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RESEARCH ARTICLE

# A Study to Compare the Effects of Buteyko Breathing Exercise Versus Papworth Breathing Exercise for Early Adults with Asthma

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Abstract: Asthma is a chronic respiratory condition that can affect individuals of all ages and is often associated with environmental triggers, genetic predisposition, and recurrent respiratory infections. It is characterized by bronchial hyper-responsiveness, airway inflammation. Though regular exercise improves lung capacity and reduces inflammation, specific breathing techniques may further boost in asthma management. The main aim is to compare the effectiveness of Buteyko and Papworth breathing techniques in young adults with asthma. Participants aged 20–30 years were allocated into two groups: Group A (Buteyko) and Group B (Papworth) using random sampling technique. The both before and after interventions were assessed using these tests Asthma Control Diary Score, Anxiety Scale and Modified Borg Dyspnoea Scale. Comparative analysis of these interventions revealed that Group A exhibited significant improvement in peak expiratory flow rate, anxiety, and dyspnoea compared to Group B. These findings showed that the Buteyko breathing technique is the most effective method in reducing symptoms of asthma, especially for the conditions like dyspnoea and anxiety than the Papworth method. It also enhances the breath control and thus promoting proper breathing patterns in young adults.

Keywords: Buteyko breathing technique, Pap worth breathing technique, Anxiety, Breath control, Hyperinflation.

## INTRODUCTION

Asthma is a chronic inflammatory airway disease affecting approximately 334 million people worldwide, characterized by coughing, wheezing, dyspnoea, and chest tightness. The bronchial hyper-responsiveness and mucus hypersecretion, is the highest contributor to airway obstruction and variable respiratory symptoms[1,2]. Persistent inflammation in the airway results in airway remodeling that worsen the disease control and impair quality of life. Although pharmacological therapy is the mainstay of treatment, many patients continue to experience symptoms, functional limitations, and psychological issues such as anxiety and depression[3]. Non-pharmacological interventions, including breathing retraining techniques, are increasingly recognized as valuable adjuncts in asthma management[4].

Among these, the Buteyko breathing technique emphasizes controlled nasal breathing, breath-holding, and reduced ventilation to correct hyperventilation and normalize carbon dioxide levels [5,6]. The Papworth method focuses on diaphragmatic breathing combined with relaxation exercises to improve breathing patterns and reduce reliance on accessory respiratory muscles[7,8,9]. Both techniques have shown potential in reducing asthma symptoms, improving dyspnoea, and enhancing quality of life[10] .However, limited studies have directly compared their effectiveness, particularly in young adults. This study aims to evaluate and compare the effects of Buteyko and Papworth breathing techniques on asthma control, dyspnoea, and anxiety in young adults, with the goal of identifying the more effective non-pharmacological strategy for improving respiratory function and overall well-being.

## METHODOLOGY

**Study Design and sampling:**

The present study employed an experimental, comparative design and was conducted in the Physiotherapy Outpatient Department at MAHER over a period of six weeks.A total of fifty participants, clinically diagnosed with mild to moderate asthma, were recruited using a simple random sampling method and equally allocated into two groups: Group A (n = 25) and Group B (n = 25).

**Inclusion and Exclusion criteria:**

Inclusion criteria were: age 20–30 years, presence of anxiety symptoms, recurrent episodes of dyspnoea, and Peak Expiratory Flow Rate (PEFR) values between 300–400 L/min. Only participants already on prescribed inhalers and medications were considered. Exclusion criteria included status asthmaticus, epilepsy, tuberculosis, cardiovascular diseases, lung carcinoma, or restrictive lung disorders to ensure sample homogeneity and minimize confounding factors.

**Baseline Assessment:**

All participants were before inclusion in the study was subjected to thorough screening for medical history and general profile evaluation. Written informed consent was obtained prior to enrollment. Baseline assessments included anthropometric measurements and pulmonary function testing. Height was measured in centimeters and PEFR was predicted using the formul

**Predicted PEFR (L/min) =(Height in cm−80)×5**
**Intervention groups:**

**Group A – Buteyko Breathing Technique (BBT):**
Out of the n=50, 25 patients were subjected to BBT method that was divided in to three half's namely the Control Pause: Gentle inhalation (2 seconds), exhalation (3 seconds), followed by nasal occlusion while holding the breath. Followed by Shallow Breathing: Gentle nasal respiration with attention to the sensation of exhaled air and finally the Integration Phase: Cycles of Control Pause followed by four minutes of Shallow Breathing, two minutes rest, and repetition.

