

EFFECTIVENESS OF BUTEYKO BREATHING TECHNIQUE ON DYSPNEA, PULMONARY FUNCTION, AND FUNCTIONAL CAPACITY IN OBESITY-RELATED BREATHLESSNESS: A NARRATIVE REVIEW

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Abstract :

Background: Obesity is associated with significant respiratory complications, including dyspnea, reduced pulmonary function, impaired respiratory mechanics, and decreased functional capacity. Excess adipose tissue alters chest wall compliance, diaphragm mobility, and ventilatory efficiency, thereby contributing to obesity-related breathlessness. Non-pharmacological interventions such as breathing retraining techniques have gained increasing attention in respiratory rehabilitation. Among these, the Buteyko Breathing Technique (BBT) has been widely studied in asthma and other respiratory disorders for its potential to improve breathing control, reduce hyperventilation, and enhance exercise tolerance. However, evidence regarding its effectiveness in obesity-related breathlessness remains scattered.

Objective: This narrative review aims to evaluate the effectiveness of the Buteyko Breathing Technique on dyspnea, pulmonary function, and functional capacity in individuals experiencing obesity-related breathlessness.

Methods: A narrative review of the literature was conducted using electronic databases including PubMed, Google Scholar, Scopus, Web of Science, and PEDro. Relevant studies, review articles, randomized controlled trials, and clinical reports published in English were reviewed. Keywords used for the search included “Buteyko Breathing Technique,” “obesity,” “dyspnea,” “pulmonary function,” “functional capacity,” “breathing exercises,” and “respiratory rehabilitation.” Articles discussing respiratory changes in obesity and the effects of breathing retraining interventions were included.

Results: The reviewed literature suggests that obesity significantly affects pulmonary function by reducing lung volumes, respiratory compliance, and inspiratory muscle efficiency, leading to exertional dyspnea and poor functional performance. Evidence from breathing exercise interventions indicates that BBT may improve breathing pattern efficiency, reduce respiratory rate, promote diaphragmatic breathing, and decrease the sensation of breathlessness. Several studies also reported improvements in pulmonary function parameters such as forced expiratory volume (FEV1), forced vital capacity (FVC), oxygen saturation, and exercise tolerance following breathing retraining programs. Functional capacity outcomes, including six-minute walk distance and perceived exertion scores, also demonstrated positive trends. Although most available evidence originates from asthma and chronic respiratory disease populations, the physiological mechanisms appear applicable to obesity-related respiratory dysfunction.

Conclusion: The Buteyko Breathing Technique appears to be a promising adjunctive intervention for reducing dyspnea and improving pulmonary function and functional capacity in individuals with obesity-related breathlessness. Nevertheless, there is limited direct evidence specifically targeting obese populations. Further high-quality randomized controlled trials are required to establish standardized protocols and determine the long-term clinical effectiveness of BBT in obesity-related respiratory impairment.

IndexTerms- Buteyko Breathing Technique; Obesity; Dyspnea; Pulmonary Function; Functional Capacity

INTRODUCTION

affects respiratory mechanics, lung volumes, airway resistance, and gas exchange, thereby contributing to the development of breathlessness and exercise intolerance. Excess adipose tissue Obesity has become a major global public health concern and is

strongly associated with multiple systemic and respiratory complications. Increasing body mass index (BMI) adversely accumulation around the thoracic and abdominal regions reduces chest wall compliance and diaphragmatic excursion, resulting in impaired ventilatory efficiency and increased work of breathing. These physiological alterations often lead to dyspnea even during mild physical activity, significantly affecting quality of life and daily functioning in obese individuals. Obesity-related respiratory dysfunction has therefore emerged as an important area of clinical and rehabilitative research. (1,3)

Dyspnea, commonly described as the subjective sensation of breathing discomfort, is one of the most prevalent symptoms experienced by individuals with obesity. The sensation of breathlessness in obesity is multifactorial and may occur even in the absence of primary pulmonary disease. Reduced expiratory reserve volume, decreased functional residual capacity, impaired inspiratory muscle performance, and increased oxygen demand contribute substantially to respiratory distress in this population. Furthermore, obesity-induced inflammation and altered ventilatory control mechanisms may aggravate respiratory symptoms and reduce exercise tolerance. Studies have reported that obese individuals frequently demonstrate diminished aerobic capacity and early fatigue during physical activity due to respiratory and cardiovascular limitations. (2,7)

