

Effectiveness of Buteyko Breathing Exercise on Respiratory Outcomes Among Patients with Obstructive Airway Disease at Selected Hospital, Coimbatore

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ABSTRACT

Obstructive Airway Disease (OAD) is a chronic respiratory condition characterized by airflow limitation due to airway narrowing or obstruction. It encompasses conditions such as chronic obstructive pulmonary disease and asthma, leading to progressive respiratory impairment and reduced quality of life. The Aim of the study is to assess the Effectiveness of Buteyko Breathing Exercise on Respiratory Outcomes among patient with Obstructive Airway Disease at selected hospital, Coimbatore. Quasi experimental pretest post-test control group design was adopted by using purposive sampling technique. Among 40 patients, 20 were selected for experimental group and 20 were selected for control group based on inclusion and exclusion criteria. Pretest was conducted to assess the Respiratory outcomes like Dyspnea by mMRC dsypnea scale, Oxygen Saturation by Pulse Oximeter, Respiratory Airflow Rate by Peak Expiratory Flow Meter, Impact on wellbeing and daily activities by CAT assessment test. Post test was conducted in the experimental group, after administering the Buteyko Breathing Exercise for 15 minutes, 3 times a day for 2 weeks and control group receives routine treatment. Paired 't' test was used to assess the effectiveness of Buteyko Breathing Exercise in experimental group the calculated t values for Dyspnea (8.33), Oxygen Saturation (18.94), Respiratory Airflow Rate (7.61) and Impact on wellbeing and daily activities (15.52) respectively were greater than table value 3.88 at 0.001 level of significance. In control group the calculated t values for Dyspnea (4.54), Oxygen Saturation (9.28), Respiratory airflow rate (4.33) and Impact on wellbeing and daily activities (9.74) respectively were greater than table value 3.88 at 0.001 level of significance. An Unpaired 't' test was used to evaluate the Buteyko Breathing Exercise, the calculated 't' value for dyspnea is 0.88 which is lower than table value of 2.09 at 0.05 level of significance. Oxygen Saturation (3.54) and Respiratory Airflow Rate (5.00) which is greater than table value 3.88 at 0.001 level of significance. Impact on wellbeing and daily activities the calculated 't' value is (2.28) which is greater than table value of 2.09 at 0.05 level of significance. Among Respiratory outcomes, oxygen saturation, respiratory airflow rate and impact on wellbeing and daily activities were significant after implementing the Buteyko Breathing Exercise. Hence, the Buteyko Breathing Exercise is simple, cost-effective, easy-

to-administer and effective in improving respiratory outcomes among patient with Obstructive Airway Disease.

Keywords: Obstructive Airway Disease, Buteyko Breathing Exercise, Respiratory Outcomes, Dyspnea, Oxygen Saturation, Peak Expiratory Flow Rate, COPD Assessment Test.

INTRODUCTION

Chronic respiratory diseases are the leading causes of morbidity and mortality worldwide, affecting hundreds of millions of individuals and exerting a profound socio-economic burden. Obstructive airway diseases (OADs), particularly asthma and chronic obstructive pulmonary disease, represent a major segment of these illnesses, characterized by airway inflammation and airflow limitation, these conditions cause persistent respiratory symptoms that impair daily functioning and diminish quality of life. The World Health Organization (2023) reported that asthma affected approximately 262 million individuals globally in 2019, leading to 455,000 deaths. COPD, meanwhile, remains the third leading cause of death worldwide, accounting for 3.65 million deaths in 2021 (**World Health Organization, 2024**). These staggering statistics underscore the need for more effective strategies in preventing, managing, and treating OADs.

NEED FOR THE STUDY

Chronic Obstructive Pulmonary Disease remains a significant global health burden, leading to chronic respiratory symptoms, functional limitations, and premature mortality. In 2021, an estimated 213.39 million people worldwide were living with COPD, contributing to 3.72 million deaths and 79.78 million Disability Adjusted Life Years. Although the age standardized mortality and Disability Adjusted Life Years rates have decreased by 37.12% and 36.98% respectively since 1990, the absolute disease burden has increased due to global aging and population growth (**Wang et al., 2025**).