**Group B – Papworth Breathing Technique (PBT):**
PBT incorporated diaphragmatic breathing, relaxation training, patient education, and integration into daily activities. Sessions lasted 20 minutes and progressed from semi-recumbent to sitting, standing, and performance during daily activities. Emphasis was placed on slow diaphragmatic breathing, correction of maladaptive breathing patterns, and home practice for carryover.

The participants of both groups had sessions twice daily, four days per week, for six consecutive weeks. Sessions were scheduled two hours after meals to minimize variability.

**Statistical Analysis:**
The collected data were tabulated and analyzed using both descriptive and inferential statistics. All the parameters were assessed using statistical package for social science (SPSS) version 24, with a significance level of p value less than 0.05 and a 95% confidence interval set for all analysis. Paired t-test was adopted to find the statistical difference within the groups & Independent t-test (Student t-Test) was adopted to find statistical difference between the groups.

# RESULTS

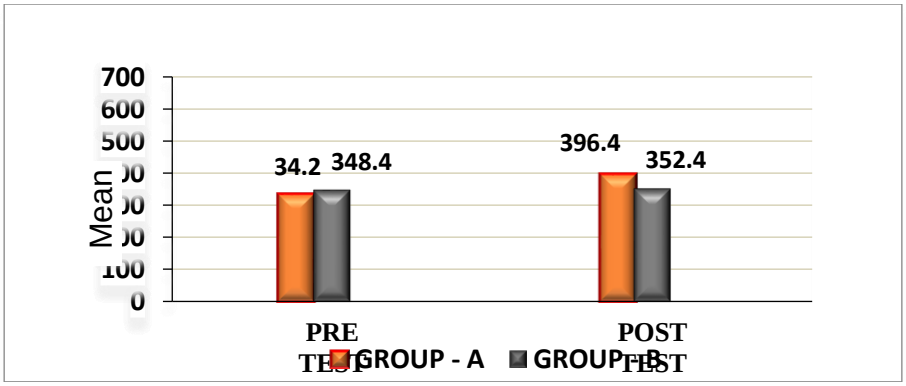
On comparing the post test mean Values of Group A & Group B on PEFR Score, both groups show a significant increase. Participants who received Buteyko breathing exercise showed more improvement in the PEFR scores with a mean value of 396.40 ± 26.75 in comparison to participants who received Papworth breathing technique with mean value of 352.40 ± 39.29 at P ≤ 0.05. The results indicates that Buteyko breathing exercise aids more in increasing the PEFR values for further details refer table 1 and figure 1.

**Table-1 Comparison of PEFR Score between Group – A and Group - B in Pre and Post Test**

| | GROUP - A | | GROUP - B | | | | SIGNIFICANCE |
|---|---|---|---|---|---|---|---|
| **TEST** | MEAN | S.D | MEAN | S.D | T - TEST | df | |
| **PRE TEST** | 334.80 | 35.83 | 348.40 | 37.49 | -1.31 | 48 | .196* |
| **POST TEST** | 396.40 | 26.75 | 352.40 | 39.29 | 4.62 | 48 | .001** |