Pulmonary function impairment in obesity is characterized by reductions in lung volumes and capacities, particularly functional residual capacity (FRC), expiratory reserve volume (ERV), and total lung capacity (TLC). Increased abdominal pressure and thoracic fat deposition mechanically restrict lung expansion and diaphragmatic movement. These changes alter respiratory system compliance and increase airway resistance, thereby impairing pulmonary ventilation. Several studies have demonstrated that obesity can negatively influence spirometric parameters such as forced expiratory volume in one second (FEV1) and forced vital capacity (FVC), leading to restrictive respiratory patterns. Such impairments contribute to reduced physical performance and diminished functional independence among obese individuals. (3,10)

Functional capacity refers to an individual's ability to perform activities of daily living and sustain physical activity. In obesity, functional capacity is often compromised due to increased metabolic demand, musculoskeletal strain, and respiratory inefficiency. Obese individuals frequently experience decreased walking endurance, lower exercise tolerance, and increased perception of exertion during physical tasks. Assessment tools such as the Six-Minute Walk Test (6MWT), Borg Rating of Perceived Exertion Scale, and dyspnea scales are commonly used to evaluate functional performance and respiratory limitation in clinical settings. Declines in functional capacity not only affect physical health but also contribute to sedentary behavior, reduced participation in physical activities, and worsening obesity-related complications. (38,39)

Respiratory rehabilitation strategies, particularly breathing retraining techniques, have gained increasing attention as non-pharmacological interventions for managing dyspnea and improving respiratory efficiency. Breathing exercises aim to optimize breathing patterns, reduce respiratory muscle overactivity, improve diaphragmatic function, and enhance oxygen utilization. Among the various breathing retraining methods, the Buteyko Breathing Technique (BBT) has emerged as a potentially beneficial intervention for individuals with respiratory dysfunction. Developed by Konstantin Buteyko, this technique primarily focuses on controlled nasal breathing, reduced breathing volume, breath-holding exercises, and relaxation to normalize ventilation patterns and reduce hyperventilation. (28,35)

The Buteyko Breathing Technique has been extensively studied in patients with asthma and chronic obstructive pulmonary disease (COPD). Evidence suggests that BBT may reduce respiratory rate, improve breath control, decrease symptoms of breathlessness, and enhance quality of life. Randomized controlled trials conducted in asthmatic populations have demonstrated improvements in symptom control, reduced reliance on bronchodilator medication, and better breathing efficiency following BBT interventions. Furthermore, breathing retraining programs have been associated with improved exercise tolerance and reduced perception of dyspnea, indicating potential applicability in populations experiencing obesity-related respiratory limitations. (21,22)

Breathing dysfunction and hyperventilation patterns are also commonly observed in individuals with obesity. Increased respiratory demand and altered chest wall mechanics may promote rapid shallow breathing, contributing to inefficient ventilation and early onset of fatigue. Controlled breathing interventions such as diaphragmatic breathing, inspiratory muscle training, and Buteyko breathing may help improve respiratory muscle coordination, optimize ventilation-perfusion matching, and reduce excessive respiratory effort. Previous studies investigating breathing exercises in chronic respiratory diseases have shown positive effects on pulmonary function, respiratory muscle endurance, and exercise performance. These physiological benefits provide a strong rationale for exploring the effectiveness of BBT in obesity-related breathlessness. (31,32)

Despite growing evidence supporting breathing retraining interventions, there remains limited literature specifically examining the role of Buteyko Breathing Technique in obese individuals with dyspnea. Most existing studies focus primarily on asthma or

COPD populations, while obesity-related breathlessness continues to be underexplored. Given the increasing prevalence of obesity worldwide and the substantial burden of respiratory symptoms associated with it, there is a need to evaluate alternative and adjunctive rehabilitative approaches that may improve pulmonary function and functional capacity. Understanding the potential benefits of BBT may contribute to the development of cost-effective, non-invasive, and easily applicable interventions for obesity-related respiratory dysfunction. (1,6)

Therefore, the present narrative review aims to examine the effectiveness of the Buteyko Breathing Technique on dyspnea, pulmonary function, and functional capacity in individuals experiencing obesity-related breathlessness. The review also seeks to summarize current evidence regarding respiratory changes associated with obesity, mechanisms of breathing retraining, and the potential clinical implications of incorporating BBT into respiratory rehabilitation programs.