STATEMENT OF THE PROBLEM

Effectiveness of Buteyko Breathing Exercise on Respiratory Outcomes among Patients with Obstructive Airway Disease at selected Hospital, Coimbatore.

OBJECTIVES OF THE STUDY

1. To assess the Level of Respiratory Outcomes among patients with Obstructive Airway Disease.
2. To evaluate the Effectiveness of Buteyko breathing exercise on Respiratory Outcomes among patients with Obstructive Airway Disease.
3. To find out the Association between the Respiratory Outcomes and selected variables.

OPERATIONAL DEFINITION

Effectiveness

It refers to changes in the respiratory outcomes (dyspnea, oxygen saturation, respiratory airflow rate and impact on wellbeing and daily activities) after implementing Buteyko breathing exercise.

Buteyko Breathing Exercise

It is the type of breathing exercise performed by sitting on the chair or the floor, breathe normally for a few minutes to relax the muscles, exhale slowly and then hold the breathe by using the index and thumb

finger to plug the nose. Hold the breathe as long as possible and breathe normally for 10 seconds and repeat it several times up to 15 minutes, 3 times a day for 2 weeks.

Respiratory Outcomes

Respiratory outcomes are dyspnea, oxygen saturation, respiratory airflow, impact on well-being. It will be assessed by mMRC (Modified Medical Research Council) Dyspnea Scale, Pulse Oximeter, Peak Expiratory Flow Meter, CAT (COPD Assessment Test) respectively.

Obstructive Airway Disease

Obstructive Airway Disease refers to a group of chronic respiratory conditions characterized by airflow limitation that is usually progressive and not fully reversible. This includes diseases such as Chronic Obstructive airway Disease chronic bronchitis, Bronchiectasis, Emphysema, Bronchial asthma, cystic fibrosis.

HYPOTHESIS

H₁ - There is a significant difference in Respiratory Outcomes before and after the Buteyko breathing exercises in the experimental group and control group.

H₂ - There is a significant difference in Respiratory Outcomes among experimental and control group after implementing the Buteyko breathing exercise.

H₃ - There is a significant association between respiratory outcomes and selected variables among patients with Obstructive Airway disease.

METHODOLOGY

RESEARCH APPROACH: Quantitative approach

RESEARCH DESIGN: Quasi- Experimental, Pre-test Post -test control group design.

SETTING: Sri Ramakrishna hospital, Coimbatore.

TARGET POPULATION: Patient with Obstructive Airway Disease.

ACCESSIBLE POPULATION: Obstructive Airway Disease patients admitted in general ward and special wards of Sri Ramakrishna Hospital, Coimbatore.

SAMPLING TECHNIQUE: Purposive sampling technique.

SAMPLE SIZE: 40 samples were taken.

CRITERIA FOR SAMPLE SELECTION

Samples were selected based on the following inclusion and exclusion criteria.

Inclusion Criteria

- Patient who admitted for Obstructive airway Disease.
- Patient age up to 60 years.
- Patient who are able to sit.
- Patient who are conscious.
- Patient with dyspnea.

Exclusion Criteria

- Patient with severe dyspnea.
- Patient with severe hypoxemia.
- Patient who are critically ill.
- Patient with oral infections and mouth ulcers.

- Patient with cardiac comorbidities.

DATA COLLECTION PROCEDURE

The validated tool was used to collect data, and the main study was conducted over a one-month period. The research was carried out in general, and special wards at Sri Ramakrishna Hospital at Coimbatore. Quasi experimental pretest and post-test control group design was adopted. Using the purposive sampling technique, 40 study participants were chosen based on inclusion and exclusion criteria and 20 patients allocated to the experimental group from the special ward, and 20 patients allocated to the control group from the general ward. Pretest data was collected using structured questionnaire, mMRC dyspnea scale, Pulse Oximeter, Respiratory Airflow Meter and CAT assessment tool for experimental and control group. Buteyko Breathing Exercise was given to the experimental group for 15 minutes, 3 times a day for 2 weeks. For both experimental and control group post test was conducted at the end of 2 nd week by using same the same scales. The control group received normal routine treatment.

