

A Review on Implications of Physiotherapy Techniques in COPD: A Review Article

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ABSTRACT

Aim: To provide a review on the implications of different physiotherapy techniques for improving breathing patterns, lung capacities and volumes for management of Chronic Asthma COPD patients.

Methodology: It was review on physical therapy interventions and results were formatted based. All the Randomized clinical/controlled trial published in last 5 years was selected. To trace articles, article searching was executed electronically using the following search terms: "Physiotherapy interventions", "Asthma" and Medical Subject Headings (Mesh) on the following databases: PubMed and Web of Science. Only the full text available were selected and documented as per PICOS (Population, Interventions, Comparators, Outcomes, Study designs) model and PEDro Scale.

Results: 1,594 articles were traced. After the application of inclusion and exclusion criteria, only 21 studies were analysed. Out of them 16 were evaluated as physiotherapy intervention for asthmatic patients.

Conclusion: The results evaluated by this study suggested that physical therapy provides an extensive choice of treatment for asthma patients and all of them shown improvements in quality of life and clinical symptoms. Different protocols of physiotherapy provide a massive range of variety of rehabilitation for asthmatic patient to cope with this situation and make them under control.

Keywords: COPD, physiotherapy technique, PICOS, asthma

INTRODUCTION

Asthma is the most common respiratory problem with 18% prevalence rate globally¹. It not only adds health burden to health care cost but also reduce the individual's quality of life in terms of poor productivity in family and profession². It is more common in urban population due to increased industrialization that leads to stabilization of disease in these people about 10-12% in adults and 15% in children³. Overall prevalence of asthma in children is about 5–10% and in adults is about 3%⁴. It is chronic airways inflammation presented with sign and symptoms like as tightness of chest cough, sputum, wheezing and shortness of breath, that vary in duration and intensity^{5,6}. It has three pathophysiological patterns. In case of bronchial inflammation, it involves the inflammatory cells that develop the edema and bronchoconstriction. In other type like allergic asthma, environmental exposure or any pollen or allergen precipitate the disease and increase the eosinophils. In third pattern named bronchial asthma, there is bronchial hyper-reactivity in response to physical and chemical stimuli to the bronchial tree⁷.

From decades, the pharmacological management is always considered as gold standard and first line treatment but agreed to take medications regularly but emphasizes on non-pharmacological management⁸. Poorly managed asthma can avert patients from living a creative life by undesirably affecting the quality of life of patients⁹. Currently, many non-pharmacological treatments are under consideration. Among them balancing and consolidative techniques for example breathing techniques, acupuncture, yoga, homeopathy, and herbal products are used for treating asthma and amending its symptoms. Breathing techniques are used to control symptoms of asthma in physiotherapy perspective. About 30% patients reported benefit from it. But in both, children and adults, poor collective management inflicts restrictions regarding physical exercise, quality of life and hinder activities of daily livings too^{6,8}.

A multidimensional approach is required to help patients with asthma to guarantee a better quality of life and disease management to manage symptoms effectively^{11,12}. About taking regular medications corticosteroids, many patients have shown concern and shown concernment towards without medication self-reliance approaches and about 30% of them reported that they practice breathing exercises to get relief from sign and symptoms. Among people with asthma breathing techniques are used as the most popular complementary medicine mode nowadays⁸.

Asthmatic patients have abnormal breathing patterns so the main reason to use breathing exercises is to change the pattern of breathing by using different stimuli. In this, patient is trained to adopt the slower inspiration and long expiration to change the breathing rate and reduced hyperventilation and hyperinflation¹³. Multiple studies regarding physical training for asthmatics include diaphragmatic breathing technique, ACBT, purse lip breathing and aerobic exercise like swimming or treadmill¹⁴.

Several breathing techniques for example deep breathing, rapid or slow breathing pattern, breath-holding sessions, diaphragmatic breathing, and nasal breathing patterns, are used to normalize the variation of respiratory rate with pranayama practice, can also benefit maintaining breathing pattern or rate more precisely and by this means control asthma symptoms effectively¹⁵. In improving the quality of sleep and body fatigue, breathing approaches like the Buteyko method and Papworth technique yield the best evidence¹⁶.

Complementary medicine is frequently appraised by active breathing modulation techniques. Meanwhile, the prevalence of complementary medicine is 50–60% among children and 20–30% for adults. In the complementary medicine method, it has been found that breathing exercises are mostly used^{17,18}. On the efficiency of different breathing exercises for asthma, a Cochrane review suggested that breathing exercises not only decline the usage of short-acting β_2 agonists but also enhance the quality of life, on the other hand unfortunately there is no reliable suggestion for disease control. It has also highlighted the necessity for more studies to assess the effect of breathing techniques on symptom free days, airway inflammation lung function and physiological measurements¹⁹.