NEED OF THE STUDY.

3.1 Population and Sample

The population considered in this narrative review consisted primarily of adults with obesity experiencing respiratory dysfunction, breathlessness, reduced pulmonary function, or decreased exercise tolerance. The reviewed studies also included participants with chronic respiratory conditions such as asthma and chronic obstructive pulmonary disease (COPD), as these populations were frequently used to investigate the effects of breathing retraining interventions, particularly the Buteyko Breathing Technique (BBT).

The sample included participants from previously published randomized controlled trials, clinical studies, observational studies, and pulmonary rehabilitation research articles. Most studies involved overweight or obese adults, while several studies included asthma or COPD patients with symptoms of dyspnea and impaired breathing mechanics. The narrative review did not involve direct recruitment of participants; instead, it synthesized findings from multiple studies available in the literature

3.2 Data and Sources of Data

Data for this narrative review were obtained from published peer-reviewed journal articles, clinical trials, respiratory rehabilitation studies, and evidence-based literature related to obesity, pulmonary function, dyspnea, breathing retraining, and the Buteyko Breathing Technique. Secondary data were collected from electronic databases including PubMed, Google Scholar, Scopus, and other scientific sources relevant to respiratory rehabilitation and obesity management. The reviewed literature included studies assessing pulmonary function parameters such as forced vital capacity (FVC), forced expiratory volume in one second (FEV1), total lung capacity, dyspnea scores, respiratory muscle endurance, exercise tolerance, and functional capacity outcomes such as the Six-Minute Walk Test (6MWT) and Borg Rating of Perceived Exertion Scale. Both experimental and observational studies were included to evaluate the relationship between obesity-related breathlessness and the effectiveness of breathing retraining interventions, particularly BBT.

3.3 Theoretical framework

This framework is supported by evidence from studies conducted in obesity, asthma, COPD, and pulmonary rehabilitation populations, where breathing retraining interventions demonstrated improvements in respiratory symptoms, exercise tolerance, and quality of life. Although direct evidence in obese populations remains limited, the physiological mechanisms identified in previous respiratory rehabilitation research provide the theoretical basis for applying BBT in obesity-related breathlessness.

RESEARCH METHODOLOGY

This narrative review was conducted to evaluate the effectiveness of the Buteyko Breathing Technique (BBT) on dyspnea, pulmonary function, and functional capacity in individuals with obesity-related breathlessness. A narrative review design was chosen due to the limited availability of direct studies on BBT in obese populations, requiring synthesis of evidence from related areas such as obesity-related respiratory dysfunction and breathing retraining interventions. A comprehensive literature search was performed using PubMed, Google Scholar, Scopus, Web of Science, and PEDro databases. Studies published in English from 1990 to 2025 were included. Keywords such as “Buteyko Breathing Technique,” “obesity,” “dyspnea,” “pulmonary function,” “functional capacity,” and “breathing exercises” were used with Boolean operators to identify relevant literature.

Studies were included if they were review articles, systematic reviews, narrative reviews, randomized controlled trials, or clinical studies addressing obesity-related dyspnea, pulmonary function, functional capacity, or breathing interventions. Non-English articles, abstracts, editorials, and studies unrelated to respiratory outcomes or breathing techniques were excluded. Full-text screening was performed after initial title and abstract review based on relevance to the study objectives. Data were extracted on study characteristics, population, interventions, and outcomes including FEV1, FVC, dyspnea scores, and functional capacity

measures such as the Six-Minute Walk Test and Borg Scale. The evidence was synthesized to understand the relationship between obesity-related respiratory dysfunction and the potential effects of BBT.

Supporting literature on obesity-related dyspnea, pulmonary mechanics, and breathing exercise interventions was used to build the conceptual framework. As this was a narrative review based on published studies, no ethical approval or informed consent was required.

