, Pre test Post test Control Group Research Design and Simple Random Sampling technique was adopted. Buteyko Breathing Exercise was demonstrated two times a day for a week for the interventional group alone, and the post test was conducted for both the groups on the seventh day using Modified ACT, CAT and PEFR. The result revealed that the Buteyko Breathing Exercise was significantly effective on Respiratory Outcomes among patients with OAD. The pre test mean and standard deviation of interventional group for Modified ACT was 9.03 ± 1.87 , CAT was 32.83 ± 3.29 , and PEFR was 47.63 ± 21.12 , whereas post test mean and standard deviation of Modified ACT was 21.07 ± 1.5 , CAT was 13.83 ± 3.78 and PEFR was 67.40 ± 15.40 , whereas the calculated 't' value for Modified ACT, CAT and PEFR was 29.71, 17.38 and 5.62 respectively and given table value was 2.04, and it states that the provision of Buteyko Breathing Exercise was effective for the patients with Obstructive Airway Diseases.

Key words: *Buteyko Exercise, Breathing Exercise, Respiratory Outcomes, Obstructive Airway Diseases.*

Introduction:

Now a days respiratory illness are the common problem of the developing countries. According to American lung association the top three respiratory diseases are Bronchial Asthma, Chronic Obstructive Airway Disease and Lung Cancer. Obstructive Airway Disease (OAD) is characterized by poorly reversible airflow obstruction and an abnormal inflammatory response in the lungs. Although there is no permanent cure for OAD, the disorder can be managed by complementary and alternative therapies, which is growing worldwide. Breathing exercises for COPD are vital since acute COPD exacerbations are always accompanied by increased lungs ventilation: breathing becomes faster and usually deeper. One such effective therapy was Buteyko Breathing Exercise, is a form of complimentary or alternative physical therapy that proposes chronic "Breathing

Retraining” as a treatment for OAD as well as other conditions. It is a set of simple breathing exercises which help to control OAD and other breathing disorder. At the core of the Buteyko method is a series of reduced-breathing exercises that focus on nasalbreathing, breath holding and relaxation. (Bruton A, Thomas M, 2011).

Materials and methods:

True experimental, Pre Test Post Test Control Group Design was adopted with 60 study participants who has got admitted in the Pulmonogy and Medical wards of PSG Hospitals Coimbatore. The study participant who satisfies the inclusion criteria were randomly allocated into the interventional and control group using Simple Random Sampling technique. After obtaining the ethical clearance from the Institution of Human Ethics Committee and written consent, data were collected using Demographic variables, Clinical variables, Modified Asthma Control Test (ACT), COPD Assessment Test (CAT), and Peak Expiratory Flow Rate (PEFR). The PEFR is calculated by, $PEFR = (Height - 80) \times 5$, $PEFR (\%) = \frac{\text{Actual Value}}{\text{Predicted Value}} \times 100$. PEFR among OAD patients were assessed using calibrated Peak Flow Meter and inch tape. After which, Buteyko Breathing Exercise was taught to the interventional group for about 15 minutes twice a day for consecutive seven days, whereas the control group receives only routine care like medication, nebulization and physiotherapy, then the post test was conducted for both the interventional and control group at the seventh day of intervention using the same scale. The collected data were analyzed using descriptive and inferential statistics.

Results:

Table: 1. Frequency and percentage distribution of demographic variables among patients with OAD in interventional and control group. n=60

S. No	Demographic variables	Interventional group		Control group	
		f	%	f	%
1.	Age				
	21 to 40 years	12	40	17	56.66
	41 to 60 years	18	60	13	43.33
2.	Gender				
	Male	20	66.66	17	56.66
	Female	10	33.33	13	43.33
3.	Religion				
	Hindu	21	70	18	60
	Christian	3	10	9	30
	Muslim	6	20	3	10
4.	Place of stay				
	Urban	16	53.33	18	60
	Rural	14	46.66	12	40
5.	Educational status				
	Illiterates	9	30	7	23.33
	Primary education	16	53.33	17	56.66
	Higher Secondary	5	16.66	6	20

	Graduates	0	0	0	0
6.	Occupation				
	Farmer	16	53.33	12	40
	Industrial workers	14	46.66	18	60
7.	Type of family				
	Joint family	15	50	14	46.66
	Nuclear family	15	50	16	53.33
8.	Monthly income				
	Rs. 10,000 to 20,000	15	50	14	46.66
	Rs. 20,000 to 30,000	15	50	16	53.33
9.	Type of house				
	Kutchha	20	66.66	14	46.66
	Sealed	10	33.33	16	53.33
10.	Situation of house				
	Industries	11	36.66	8	26.66
	Highways	3	10	11	36.66
	Farms	16	53.33	11	36.66