**(*- P > 0.05 - Not Significant) & (**- P ≤ 0.05 - Significant) df: degree of freedom**

**Figure 1 Comparison of PEFR Score between Group – A and Group - B in Pre and Post Test**



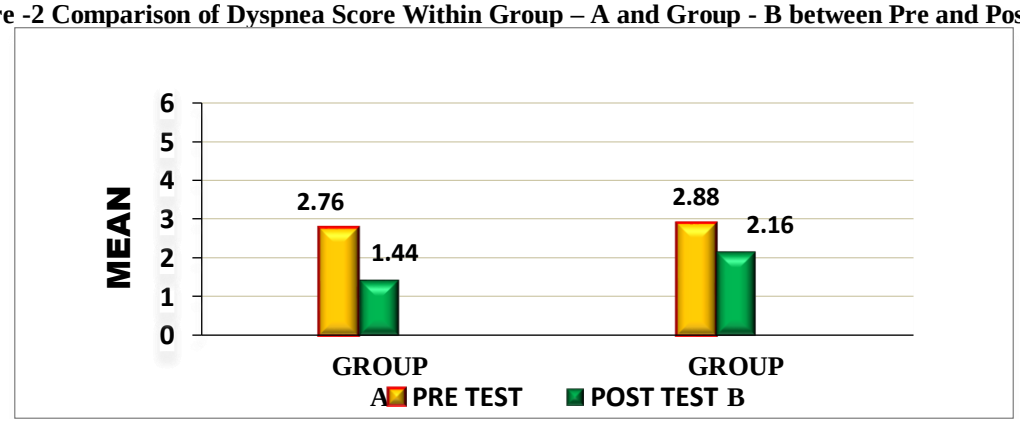

Further comparison on post test Mean Values of Group A & Group B pertaining to Dyspnea Score was performed, there was a significant decrease in the level of dyspnea in both groups. However, participants in Group A ( Buteyko) showed more reduction in dyspnea scores with a post test mean value of 1.44 ± .781 than participants in Group B (Papworth) with a mean value which of 2.16 ± 1.13 at P ≤ 0.05. The results suggest that the buteyko breathing technique helps decrease dyspnea to a greater extent than papworth technique refer table 2 and figure 2.

**Table – 2 Comparison of Dyspnea Score Within Group – A and Group - B between Pre and Post Test**

| **GROUPS** | PRE TEST | | POST TEST | | t - TEST | SIGNIFICANCE |
|---|---|---|---|---|---|---|
| | MEAN | S.D | MEAN | S.D | | |
| **GROUP- A** | 2.76 | 1.01 | 1.44 | .781 | 10.81 | .000** |
| **GROUP- B** | 2.88 | 1.05 | 2.16 | 1.13 | 6.42 | .000** |

**(**- P ≤ 0.05 - Significant).**

**Figure -2 Comparison of Dyspnea Score Within Group – A and Group - B between Pre and Post Test**




Similarly, when comparing the Mean Values of Group A & Group B on Anxiety Level Assessment Scale Score, it shows a significant decrease in the post test mean values in both groups, but (Group A – Buteyko) shows a lower mean value of 1.76 ± 1.30 value than (Group B – Papworth) 2.40 ± 1.22 at P ≤ 0.05 for further details refer table 3 and figure 3.

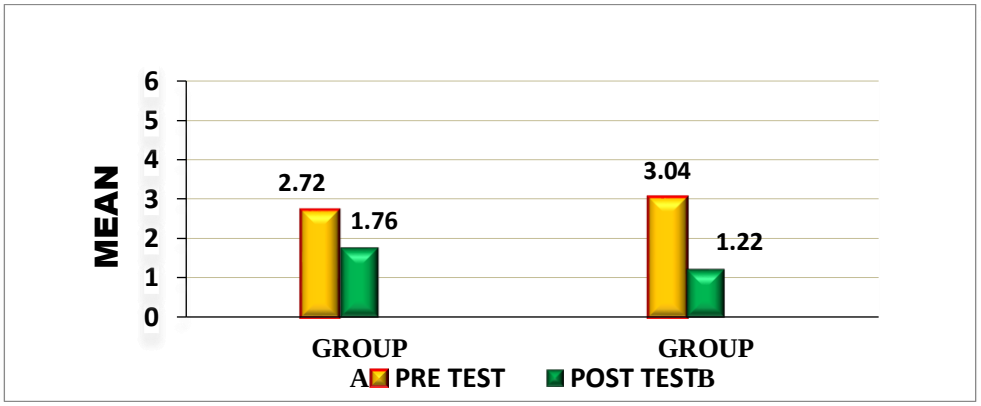
**Table – 3 Comparison of Anxiety Level Assessment Scale Score within Group – A and Group - B between Pre Test and Post Test**

| **GROUPS** | PRE TEST | | POST TEST | | t - TEST | SIGNIFICANCE |
|---|---|---|---|---|---|---|
| | MEAN | S.D | MEAN | S.D | | |
| **GROUP- A** | 2.72 | 1.33 | 1.76 | 1.30 | 7.85 | .000** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **GROUP- B** | 3.04 | 1.24 | 2.40 | 1.22 | 6.53 | .000** |