DATA ANALYSIS AND INTERPRETATION

SECTION I

Frequency and percentage distribution of Demographic variables of patient with Obstructive Airway Disease (n=40)

S. No	Demographic variables	Experimental Group		Control Group	
		F	%	F	%
1.	Age (In Years)				
	a) 30-40	0	0	0	0
	b) 41-50	8	40	10	50
	c) 51-60	12	60	10	50
2.	Gender				
	a) Male	11	55	11	55
	b) Female	9	45	9	45
3.	Religion				
	a) Hindu	12	60	13	65
	b) Christian	4	20	4	20
	c) Muslim	4	20	3	15
	d) Others	0	0	0	0
4.	Education status				
	a) No formal education	2	10	5	25

S. No	Demographic variables	Experimental Group		Control Group	
		F	%	F	%
	b) Primary education	2	10	0	0
	c) Secondary education	9	45	10	50
	d) Higher secondary education				
	e) Graduate	5	25	3	15
		2	10	2	10
5.	Types of family				
	a) Joint family	7	35	7	35
	b) Nuclear family	13	65	13	65
	c) Broken family	0	0	0	0
	d) Extended family	0	0	0	0
6.	Marital status				
	a) Unmarried	0	0	0	0
	b) Married	20	100	20	100
	c) Divorced	0	0	0	0
	d) Widow/ widower	0	0	0	0
7.	Type of houses				
	a) Pucca	17	85	16	85
	b) Kutcha	3	15	4	15
8.	Type of water				
	a) R/O water	8	40	5	25
	c) Mineral water	7	35	5	25
	d) Tap water	5	25	10	50
9.	Personal habits				
	a) Alcohol	1	5	1	5

S. No	Demographic variables	Experimental Group		Control Group	
		F	%	F	%
	b) Smoking	7	35	8	40
	c) Betal leaves	1	5	0	0
	d) No bad habits	11	55	11	55
10.	Food habits				
	a) Vegetarian	5	25	5	25
	b) Non vegetarian	15	75	15	75
11.	Comorbid illness				
	a) Diabetic mellitus	6	30	10	50
	b) Hypertension	7	35	8	40
	c) No comorbid illness	7	35	2	10
12.	Occupation				
	a) Private	6	30	6	30
	b) Government	3	15	3	15
	c) Coolie	7	35	6	30
	d) Unemployed	4	20	5	25
13.	Place of Residence				
	a) Rural	7	35	12	60
	b) Urban	13	55	8	40
14.	Location of house				
	a) Industrial area	0	0	0	0
	b) Residential area	13	65	8	40
	c) Agricultural area	6	30	11	55
	d) Hilly area	1	5	1	5
	e) Nearby / pond area	0	0	0	0

Section II

Frequency and percentage distribution of Clinical variables of patient with Obstructive Airway Disease.

(n=40)

S. No	Clinical variables	Experimental Group		Control Group	
		F	%	F	%
1.	Height				
	a) 150 to 160	7	35	7	35
	b) 161 to 170	9	45	10	50
	c) 171 to 180	4	20	3	15
2.	Weight				
	a) 50 to 60	9	45	9	45
	b) 61 to 70	4	20	6	30
	c) 71 to 80	7	35	5	25
3.	Types of diagnosis				
	a) Chronic bronchitis	0	0	0	0
	b) Bronchiectasis	2	10	2	10
	c) Emphysema	0	0	0	0
	d) COPD	7	35	7	35
	e) Bronchial asthma	11	55	11	55
	f) Cystic fibrosis	0	0	0	0
4.	Duration of illness				
	a) 1 to 6 months	5	25	7	35
	b) 7 to 12 months	6	30	4	20
	c) >1 years	9	45	9	45
5.	Triggering factors				
	a) Allergen	0	0	0	0
	b) Pollen	9	45	7	35
	c) Chemical	0	0	0	0
	d) Pet animals	0	0	0	0
	e) Strenuous activity	11	55	13	65
6.	Sleeping position				
	a) Supine position	0	0	0	0

