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ORIGINAL ARTICLE

THE COMBINED EFFECT OF BUTEYKO BREATHING AND COGNITIVE BEHAVIOR THERAPY ON CHEST EXPANSION IN ASTHMATIC COLLEGIATE POPULATION

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ABSTRACT

Background of the study: Asthma, a chronic inflammatory lung disease affecting over 300 million individuals globally, presents significant challenges in management and treatment. Non-pharmacological interventions, including breathing exercises and behavioral therapies, have shown promise in alleviating symptoms and enhancing the quality of life for asthmatic patients. **Methodology:** This study investigates the synergistic effects of Buteyko breathing exercises and Cognitive Behavior Therapy (CBT) on chest expansion and overall quality of life in asthmatic collegiate individuals. Employing a pre-post experimental design with a cohort of five participants aged 17-23 years, the study assesses the impact of a 12-week intervention combining Buteyko breathing techniques and CBT. **Result:** Chest expansion measurements and quality of life assessments, utilizing inch tape and the Pediatric Asthma Quality of Life Questionnaire (PAQLQ), respectively, reveal significant improvements in both parameters. **Conclusion:** These findings support the efficacy of integrating these non-pharmacological interventions as complementary strategies in asthma management, offering potential benefits in respiratory function and psychological well-being.

Keywords: Asthma, Buteyko Breathing Technique, Cognitive Behavior Therapy, Chest Expansion, Quality of Life, Collegiate Population, Non-Pharmacological Interventions

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INTRODUCTION

Asthma is a prevalent chronic respiratory condition characterized by airway inflammation, bronchoconstriction, wheezing, dyspnea, and recurrent exacerbations. The condition not only manifests physiologically but also carries significant psychological implications, leading to heightened stress levels, diminished health status, and a tendency towards mouth breathing. The Buteyko breathing technique, aimed at reducing hyperventilation, enhancing respiratory efficiency, and improving exercise endurance, has emerged as a promising intervention[1].

Concurrently, Cognitive Behavior Therapy (CBT) offers a structured approach to regulate anxiety, mitigate fear responses, and foster relaxation, addressing the psychological aspects of asthma. This study aims to explore the combined effect of Buteyko breathing exercises and CBT on chest expansion and quality of life in asthmatic collegiate individuals, hypothesizing that the integration of these interventions will yield synergistic benefits in both physiological and psychological outcomes.

Need for the Study: Comprehensive asthma rehabilitation necessitates a multifaceted approach, integrating pharmacological treatments with non-pharmacological interventions to address the diverse needs of affected individuals. Prior research underscores the efficacy of relaxation techniques in alleviating asthma-related symptoms, highlighting the potential of behavioural interventions in managing the condition. Furthermore, studies have demonstrated that the Buteyko Breathing Technique can improve the quality of life and reduce reliance on bronchodilator medications in asthmatic patients [2].

Elsaid, et al; (2023) also found significant improvements in pulmonary function and asthma control using the Buteyko breathing technique [12]. The integration of physical rehabilitation strategies, such as breathing exercises, with CBT, can further optimize patient outcomes by modifying maladaptive behavior patterns and mitigating psychological distress.

This study seeks to contribute to the existing body of knowledge by investigating the combined effect of Buteyko breathing and CBT, offering insights into a holistic approach to asthma management that addresses both physiological and psychological dimensions of the condition. The collegiate population, often facing unique stressors related to academic demands and social adjustments may particularly benefit from integrated approaches that enhance both physical and mental well-being.

Objectives: The primary objective of this study is to analyze the combined effect of Buteyko breathing exercises and Cognitive Behavior Therapy on chest expansion and quality of life in collegiate individuals with acute asthma. Specific objectives include:

- To assess the impact of Buteyko breathing exercises and CBT on chest expansion measurements at axillary, nipple, and xiphisternal levels.
- To evaluate the effect of the combined intervention on the quality of life, as measured by the Pediatric Asthma Quality of Life Questionnaire (PAQLQ).

- To determine the statistical significance of changes in chest expansion and quality of life following the intervention period.

METHODOLOGY

This study employed a pre- and post-test experimental design to evaluate the combined effect of Buteyko breathing exercises and Cognitive Behavior Therapy on chest expansion and quality of life in asthmatic collegiate individuals. Participants were recruited from the Department of Physiotherapy at KMCT College of Allied Health Sciences. The study population consisted of five clinically diagnosed asthmatic participants aged 17-23 years. Inclusion criteria required participants to have a clinical diagnosis of asthma and be within the specified age range (17-23 years), with both sexes included to ensure gender representation.

Exclusion criteria included the presence of status asthmaticus, co-existing cardiothoracic, orthopedic, or neurological disorders, and the presence of skin, peripheral vascular, or infectious diseases. The study was conducted over a 12-week period, divided into two phases: Phase 1 (Weeks 1-6) focused on relaxed postures and preliminary assessments, while Phase 2 (Weeks 7-12) involved the implementation of the Buteyko Breathing Technique and Cognitive Behavior Therapy (CBT).