Table: 2.Frequency and percentage distribution of clinical variables among patients with OAD in interventional and control group. n=60

S. No	Clinical variables	Interventional group		Control group	
		f	%	f	%
1	Family history				
	Bronchial asthma	7	23.33	7	23.33
	COPD	7	23.33	6	20
	Bronchiectasis	7	23.33	6	20
	None of the above	9	30	11	36.66
2	Duration				
	2 -10yrs	10	33.33	17	26.66
	11 -20yrs	15	50	6	20
	Above 20yrs	5	16.66	7	23.33
3	Triggering agent				
	Pollens	13	43.33	11	36.66
	Allergens	4	13.33	6	20
	Chemicals	13	43.33	13	43.33
4	Frequency				
	Frequently	10	33.33	8	26.66
	2 to 3times/ week	9	30	5	16.66
	Once a week	4	13.33	8	26.66
	Rarely	7	23.33	9	30
5	Smoking habits				
	Non smoker	2	6.66	5	16.66
	Passive smoker	15	50	7	23.33
	Smoker	8	26.66	5	16.66
	Ex smoker	5	16.66	13	43.33
6	OAD symptoms				
	Wheezing	14	46.66	8	26.66

	Chest tightness	4	13.33	12	40
	Coughing	4	13.33	8	26.66
	All the above	8	26.66	2	6.66
7	Pattern of symptoms				
	Perennial	2	6.66	11	36.66
	Seasonal	10	33.33	5	16.66
	Episodic	13	43.33	5	16.66
	Diurnal	5	16.66	9	30
8	Unscheduled care				
	2 or more times/ week	6	20	7	23.33
	Once a week	10	33.33	4	13.33
	Twice a week	4	13.33	8	26.66
S. No	Clinical variables	Interventional group		Control group	
		f	%	f	%
9	Life threatening episodes				
	Frequently	2	6.66	7	23.33
	2 times a week	8	26.66	4	13.3
	Single episode	11	36.66	8	26.66
	Rarely	9	30	11	36.66
10	Activity of daily living				
	Completely dependent	3	10	10	33.33
	Occasionally dependent	7	23.33	8	26.66
	Can do some extent	9	30	5	16.66
	Rarely need the assistance	11	36.66	7	23.33

Table:3. Frequency and percentage distribution of pre and post test score of Respiratory Outcomes among patients with OAD in the interventional and control group.

n=60

Respiratory Outcome	Interventional group				Control group			
	Pre test		Post test		Pre test		Post test	
	f	%	f	%	f	%	f	%
Dyspnea								
No dyspnea	2	6.66	15	50	5	16.66	-	-
Grade I	10	33.33	15	50	10	33.33	18	60
Grade II	18	60	-	-	15	50	12	40
Grade III	-	-	-	-	-	-	-	-
Grade IV	-	-	-	-	-	-	-	-
Oxygen Saturation								
Mild desaturation	18	60	18	60	12	40	15	50
Moderate desaturation	10	33.33	8	26.66	15	50	10	33.33
Severe desaturation	2	6.66	4	13.33	3	10	5	16.66
Cough								
Nil	2	6.66	13	43.33	10	33.33	9	30
With expectoration	12	40	10	33.33	5	16.66	11	36.66
Without expectoration	16	53.33	7	23.33	15	50	10	33.33

Table: 4. Comparison of pre test and post test level of Respiratory Outcomes among patients with OAD in both interventional and control group using paired 't' test. n=60

Parameters	Mean \pm SD		Paired 't' value		df	Table value
	Interventional group	Control group	Interventional group	Control group		
Modified Asthma Control Test (ACT)					29	2.042
Pre test	9.03 \pm 1.87	8.05 \pm 1.63	29.716*	5.13*		
Post test	21.07 \pm 1.5	12.53 \pm 4.76				
COPD Assessment Test (CAT)						
Pre test	32.83 \pm 3.29	27.87 \pm 2.76	17.38*	3.22*		
Post test	13.83 \pm 3.78	26.40 \pm 3.57				
Peak Expiratory Flow Rate (PEFR)						
Pre test	47.63 \pm 21.12	50.57 \pm 19.46	5.62*	3.37*		
Post test	67.40 \pm 15.40	47.20 \pm 15.10				

Note:* denotes - Significant at the level of $p \leq 0.05$

The given table value was 2.04 whereas the calculated 't' values of Modified ACT, CAT, and PEFR were 29.71, 17.38 and 5.62 respectively, since the calculated 't' value was greater than that of the given table value at the level of $p \leq 0.05$, it states that there was a significant difference between the pre test and post test score of the Respiratory Outcomes among the patients with OAD who procured Buteyko Breathing Exercise. Hence the Buteyko Breathing Exercise was more effective in patients with OAD.