Recent studies suggested that in addition to the standard pharmacological treatment if pranayama is practiced regularly it benefits to reduce inhaler bronchodilator usage and advance quality of life. It improves the parameters of spirometer in terms of lung function test, such a speak expiratory flow (PEF) rate (PEFR), forced expiratory volume in one second (FEV₁), forced vital capacity (FVC), and ratio of FEV₁/FVC²⁰. Improve respiratory muscle strength, reduce airway sensitivity and the sum of absolute eosinophilia reduced in individuals suffering from asthma²¹.

Many randomized clinical trials have stated useful results after breathing retraining program of physiotherapy-based protocols. These are now considered as the basic guidelines for patients who shows persistent symptoms despite proper standard pharmacologic dealing^{22,23}.

Two components of pranayama², the yoga breathing exercise, previously studied by requesting patients with asthma to breathe through a cylinder with an expiratory resistance twice a

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day (the Pink City Lung Exerciser (PCLE)) was designed to increase the duration of expiration and decrease breathing frequency. After 2 weeks of using a placebo device without a resistance in comparison to the PCLE there was a slight decrease in airway responsiveness to histamine²⁴.

Konstantin Buteyko developed Buteyko breathing method in Russia. It is grounded on the intuition that the hypercapnia and hyperventilation is cause behind asthma pathology and can be treated in most of the patients. Eucapnic Buteyko technique is a variation of the Buteyko breathing technique. It comprises the same emphasis for ventilation regulation, mean while the method has structured to treat asthma patients of western nations^{8,25}.

According to the benefits of different physiotherapy techniques to control the symptoms and manage the effects of bronchial asthma it is essential to go through literature reviews published until now with objectives to estimating impacts of physiotherapy techniques in asthma patient to find out that which physiotherapy techniques can improve the patients' symptoms in addition to enhance quality of life and decrease the frequency of asthmatic attack. The determination of this study was to determine the impact of different physiotherapy techniques that helps to improve breathing patterns, lung capacities and volumes for management of Chronic Asthma.

MATERIAL AND METHODS

Design: It was review on physical therapy interventions

Search Strategy: The operational terms Physiotherapy interventions, Asthma and Medical Subject Headings (Mesh) were designed for the systematic search. These terminologies were presented in the following databases: PubMed and Web of Science. To trace articles, article searching was executed electronically by means of the search terms such as: "physiotherapy", limited to the title or Text, "asthma", keywords, or abstract all inserted in a particular search and linked by "AND" the Boolean operator with confined to "5 years" and "full text" available. For this review, articles were selected which were about application of various physiotherapy interventions on asthmatic patients with different age groups. To assist the search review's scope, searching, selection, and the synthesis of the literature PICOS criterion (Population, Interventions, Comparators, Outcomes, Study design) was articulated.

Eligibility criteria: All the Randomized clinical/controlled trial published in last 5 years were selected. Articles with full text availability were selected. Only physiotherapy interventions were used for the management. No article was selected with pharmacological intervention. In all the selected articles the patients were diagnosed a thematic and underwent different pharmacotherapy and now they are on different physiotherapy techniques for recovery and improving quality of life. Studies were excluded if, the studies which were in any other language. Non-peer appraised articles, Narrative reviews articles, books or abstracts moreover editorials were not selected. Articles were excluded with inadequate material or articles with unavailability of full text.

RESULTS

1,594 articles were traced. After the application of inclusion and exclusion criteria, only 21 studies were analysed. Out of them 16 were evaluated as physiotherapy intervention for asthmatic patients.

DISCUSSION

The purpose of this study was to determine literature about role of physical therapy interventions for treatment of asthmatic patient and to address the importance of physical therapy to control the aggressive symptoms of asthma using physiotherapy interventions or exercise to control the symptoms. This study shows the importance of physiotherapy that will help to find out the

cardiopulmonary intervention to enhance the quality of life by reducing the symptoms of asthmatic patients. The physical training augments the quality of life, enhance the cardiopulmonary functions level, and improves inspiratory capacity and reduce the aggressive symptoms to make the quality of life better.

Breathing exercise and aerobic exercise for asthmatic patients are helpful in improving breathing rhythm. Breathing exercises like diaphragmatic breathing, nasal breathing, plays a crucial role in increasing expiratory period, to slow down the respiratory stream, and to normalize breathing pattern. According to aerobic training exercises like indoor treadmill. Started at heart rate (HR) of 60% retrieval attained by the Karvonen equation: Training = HRrest + 0.6 (HRmaximal–HRrest)²⁵. Another study found that patient with asthma COPD were induced in an exercise program of six-weeks that included supervised resistance and endurance training, breathing exercises, self-management, and education. In the pulmonary rehabilitation group after completion of six weeks the result shown that there was a noteworthy upgrading in 6MWT (p = 0.001), BI (p < 0.001) and SGRQ (p = 0.007)²⁶.