S. No	Clinical variables	Experimental Group		Control Group	
		F	%	F	%
	b) Semi flowers position	7	35	6	30
	c) Side lateral position	13	65	14	70
7.	Duration of sleep				
	a) less than 5 hours / day	9	45	9	45
	b) 6-7 hours / day	11	55	11	55
	c) 8 hours / day	0	0	0	0
8.	Activity of daily living				
	a) Independent	10	50	11	55
	b) Partial dependent	10	50	9	45
	c) Completely dependent	0	0	0	0
9.	Do you exposure to covid				
	a) Yes	5	25	3	15
	b) No	15	85	17	85

SECTION- III

Assessment on respiratory outcomes among patient with obstructive airway disease before and after Buteyko breathing exercise.

Level of Dyspnea among patient with Obstructive Airway disease before and after Buteyko Breathing Exercise.

(n=40)

S. No	Level of Dyspnea scale	Experimental group				Control group			
		Pre test		Post test		Pre test		Post test	
		f	%	f	%	f	%	f	%
1	Grade 0	-	-	-	-	-	-	-	-
2	Grade 1	-	-	11	55	3	15	9	45
3	Grade 2	10	50	8	40	11	55	8	40
4	Grade 3	10	50	1	5	6	30	3	15
5	Grade 4	-	-	-	-	-	-	-	-

Level of oxygen saturation among patient with Obstructive Airway disease before and after Buteyko Breathing Exercise.

(n=40)

S.No	Level of oxygen saturation	Experimental group				Control group			
		Pre test		Post test		Pre test		Post test	
		f	%	f	%	f	%	f	%
1	Normal (95-100)	-	-	20	100	2	10	14	70
2	Mild hypoxemia (91-94)	20	100	-	-	18	90	6	30
3	Moderate hypoxemia (86-90)	-	-	-	-	-	-	-	-
4	Severe hypoxemia (<85)	-	-	-	-	-	-	-	-

Level of respiratory airflow rate among patient with Obstructive Airway disease before and after Buteyko breathing exercise.

(n=40)

S.No	Level of respiratory airflow rate	Experimental group				Control group			
		Pre test		Post test		Pre test		Post test	
		f	%	F	%	f	%	f	%
1	Green zone (280-400 l/min)	-	-	1	5	-	-	-	-
2	yellow zone (160-270 l/min)	14	70	19	95	17	85	20	100
3	Red zone (>150 l/ min)	6	30	-	-	3	15	-	-

Level of impact on wellbeing and daily activities among patient with Obstructive Airway disease before and after Buteyko Breathing Exercise.

(n=40)

S.No	Impact on well-being and daily activities	Experimental group				Control group			
		Pre test		Post test		Pre test		Post test	
		f	%	F	%	f	%	f	%
1	Low impact (0-9)	-	-	-	-	-	-	-	-
2	Medium impact (10-20)	-	-	15	75	-	-	7	35
3	High impact (21-30)	13	65	5	25	18	90	13	65
4	Very high impact (31-40)	7	35	-	-	2	10	-	-

Section – IV

Effectiveness of Buteyko breathing exercise on respiratory outcomes among patient with obstructive airway disease.

This section deals with analysis and Interpretation of the effect of Buteyko Breathing Exercise among patients with Obstructive Airway Disease.

Effect of Buteyko breathing exercise on Respiratory Outcomes among patient with Obstructive Airway Disease in experimental group.

(n=20)

Respiratory outcomes	Experimental group	Mean	SD	Mean difference	't' value	Table value
Dyspnea	Pre test	2.5	0.5	1	8.33***	3.88
	Post test	1.5	0.59			
Oxygen saturation	Pre test	92.25	0.88	3	18.94***	3.88
	Post test	95.25	0.79			
Respiratory airflow rate	Pre test	181	24.67	61	7.61***	3.88
	Post test	242	25.78			
	Pre test	29.45	2.15	10.4	15.52***	3.88

Impact on well-being and daily activity	Post test	19.05	3.09			
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***Significance at 0.001 level

Effect of Buteyko Breathing Exercise on Respiratory Outcomes among patient with Obstructive Airway Disease in control group.