Table:5. Comparison of Respiratory Outcomes among OAD patients in both interventional and control group using independent 't' test. n=60

S.No	Post test	Interventional group	Control group	Calculated t value	df	Table value
1.	Modified Asthma Control Test (ACT)	21.07 \pm 1.5	12.53 \pm 4.76	1.09 ^{NS}	59	2.04
2.	COPD Assessment Test (CAT)	13.83 \pm 3.78	26.40 \pm 3.57	1.05 ^{NS}		
3.	Peak Expiratory Flow Rate (PEFR)	67.40 \pm 15.40	47.20 \pm 15.10	1.38 ^{NS}		

Note: NS denotes- not significant at the level of $p \leq 0.05$

The calculated 't' value of Modified ACT, CAT, PEFR were 1.09, 1.05, 1.38 respectively, and the given table value was 2.04. Since the calculated 't' value was less than the given table value, therefore this reveals that there was no significant relation between the interventional and control group after the therapy. Hence it has been

proven that the Buteyko Breathing Exercise was effective among the study participants of the interventional group.

Table:6. Association between pre test levels of Respiratory Outcome with their selected demographic variables in interventional group. **n=30**

SI. No	Demographic variables	Interventional group						df	χ^2 value	Table value
		Well controlled		Moderately controlled		Poorly controlled				
		f	%	f	%	f	%			
1.	Age									
	21- 40yrs	5	16.6	2	6.6	3	10	2	6.625*	5.99
	41-60yrs	5	16.6	5	16.6	5	16.6			
2.	Occupation									
	Farmer	6	20	4	13.3	6	20	2	6.8*	5.99
	Industry	8	26.6	4	13.3	4	13.3			
3.	Situation of house									
	Industries	2	6.6	2	6.6	5	16.6	9	18.94*	16.91
	Highways	2	6.6	2	6.6	1	3.3			
	Farms	3	10	4	13.3	5	16.6			
	Coal mines	1	3.3	1	3.3	2	6.6			
4.	Family history									
	Bronchial asthma	3	10	1	3.3	3	10	9	16.95*	16.91
	COPD	3	10	3	10	1	3.3			
	Bronchiectasis	2	6.6	4	13.3	2	6.6			
	None	4	13.3	1	3.3	4	13.3			
5.	Duration									
	1 – 2yrs	1	3.3	1	3.3	2	6.6	9	18.03*	16.91
	2-10yrs	3	10	2	6.6	1	3.3			
	10-20yrs	5	16.6	2	6.6	8	26.6			

Note: * denotes significant at the level of $p \leq 0.05$

It states that the calculated chi square value was higher than the table value for demographic variables of age, occupation, situation of house, familial history of airway diseases, duration of the disease, triggering agent, frequency of the symptoms, smoking habits of the study participants, OAD symptoms, pattern of symptoms, unscheduled visits and life threatening episodes with the pre test level of Respiratory Outcome in the interventional group at the level of $p \leq 0.05$. It reveals that there was a significant association between the demographic variables and the pre test level of Respiratory Outcome, hence H_2 is accepted.

Table:7. Association between pre test level of Respiratory Outcome with their selected demographic variables in control group.
n=30

SI. No	Demographic variables	Control group						df	χ^2 value	Table value
		Well controlled		Moderately controlled		Poorly controlled				
		f	%	f	%	f	%			
1.	Age							2	6.49*	5.99
	21- 40yrs	8	26.6	5	16.6	5	16.6			
	41-60yrs	6	20	3	10	3	10			
2.	Situation of house							9	23.79*	16.91
	Industries	3	10	3	10	5	16.6			
	Highways	1	3.3	1	3.3	3	10			
	Farms	3	10	3	10	4	13.3			
	Coal mines	1	3.3	1	3.3	2	6.6			
3.	Family history							9	19.64*	16.91
	Bronchial asthma	2	6.6	4	13.3	4	13.3			
	COPD	6	20	2	6.6	4	13.3			
	Bronchiectasis	2	6.6	1	3.3	1	3.3			
	None	1	3.3	1	3.3	2	6.6			
4.	Duration							9	23.73*	16.91
	1 – 2yrs	3	10	3	10	2	6.6			
	2-10yrs	2	6.6	4	13.3	4	13.3			
	10-20yrs	2	6.6	1	3.3	2	6.6			
	20 and above yrs	2	6.6	2	6.6	2	6.6			