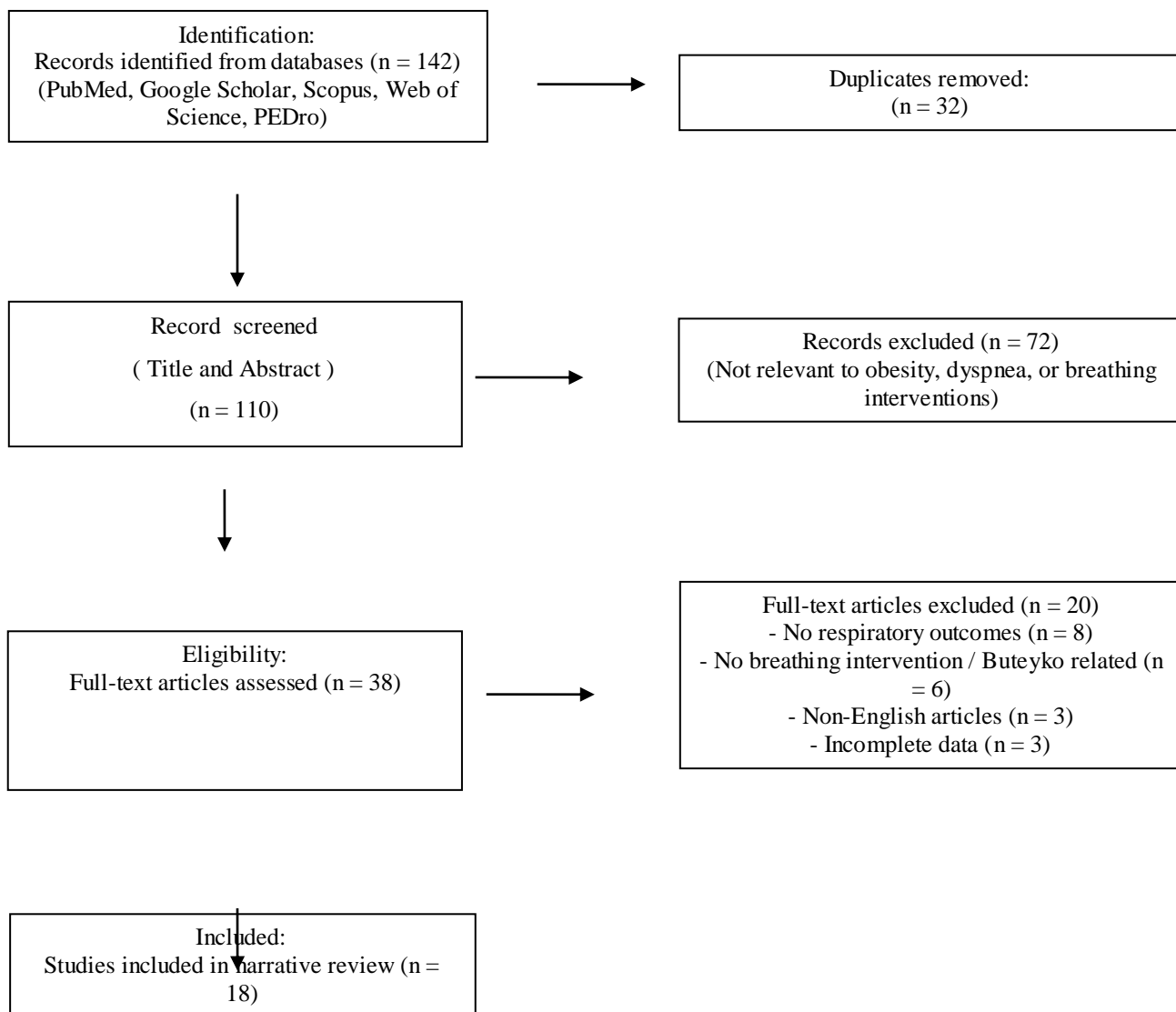


Figure 1. Flowchart of eligible studies

RESULTS AND DISCUSSION

This narrative review analyzed literature from 1990 to 2025 on the effects of the Buteyko Breathing Technique (BBT) in obesity-related breathlessness. Evidence shows that obesity is associated with reduced FEV1, FVC, lung volumes, increased work of breathing, and dyspnea due to impaired respiratory mechanics. Breathing retraining techniques, including BBT, may improve breathing efficiency by reducing hyperventilation, lowering respiratory rate, and enhancing diaphragmatic control. Studies in asthma and COPD populations report reduced dyspnea and improved respiratory function following BBT, though direct evidence in obesity is limited. Functional capacity measures such as the Six-Minute Walk Test and Borg Scale indicate improved exercise tolerance with breathing exercises. Overall, BBT shows potential benefits for respiratory efficiency and functional capacity in obesity-related breathlessness, but direct clinical evidence remains insufficient. Obesity is strongly associated with respiratory dysfunction and breathlessness due to excessive fat accumulation around the thoracic and abdominal regions, which impairs chest wall compliance, diaphragmatic movement, and ventilatory mechanics. The reviewed literature consistently demonstrates that obesity contributes to reduced lung volumes, increased airway resistance, impaired respiratory muscle efficiency, and altered breathing patterns, ultimately leading to exertional dyspnea and decreased functional capacity. Studies by Mafort et al., Melo et al., and Salome et al. highlighted that obesity significantly affects pulmonary function parameters such as forced vital capacity (FVC), forced expiratory volume in one second (FEV1), and total lung capacity. Additional evidence also suggests that visceral adiposity further aggravates respiratory symptoms and exercise intolerance in obese individuals. (1,3)

