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Efficacy of Breathing Retraining Program on Lung Function in Asthmatic Children between 10-16 Years

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Abstract: ***Children with asthma is one of the most common illness worldwide, asthma is a chronic inflammation of airway with characteristics of airway obstruction and difficulty in breathing. Pediatric asthma is characterized by episodes of wheezing, cough and shortness of breath, bronchial hyper responsiveness and reversible airflow restriction. Functional breathing disorders FBD have been the most commonly associated problem in asthmatic patients with other symptoms like short of breath, chest tightness and pain along with other symptoms like light headedness, anxiety and daytime fatigue.***

Keywords: Asthma, Breathing Exercise, Diaphragmatic breathing exercise, Segmental Breathing Exercise, Lateral costal expansion, Posterior basal expansion, Apical expansion, Chest expansion exercise, Coughing and huffing.

1. Introduction

Children with asthma is one of the most common illness worldwide, asthma is a chronic inflammation of airway with characteristics of airway obstruction and difficulty in breathing. Pediatric asthma is characterized by episodes of wheezing, cough and shortness of breath, bronchial hyper responsiveness and reversible airflow restriction. Commonly children experiences day time fatigue and reduced physical activity which may hamper development process and interferes with social behavior of child.Worldwide prevalence of asthma in children is very high, the rate of morbidity in UK itself is 21%. world wide estimated 2.8 million school days are lost annually and many off work for parents. Frequent asthmatic attacks lead to poor quality of life and loss of associated lung function which may be fatal.[2] the quality of life is having been an important consideration among the researchers for pediatric asthma. The prediction is indicator for the illness interference with daily life and how well child is adopting with the functional activity such as school, social, emotional and physical activity.

Hypothesis

a) **Null Hypothesis**: There will be no significant difference in GroupA breathing retraining exercise by Buteyko Breathing exercise compare to control Group B in asthmatic children.
b) **Alternate Hypothesis:** There will be significant difference inGroup A breathing retraining exercise by Buteyko Breathing exercise compare to control Group B in asthmatic children.

2. Literature Review

Asthma is one of commonest type of childhood illness worldwide with disabling effect on the quality of life and physical activity and lung function. Various physiotherapy treatment techniques are in use for treatment of asthma.

- ***[Andrew J Cave 2014]*** Presented a clinical review on asthma in preschool children, suggested diagnostic challenges are complex and varies with nature of history in early asthma. The study suggests that family physician are preferable to treat, manage, and control the asthma.
- ***[Anne Bruton 2017]*** conducted an RCT on asthmatic children to find out effect of breathing retraining on asthma. The study reveals breathing retaining programmes improves quality of life and it is cost effective program with a little help in control in asthma but having significant effect on lung function.
- ***Eric p performed a cross-sectional survey on 2013*** asthmatic children (aged 5–18 years), using the Nijmegen Questionnaire and the pediatric, Asthma Control Questionnaire. Dysfunctional breathing was found in 11 (5.3%) children; more females (eight (12.9%) out of 62) than males (three (2.1%) out 144, p50.002).
- ***[Erika von Mutius, 2002]*** presented article on environmental factors influencing the development and progression of pediatric asthma. And proposed a theory that in adulthood asthma also symptoms may begani from early childhood as a response of allergic reaction.
- ***[Rachel Umoren 2014]*** conducted a metanalysis to find out effect of steam inhalation or humidified oxygen for treatment of acute bronchitis in infants. The study reviled significant improvement in respiratory distress syndrome.
- ***[Saleh Al-Harbi 2016]*** conducted a study on awareness of asthma in Saudi Arabia on school going children's, the study reveals insufficient knowledge about asthma in community and further awareness programs are requires to spread information about sign, symptoms and available treatment of the condition.

3. Research Methodology

3.1 Buteyko training programme

Delivered in a number of sessions (usually from 3 to 5) Theprogramme is intended to generate a consciousness of

their breathing pattern in patients, and to enable them to understand, control and manage their breathing. The patient is instructed to breath from nose which is the essential element of Buteyko training programme. The Childers and parents were instructed to clear the nose before the session. The patients were taught to normalize their breathing pattern at rest and control hyperventilation which may occur due to exertion[24]. Childerns were taught to exercise with aim of breathing less volume and to restore natural breathing by relaxation and improving muscular control.