**(**- P ≤ 0.05 - Significant).**

**Figure 3 Comparison of Anxiety Level Assessment Scale Score within Group – A and Group - B between Pre Test and Post Test**




Since there was a significant difference between the groups on comparison of the Pre test and Post test values within Group A & Group B different parameters such as PEFR Score, Dyspnea score & Anxiety Level with an assessment scale score of significance of P ≤ 0.05 during the post interventions.

# DISCUSSION

Bronchial asthma is a persistent inflammatory sickness that influences more than 334 million globally and a further expected 100 million population 2030. Asthma can affect different age groups, race or ethnicity and are associated with recurrent episodes of cough, wheezing, dyspnoea and chest tightness.

According to suggestion by country-wide Institute of Fitness on asthma (NIH guidelines)[11] posted in 1991, 1997, and 2007 "the long-time period inflammatory circumstance is known as asthma that is a characterized by numerous cells and cell additives, inclusive of mast cells, eosinophils, T lymphocytes, macrophages, neutrophils, and epithelial cells.

In this study, two breathing techniques such as buteyko and papworth exercise were implemented to mild to moderate asthmatic patient and to know about the immediate effect of both the exercise and concludes that buteyko shows significant improvement in asthmatic people. Arora and his colleagues[12] found that the Buteyko breathing technique, when used in conjunction with traditional physiotherapy over the course of four weeks, improved resting heart rate and helped individuals with COPD control their breathing. In a study it was suggested that papworth method have found to be effective in patient with severe asthma[12] and it also helps in promoting the relaxation.

Jemimah John David[13] discovered that, at the conclusion of the procedure, the majority of our patients showed improvements in their PEFR and dyspnea level using the Buteyko Technique rather than the Stacked Breathing Technique. The Buteyko breathing technique aims to progressively reset or readjust the breathing centre of greater aCo2 values and lower minute ventilation, according to a number of research and hypotheses. Control pause raises the concentration of aCo2, which crosses the blood-brain barrier. The respiratory centre in the medulla is reset by this invasion.

In a study Cowie and his friends[14] conducted in a study in Canada, 129 asthmatic patients were randomly assigned to acquire a sequence of respiratory physical activities from a chest physiotherapist or a Buteyko practitioner. The share of patients in the Buteyko group who had their asthma under proper management at six months went from 40% at baseline to 79%. In a study conducted by Holmes and colleagues the chest bodily remedy and Buteyko was assesed, the initial degree of ailment management was higher than expected, with questionnaires indicating disease manipulation in 40% of the Buteyko and forty four% of the manipulated companies. The percentage of sufferers with asthma control had improved to 79% inside the Buteyko institution and 72% in the control institution at the 6-month follow-up.

Buteyko exercises showed more significant improvements than the Papworth technique as it emphasizes focusing on breathing patterns, which is it helps in the correction of abnormal breathing patterns such as hyperventilation. This exercise also

helps dilate the airways by increasing the retention of carbon dioxide and improves oxygen delivery to tissues which reduces asthma attacks.

The physiological mechanism by which this exercise works is that it improves the ventilation-perfusion accordingly and reduction of sensitivity towards asthma attacks. On the other hand, the Papworth method helps to improve only the diaphragmatic breathing pattern and acts as a relaxation technique which is helpful in reducing stress and anxiety[15] but does not directly contribute to the reduction of asthma severity or the underlying respiratory issues hence it is suggested that this technique is an additional way of management in asthma in contrast to Buteyko exercise which address the physiological aspects of asthma directly[16]. Hence this study concludes that the Buteyko breathing technique was found to be more effective than the papworth method.

# CONCLUSION:

The present study concludes that on implementing Buteyko and Papworth breathing techniques, Buteyko exercise showed a major improvement in early adults with asthma. Also, it effectively decreases anxiety as well as recurrent episodes of dyspnea**.** Many studies also conclude that buteyko exercise improves the sleep pattern and quality of life in asthmatic patients.

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