The pathophysiology of obesity-related breathlessness is multifactorial and involves both mechanical and ventilatory limitations. Increased body mass leads to reduced chest wall compliance and elevated work of breathing, particularly during physical activity. Shoukri and Babb explained that obesity alters respiratory mechanics both at rest and during exercise, resulting in inefficient ventilation and increased perception of dyspnea. Chlif et al. further reported reduced inspiratory muscle endurance in obese individuals, while studies by Ora et al. and Laveneziana et al. demonstrated that obesity significantly worsens exertional dyspnea and limits exercise tolerance. These physiological changes contribute to decreased physical performance and poor quality of life in obese populations. (5,7)

Table 1

Characteristics of Included Studies

Author & Publication Year	Type of Study	Sample Size	Type of Population	Intervention	Outcome Measures	Conclusion
Patra et al. ¹ (2025)	Narrative review	Not applicable	Healthy & clinical populations	Buteyko Breathing Technique	Aerobic capacity, breathing efficiency	BBT improves respiratory control, oxygen utilization, and exercise performance.
Wu et al. ³ (2022)	Systematic review	Not applicable	Children and adults with obesity	Visceral adiposity analysis	FEV1, FVC, dyspnea scores	Visceral fat negatively affects lung function and respiratory outcomes.

Mafort et al. ¹⁰ (2016)	Review article	Not applicable	Obese individuals	None	Pulmonary function, respiratory mechanics	Obesity causes respiratory impairment and dyspnea due to mechanical restriction.
Shoukri ⁹ (2015)	Review study	Not applicable	Obese individuals	Exercise physiology review	Respiratory mechanics	Obesity increases work of breathing and reduces exercise tolerance.
Melo et al. ¹¹ (2014)	Systematic review	Not applicable	Obese adults	Lung function analysis	FEV1, FVC	Obesity is associated with restrictive pulmonary function patterns.
Gerlach et al. ¹² (2013)	Systematic review	Not applicable	Obese individuals	Dyspnea assessment tools	Borg, mMRC, VAS	Obesity increases perception of breathlessness; measurement varies.
Holland et al. ³ (2012)	Cochrane review	Multiple trials	COPD patients	Breathing exercises	6MWT, dyspnea	Breathing training improves functional capacity and reduces dyspnea.
Bruton & Lewith ⁸ (2005)	Review article	Not applicable	Respiratory disorders	Breathing retraining	Dyspnea, ventilation efficiency	Breathing techniques reduce hyperventilation and improve symptom control.
Gosselink ⁴ (2004)	Review article	Not applicable	COPD patients	Breathing techniques	Respiratory efficiency	Controlled breathing improves ventilation and reduces breathlessness.

Cooper et al. ⁶ (2003)	Randomized controlled trial	~600	Asthma patients	Buteyko pranayama breathing	vs Lung function, symptoms	Breathing exercises improve symptoms but show limited spirometric change.
Cahalin et al. ⁵ (2002)	Review study	Not applicable	COPD patients	Diaphragmatic breathing	Lung function, dyspnea	Diaphragmatic breathing improves respiratory efficiency and symptom control.