(n=20)

Respiratory outcomes	control group	Mean	SD	Mean difference	't' value	Table value
Dyspnea	Pre test	2.15	0.65	0.55	4.54***	3.88
	Post test	1.6	0.76			
Oxygen Saturation	Pre test	93.05	1.07	1.96	9.28***	3.88
	Post test	95	0.83			
Respiratory Airflow Rate	Pre test	192	24	12	4.33***	3.88
	Post test	204	17.22			
Impact on well-being and daily activity	Pre test	26.85	117.62	5.65	9.74***	3.88
	Post test	21.2	2.90			

***Significance at 0.001 level

Effect of Buteyko breathing exercise on Respiratory Outcomes among patient with Obstructive Airway Disease in experimental and control group.

(n=40)

Respiratory outcomes	Group	Mean	SD	Mean difference	't' value	Table value
Dyspnea	Experimental	1.5	0.59	0.15	0.88	2.09
	Control	1.65	0.65			
Oxygen saturation	Experimental	95.85	0.79	0.85	3.54**	2.86
	Control	95	0.83			
Respiratory airflow meter	Experimental	242	29.0	38	5.00***	3.88
	Control	204	17.7			

Impact on well-being and daily activities	Experimental	19.05	3.09	2.15	2.28*	2.09
	Control	21.2	2.90			

* Significant at 0.05, ** Significant at 0.01, *** Significant at 0.001

SECTION -V

Association between the Respiratory Outcomes among patients with Obstructive Airway Disease and their selected variables

(n=40)

S. No	Variables	Impact on well -being and daily activities				χ^2 Chi-square	Degree of freedom	χ^2 table value
		High impact		Very high impact				
		n	%	n	%			
1	Age in years					29.80*	1	3.84
	41-50	15	37.5	3	7.5			
	a) 51-60	17	42.5	5	12.5			
5.	Duration of illness					46.8*	1	3.84
	a) < 1 year	20	50	2	5			
	b) > 1 year	12	30	6	15			

RESULT AND DISCUSSION

The analysis shows for dyspnea, the mean score in the experimental group (1.5) and in control group (1.65), with a mean difference of 0.15. The calculated ‘t’ value was 0.88, which is below the table value of 2.09, indicating the difference was not statistically significant. Oxygen saturation in the experimental group (95.85%) and in the control group (95%), with a mean difference of 0.85. The calculated ‘t’ value was 3.54, which is greater than the table value of 2.86 at 0.01 significant. For respiratory airflow rate, the experimental group had a higher mean (242 l/min) compared to the control group (204 l/min), with a mean difference of 38. The calculated ‘t’ value was 5.00, which is greater than table value of 3.88, indicating statistically significant. In terms of impact on well-being and daily activities, the experimental group had a lower mean score (19.05) compared to the control group (21.2), showing a mean difference of 2.15. The calculated ‘t’ value was 2.28, which is greater than the table value of 2.09, indicating a statistically significant difference. Hence the research hypothesis H₂ “There is a significant difference in oxygen saturation, respiratory air flow rate and impact on well-being and daily activities between experimental and control group after implementing Buteyko breathing exercise. Was accepted.

A similar study conducted by Djiwandono et al., (2023) observed significant improvements in asthma patients, with respiratory rate decreasing from 26 breaths per minute to 18–20 breaths per minute and oxygen saturation increasing from 94.3% to 98.2%. These findings align with the present study, where significant increases in oxygen saturation (from 92.25% to 95.25%) were observed in the experimental group.

CONCLUSION

Obstructive Airway disease is a chronic respiratory condition commonly seen in disease like chronic bronchitis, Bronchiectasis, Emphysema, Bronchial asthma, Chronic Obstructive airway Disease and cystic fibrosis which significantly affect the daily activities of patient and their quality of life. Buteyko Breathing Exercise is simple, cost effective and non-invasive technique which will help to reduce the obstructive symptoms improve breathing efficiency and promote overall well-being among patient with obstructive airway disease.

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