Operational tools utilized in the study included a stopwatch for timing breathing exercises and breath-hold intervals, a nose clip to ensure nasal breathing during Buteyko exercises, inch tape for measuring chest expansion at axillary, nipple, and xiphisternal levels, and the Pediatric Asthma Quality of Life Questionnaire (PAQLQ) for assessing the quality of life in asthmatic participants.

Procedure Administration

Buteyko Breathing Technique: The Buteyko Breathing Technique is administered through a series of exercises aimed at reducing hyperventilation and improving respiratory efficiency. The key components of the technique include [1,2,3]:

1. Nasal breathing:Participants are instructed to breathe exclusively through their nose to warm, filter, and humidify the air entering their lungs.

2. Diaphragmatic breathing:Emphasis is placed on abdominal expansion during inhalation while keeping the chest relatively still.

3. Controlled shallow breathing: Participants are taught to mimic the gentle movement of a blade of grass, promoting relaxed and efficient breathing patterns.

4. Short breath holds: Participants pinch their nose post-exhalation to build breath-hold time, gradually increasing their tolerance to carbon dioxide.

5. Gradual adaptation: Participants are encouraged to resist the urge to take deep inhalations, promoting a shift towards more normal breathing volumes.

Cognitive Behavior Therapy (CBT) [10, 11]

CBT is administered in two stages to address the psychological aspects of asthma and promote adaptive coping strategies:

Stage 1: Personal Phase- Participants are taught mindfulness techniques to manage emotions and attention, fostering self-awareness and emotional regulation.

Stage 2: Exposure Phase- Participants are guided through exposure exercises to address fear and anxiety related to asthma symptoms and triggers.

Interpersonal Phase: Participants learn strategies for handling external threats and distress, improving their ability to navigate challenging social situations.

Empathic Phase: Participants are encouraged to cultivate objectivity in stressful situations, promoting rational thinking and problem-solving skills.

The primary outcome measures were chest expansion, measured using an inch tape at axillary, nipple, and xiphisternal levels, and quality of life assessed using the PAQLQ.

Statistical Analysis

Paired and unpaired t-tests are used to analyze the pre- and post-intervention data, allowing for a comparison of chest expansion measurements and quality of life scores before and after the intervention period. Statistical significance is determined to assess the effectiveness of the combined intervention in improving these outcome measures.

RESULTS

The results of the study indicated significant improvements in both chest expansion and quality of life following the combined intervention. Chest expansion measurements showed a mean increase of 1.85 cm at the axillary level, 1.6 cm at the nipple level, and 3.1 cm at the xiphisternal level. The Quality-of-Life Score, as measured by the PAQLQ, increased to 23.16 post-intervention, indicating a substantial improvement in overall well-being. These findings suggest that the integration of Buteyko Breathing and CBT can lead to clinically meaningful improvements in respiratory function and quality of life in asthmatic collegiate individuals.

DISCUSSION

The integration of Buteyko Breathing and CBT as a rehabilitative strategy has demonstrated promising outcomes in this study. The observed improvements in chest expansion and quality of life align with previous research highlighting the benefits of controlled breathing techniques and behavioral modifications in asthma management. Participants exhibited enhanced relaxation, reduced anxiety, and improved lung function following the intervention, suggesting a synergistic effect of the combined approach.

Several factors may contribute to the observed improvements in chest expansion and quality of life. Buteyko breathing techniques likely improve respiratory muscle efficiency and reduce hyperventilation, leading to enhanced oxygenation and reduced airway constriction. CBT, on the other hand, addresses the psychological factors that can exacerbate asthma symptoms, such as anxiety and stress. By teaching individuals coping strategies and relaxation techniques, CBT helps to reduce the physiological and psychological impact of asthma triggers, leading to improved symptom control and overall well-being.

The primary goals of asthma management, including maintaining normal activity levels, preventing exacerbations, and optimizing pulmonary function, were effectively addressed through the integration of Buteyko Breathing and CBT. Given the non-invasive and cost-effective nature of these interventions, they hold potential as complementary

treatments in asthma rehabilitation programs, offering a holistic approach to managing the physiological and psychological aspects of the condition [10,11,12].

These findings should be interpreted within the context of the study's limitations. The small sample size (n=5) limits the generalizability of the results to a larger population. Future studies with larger sample sizes and more diverse populations are needed to confirm these findings and to explore the potential benefits of Buteyko Breathing and CBT in different subgroups of asthmatic patients. Additionally, the lack of a control group limits the ability to attribute the observed improvements solely to the combined intervention. Future studies should include a control group to account for the potential effects of other factors, such as natural disease progression or concurrent treatments.

Despite these limitations, this study provides preliminary evidence for the potential benefits of integrating Buteyko Breathing and CBT in the management of asthma. The observed improvements in chest expansion and quality of life suggest that this combined approach may offer a valuable complementary strategy for improving respiratory function and psychological well-being in asthmatic individuals.

CONCLUSION

In conclusion, the combination of Buteyko Breathing and CBT significantly improved chest expansion and quality of life in asthmatic collegiate individuals. These findings advocate for the inclusion of breathing and behavioral therapies in asthma management protocols, offering a comprehensive approach to addressing the diverse needs of individuals affected by this chronic respiratory condition. Further research is warranted to explore the long-term effects of this combined intervention and to identify specific patient populations that may benefit most from this approach.

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