The reviewed evidence suggests that breathing retraining interventions, particularly the Buteyko Breathing Technique (BBT), may play a beneficial role in managing obesity-related breathlessness. BBT focuses on controlled nasal breathing, reduction of hyperventilation, breath control, and diaphragmatic breathing to improve ventilatory efficiency and reduce respiratory distress. Patra et al. highlighted the role of BBT in improving aerobic capacity and breathing efficiency, while Bruton and Lewth described its effectiveness in improving breathing control and reducing respiratory symptoms. Courtney also emphasized the relationship between dysfunctional breathing patterns and respiratory symptoms, supporting the rationale for breathing retraining interventions in individuals experiencing breathlessness. (6,28) Most of the available evidence regarding BBT originates from asthma and chronic respiratory disease populations. Randomized controlled trials conducted by Bowler et al., Cooper et al., McHugh et al., and Cowie et al. demonstrated that Buteyko breathing exercises improve symptom control, reduce hyperventilation, and enhance quality of life in individuals with asthma. Similarly, Slader et al. and Holloway and West reported positive effects of breathing retraining on respiratory symptoms and breathing efficiency. Although these studies were not specifically conducted in obese populations, the underlying physiological mechanisms of improved breathing control and reduced ventilatory demand may be applicable to obesity-related respiratory dysfunction. (22,23)

Breathing exercises have also demonstrated positive effects on pulmonary rehabilitation outcomes and functional capacity. Studies involving chronic obstructive pulmonary disease (COPD) populations showed that diaphragmatic breathing and guided deep breathing improve ventilation distribution, breathing coordination, and exercise tolerance. Cahalin et al., Yamaguti et al., and Gosselink reported improvements in respiratory mechanics and symptom management following breathing retraining programs. Additionally, Borge et al. found that guided deep breathing reduced breathlessness and improved breathing patterns in individuals with chronic respiratory disease. These findings support the potential role of breathing exercises in improving functional performance and reducing dyspnea perception in obese individuals. (32,33) Functional capacity assessment was an important outcome measure across the reviewed literature. The Six-Minute Walk Test (6MWT), recommended by the American Thoracic Society, is widely used to evaluate exercise tolerance and functional performance in respiratory rehabilitation programs. Perceived exertion and dyspnea levels were commonly assessed using the Borg Rating of Perceived Exertion Scale. Improvements in six-minute walk distance, reduced breathlessness scores, and enhanced exercise tolerance were frequently reported following breathing retraining interventions. These outcomes suggest that improved breathing efficiency may contribute to better physical performance and reduced activity limitation in individuals with obesity-related breathlessness. (38,39)

Despite the positive findings, the current evidence has several limitations. Most studies investigating BBT were conducted in asthma or COPD populations rather than specifically in obese individuals with breathlessness. Considerable heterogeneity also exists regarding intervention protocols, treatment duration, frequency of breathing exercises, and outcome measures used across studies. Furthermore, many studies evaluated breathing retraining in combination with other rehabilitation strategies, making it difficult to isolate the independent effects of the Buteyko Breathing Technique alone. Therefore, direct evidence supporting the effectiveness of BBT specifically for obesity-related dyspnea remains limited. (21,23) Overall, the findings of this narrative review suggest that the Buteyko Breathing Technique may be a promising adjunctive intervention for reducing dyspnea and improving pulmonary function and functional capacity in individuals with obesity-related breathlessness. Breathing retraining

appears to improve ventilatory efficiency, breathing coordination, and exercise tolerance while reducing the sensation of breathlessness. However, further high-quality randomized controlled trials focusing specifically on obese populations are required to establish standardized treatment protocols and determine the long-term clinical effectiveness of BBT in obesity-related respiratory dysfunction. (6,28)

CONCLUSION

This narrative review highlights that obesity is strongly associated with impaired pulmonary function, reduced lung volumes, increased work of breathing, and significant dyspnea, all of which contribute to decreased functional capacity and exercise intolerance. The reviewed literature suggests that breathing retraining interventions, particularly the Buteyko Breathing Technique, may improve respiratory efficiency by promoting controlled breathing patterns, reducing hyperventilation, and enhancing diaphragmatic function. Although direct evidence of Buteyko Breathing Technique in obesity-related breathlessness is limited, findings from related populations such as asthma, COPD, and general breathing exercise studies indicate potential benefits in reducing dyspnea, improving pulmonary function parameters, and enhancing functional capacity as measured by exercise tolerance tests and dyspnea scales. However, the current evidence base remains indirect and heterogeneous.

Therefore, while the Buteyko Breathing Technique appears to be a promising, non-pharmacological adjunct for managing obesity-related respiratory dysfunction, there is a clear need for well-designed randomized controlled trials specifically targeting obese populations. Future research should focus on standardized protocols, long-term outcomes, and objective respiratory measures to establish its clinical effectiveness in obesity-related breathlessness.

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