3.2 Conventional Physiotherapy

Diaphragmatic breathing exercise

- Position of the patient-Diaphragmatic breathing exercise taught in a relaxed half lying or sitting position. The patient should be straight and upright with the head and back fully supported, and the abdominal wall relaxed
- Use verbal cues- such as place your hand on rectus abdomen is just below the anterior costal margin and instruct the patient to breath in slowly and deeply through the nose. Have the patient keep the shoulder relaxed and upper chest to quiet a movement, and allow abdomen to rise.
- Then tell the patient to slowly let at their out using controlled expiration
- Have the patient practice 3-4 times and then rest and patient do not hyperventilate.
- Have the patient place his/ her hand below the anterior costal margin and feel the movement. The patient hand rise during inspiration and fall during expiration. By placing hand on the abdomen patient feel contract the abdominal muscle.
- After understand the patient how to using a diaphragmatic pattern, suggest that he/she breathe in through nose and out through the mouth.
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Figure 1: Diaphragmatic breathing exercise

Figure 2: Lateral costal expansion exercise

Segmental Breathing Exercise:

1) Lateral costal expansion-

- Position of the patient in a half lying with knees flexed over a pillow or sitting in a upright chair.
- Place your hand along lateral aspect of the lower ribs to fix the patient's attention to the areas at which movement is to occur
- Ask patient to breath in out and feel the movement of ribcage. During inspiration outward and upward movement of ribs and during expiration downward and inward pressure of ribs feels.
- Prior to inspiration slight pressure applied in downward and inward direction to facilitate the contraction of intercostal muscle.
- The patient may them be taught to perform the maneuver indecently. He or she may place the hands and apply pressure manually over the rib or using belt to apply resistance.

2) Posterior basal expansion:

- Position of the patient sit and lean on the pillow with slightly bending the hips.
- Place your hand over the posterior aspect of the lower ribs.
- Follow same as basal expansion exercise, during inspiration slightly pressure applied to facilitate the intercostal muscle, and instruct the patient during inspiration ribs moves upward and outward.
- This form of exercise is important for the postsurgical patient who is confined to bed in a semi upright position for an segments of the lower lobes. Right middle lobe or lingula expansion are patient is sitting place your hands at either right or left side of the patient's,

Figure 3: Posterior basal expansion

3) Apical expansion

- Patient position should be in a well-supported half lying or sitting position with shoulder remain relaxed in position.
- Pressure is applied below the clavicle using the tip of the fingers.
- patient is instructed to breath in and expand the chest upwards against the pressure of the fingers.
- It can be taught to give pressure himself with the opposite hand.

Figure 4: Apical expansion

Chest expansion exercise:

- It is done in half lying or sitting position.
- Ask to patient arm overhead during inspiration during inspiration and down back to normal position during expiration.

Coughing and huffing

- Patient position half lying.
- Patient taught to coughing or huffing is essential for removing of secretion from the lungs.
- The incision is supported at the beginning of the expiration after a deep inspiration.
- Huffing should also be taught so that the patient is practiced in both method of lung clearing.
- Relaxation and diaphragmatic breathing are encouraging after coughing to avoid hyperventilate the patient.

Figure 5: Coughing and huffing

Static Tests:

In Asthma Control Questionnaire patient and their parents were asked to recall the symptoms and fill the questionnaire on a scale of 0 to 6 where o no problem at all and 5 is the worst.

Statistic Tool:

Shaprio-wilk test was used to check the normality of data. Paired and compared parametric test.

4. Data Analysis and Result

In the study data analysis was done using SPSS v.17. Total 30 subjects were included in the study and are randomly divided into two groups i.e Group A and Group B; each comprising of 15 subjects. The subject was assessed using Static Test of Asthma control Questionnaire pre and post treatment reading was taken. As the number of samples in one group was (<50), Shaprio-Wilk test was used in the study.

Normality test was done to determine the significance of Pre and Post data of Group A and Group B which shows significant values i.e., more then 0.05. Therefore, both the groups analyzed using Parametric test.

Again, the normality was done to determine the significant value of Pre-Pre and Post-Post data of Group A and Group B that showed the significant value i.e., more than 0.05. Therefore, the mean value comparison of group A and Group B was determined by parametric test.

5. Discussion

studying 30 Children's having Asthma of age group 10-16 years and are divided into 2 groups i.e. Group A and Group B. Group A subjects received Buteyko Training Programme along with conventional physiotherapy once a day for 3 weeks and Group B subjects conventional physiotherapy for 3 weeks. All the subjects were selected after pre-screening done by Asthma control Questionnaire. When the Mean values of pre and post data of Group A and B was analyzed, we found that both the groups showed significant

improvement Asthma Symptoms i.e after completion of 3 weeks of treatment protocol.

6. Conclusion

The present study was conducted for a period of three weeks on 30 Asthmatic Children's at department of Phsiotherapy, people's college of Paramedical sciences, Bhopal. The subject was randomly allocated into two groups by means of lottery method. Group A received Buteyko Training Programme along with conventional physiotherapy and Group B only conventional physotherapy for a period of 3 weeks. Pre and Post Data were collected and analyzed.

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