Note: * denotes significant at the level of $p \leq 0.05$

It was observed that the calculated chi square value was higher than the table value for demographic variables of age, situation of house, familial history of airway diseases, duration of the disease, triggering agent, smoking habits of the study participants, OAD symptoms, pattern of symptoms, life threatening episodes with the pre test level of the control group at the level of $p \leq 0.05$. This shows there was a significant association between the selected demographic variables and the pre test level of Respiratory Outcome, hence H_2 is accepted.

Discussion:

The above mentioned findings were strongly supported by another study on Buteyko Breathing Exercise in Respiratory Outcomes among Bronchial Asthma patients. Buteyko Breathing Exercise improved the Respiratory Outcome, by using Modified Becker's score. The result shows that the Cochrane's test value in the interventional and control group was 3.025 and 0.365 respectively and obtained p-value was 0.041, which was significant at $p < 0.05\%$.

On Oxygen saturation shows that, the pre-test median oxygen saturation in interventional group and control group was 97 and 96, Post-test median score was 99 and 99 respectively. The obtained Wilcoxon 't' test value for interventional group was 5.247 and control group was 5.266 and indicates that Buteyko Breathing Exercise (BBE) was significantly effective in improving oxygen saturation at p-value < 0.001 . On Peak

Expiratory Flow Rate (PEFR) shows that the pre and post- test median score in the interventional group was 43.57 and 62.46 and in control group was 39.16 and 43.94 respectively.

The obtained Wilcoxon Signed rank test for the interventional group was 5.159 and control group was 5.16 and indicates that Buteyko Breathing Exercise (BBE) was significantly effective in improving Peak Expiratory Flow rate at $p < 0.001$. Hence this has been concluded that the Buteyko Breathing Exercise was effective in Respiratory Outcome among children with Bronchial Asthma (PriyalathaG,et. al.,2018).

Conclusion:

“Too much of anything is good for nothing,” as this proverb stated over breathing or hyperventilating is a major problem among patients with OAD, hence by providing Buteyko Breathing Exercise the patients were taught regarding the controlled breathing, which actually played a major role in the aspect of promotion of the Respiratory Outcomes among patient with OAD. The statistical analysis of the study shows that there was a significant improvement in the Respiratory Outcomes than in the control group. This study proved that the Buteyko Breathing Exercise would promote the Respiratory Outcomes in patients with OAD by controlled breathing.

Reference:

1. Asha puthly, (2011), *A Study To Assess The Effectiveness Of Buteyko Breathing Exercise On Asthmatic Symptoms Among Children With Bronchial Asthma* In Mangalore.
2. C. I. Bloom, S. Saglani, J. Feary, D. Jarvis, J. K. Quint (2019) *Changing prevalence of current asthma and inhaled corticosteroid treatment based cohort 2006–2016* European Respiratory Journal.
3. Bowler SD, Green A, Mitchell CA (2012). *Buteyko breathing techniques in asthma: a blinded randomised controlled trial*. Med J Aust.; 169(11-12):575–8.
4. *Buteyko Institute of Breathing and Health*, Conditions: Asthma, 2017
5. Buteyko.K, Genina.V, (2011)*The Results of BVB Method Trial at the Department of Children's Diseases*, in: S. Sechenov (Ed.), First Moscow Medical Institute,
6. Buton. A & Lewith G.T.(2015)*The Buteyko Breathing tech for Asthma:A Review. Complementary Therapies in medicine.*; 13:41-46.
7. Cooper. S, Osborne.J, Newton.S, Harrison. V,Thompson Coon. J, Leun's A Tattersfield (2013). *Effect of two breathing Ex (Buteyko and Pranayana) in Asthma: A Randomized Controlled Trial* Thorax; 58(8): 674-679.
8. Courtney Rosalba (2015), *Strengths, Weakness and possibilities of the Buteyko Breathing exercise*, Biofeedback 36(2)59-63.
9. Cowie R.L., Conley D.P., Underwood M.F., P.G. Reader (2011), *A Randomized controlled trial of the Buteyko technique as an adjunct to conventional management of Asthma*, Respiratory Medicine. 102 726
10. George Julian B (2011). *Nursing Theories the Base for Professional Nursing Practice*. 6th Edition New Delhi: Dorling Kindersley India Pvt Ltd,234-240.