A study was found that shows the positive outcome of breathing exercise training to control the asthma condition. In that study the intervention was given as individualized exercising program, comprising stretching, muscle training and aerobic exercises at least three thrice a week for ≥30minutes. On improving asthma control the effect of intervention was 3% (RD=0.23, 95% CI 0.027–0.438; P=0.0320). The shortness of breath also decreased 30.1% by intervention (RD=0.301, 95% CI 0.109–0.492; P=0.003)²⁷.

Exercise training program in winter's effect on the adults suffering from asthma or allergic rhinitis. According to another study was shown that in 10-day winters exercise program the result shows that fractional orally exhaled nitric oxide was significantly improved (FeNO; p = 0.008, day 10). At moderately cold temperatures Recreational winter exercise decreases nasal eosinophilic cell count, airways allergic inflammation that is evaluated as FeNO, and encourages sustainable improvements of allergic symptoms²⁸. In one study as a treatment method, patients were placed in salt space, in that patients were positioned in a precise air medium analogous to natural salt cave microclimate. The lining of the airways is affected by salt in the air and in response relax the smooth muscles of bronchial area. The thick mucus in the lungs can be diluted also by salt. Some studies have revealed that the efficacy of rehabilitation in upper airway conditions, enhancement of growth and even in skin repair²⁹.

A study for the control and treatment of an acute attack of asthma about Non-invasive ventilation (VNI) have used in the indoor setting. Busk et al. suggested that the continuous positive airway pressure (CPAP) administration to stable the adults lead to a decrease in the responsiveness of airways and the author considered that this non-pharmacological device to be very important for the bronchial reactivity treatment¹³. A RCT study was shown the effect of anthroposophical therapeutic speech (ATS), that practices syllabic rhythm and sound to increase articulation, cardiorespiratory interaction and moreover breathing within a real-life outpatient setting in patients with asthma²⁸. ATS session was given to 2 groups and the result was shown that Statistically important differences in between and waiting control groups and the ATS groups were determined for AQLQ score overall (d = 0.86, p = 0.001). Domain scores for emotional function, activity limitation and symptoms, along with ACT score (d = 0.53, p = 0.048). In asthma patients ATS significantly enhances quality of life and asthma control. Whether ATS may advance lung function is still under considerations³⁰.

In one study, an exercise training along with montelukast was given to children having mild asthma in a study the children receive treatment for 6 weeks. ET along with montelukast did not shown well effectiveness in refining lung functions after 6-week treatment protocol and follow-up of 2 weeks, as estimated by the values of FEV1 (P>.05) and FEV1/FVC (P>.05) than montelukast only, improvement of QoL (P<.01) and noteworthy relief of

symptoms ($P < .01$) have attained. But for children with MA, an adjunctive therapy tomontelukast, Exercise training maybe beneficial³¹. Beneficial effects of the two different exercise techniques (Buteyko and pranayama) in the asthmatic patient was shown in a study use of a Pink City Lung Exerciser (PCLE) to mimic pranayama, a PCLE placebo device use for 6 months or Eucapnic Buteyko breathing. After 6 months the result shows The Buteyko breathing technique can decrease the bronchodilator use and improve symptoms but does not seem to alter lung function or bronchial responsiveness in patients with asthma³².

Decreased physical activity (PA) in patients with COPD is related with a poor prognosis. A study was conducted to show that PA is a key therapeutic approach. Meanwhile far few approaches have been found effective in this group. The result found the intensity and amount of PA can be suggestively augmented by using a 12-week semi-automated telecoaching intervention in patients of COPD³².

For the management of patients of chronic obstructive disease, PR with multiprofessional education core components of exercise training has a vital role. As the exercise indices of cardiopulmonary efficiency and recovers clinical symptoms, in patients with asthma recommend exercise²⁹.

According to breathing techniques, many studies show that several approaches such as diaphragmatic breathing, slow or rapid breathing techniques, deep breathing protocols, nasal breathing approach, breath-holding sessions, that are used to control the discrepancy of the rate of respiration over the time in pranayama, can aid to breath more precisely and efficiently and by this means control symptoms of asthma³³. In this systematic review, there are many evidences on physiotherapy that suggests that many interventions are effective and beneficial for asthmatic patient and the rehabilitation program through different breathing exercise and aerobic training techniques can help to control the symptoms getting aggressive, increase the strength of diaphragm muscles and improves airway clearance by sputum exertion.

CONCLUSION

The study was concluded that physiotherapy provides a wide variety of exercise program like breathing exercise and various diaphragmatic breathing training and sputum exertion techniques that will rehab the bronchial asthmatic patient and decrease the risk of disease by providing a healthier quality of life.

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