

Effect of Buteyko breathing technique on respiratory parameters of 5 to 12 years old children with bronchial asthma admitted in paediatric ward at selected hospital Bhubaneswar, Odisha

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Abstract: *Background: Buteyko breathing technique is a type of complementary and alternative therapy which indicated chronic breathing retraining as a treatment method for asthma along with other associated conditions. It is a set of simple breathing exercises to reduce asthma and other breathing disorders. In this study, the Buteyko breathing technique improved the respiratory parameters and reduced the respiratory signs. Objectives: The objectives of the study were to assess the respiratory parameters of 5-12 year children with bronchial asthma before and after the Buteyko breathing technique and secondly to determine the effect of the Buteyko breathing technique. Material & method: Design of present study was quasi-experimental research design to find the effect of the Buteyko breathing technique on respiratory parameters of 5 to 12 years of children with bronchial asthma admitted in the pediatric ward at capital hospital, Bhubaneswar. The non-probability purposive sampling technique was used to select 120 (60 samples for the Experimental group and 60 samples for the control group). This procedure was demonstrated by the investigator to the experimental group for 10 - 15 minutes. This was followed for five days and was given twice a day. There was no intervention for the control group. The study was conducted for one month. Patients of both sexes of age group 5-12 year selected and critically ill patients were excluded. Result and conclusion: In comparing the respiratory parameters of bronchial asthma, the mean score was obtained for posttest in both experimental and control group were respiration rate($t_{118}=13.4, p<0.0001$), breath sound ($t_{118}=3.19, p<0.001$), oxygen saturation($t_{118}=8.79, p<0.0001$) and respiratory distress ($t_{118}=2.73, p<0.007$) respectively which was statistically significant in the respiratory parameters. The pretest and posttest mean score for control group of respiration rate($t_{59}=1.91, p>0.060$), breath sound($t_{59}= 0.52, p>0.60$), oxygen saturation($t_{59}=4.35, p<0.0001$) and respiratory distress ($t_{59}= 0.90, p>0.20$) respectively which showed that there were no significant difference was noted except oxygen saturation while the experimental group showed a significant difference after Buteyko breathing technique as respiration rate($t_{59} =3.76, p<0.0004$), breath sounds($t_{59}= 4.73, p<0.0001$), oxygen saturation ($t_{59}=12.9, p< 0.0001$), & respiratory distress($t_{59}=3.14, p<0.0026$) respectively. Hence the study revealed that the Buteyko breathing technique helped improve the respiratory parameters of 5 to 12 years of children with bronchial asthma.*

Keywords: *Buteyko breathing technique, respiratory parameters, bronchial asthma, children, respiratory sign.*

Introduction

Asthma is one of the problems for all developing countries. In most of the areas in the country, the incidence of the disease varied largely. Between 1 and 1.50 billion populations in the world, suffering from many respiratory problems and this count increasing. Worldwide, 180,000 cases found annually.¹ The prevalence of asthma is between 10% and 15% in 5- 11-year-old children in India. The incidence varied from more than 50% among declared by the western pacific region of WHO.² Asthma pointed 10% of the Indian population have been accessed to the phases of care by international guidelines The obstacle were medications, the socio-economic differences and cultural issues.³ World Health Organization identifies asthma is a major chronic health problem. Family member opinion on the disease condition of the child is a significant factor that influenced the acceptance of the disease and compliance to the therapy. Therefore, client-centered education program forms an integral component in the long term treatment of asthma. Knowledge on disease condition empowers patients and their family member especially, a chronic disease like asthma.⁴

In asthma management, complementary and alternative medicine is enjoying a growing popularity worldwide. Buteyko Breathing exercise is a complementary or alternative therapy that healed chronic “breathing retraining technique” as a therapeutic process for asthma as well as other health conditions. It is a series of simple breathing exercises which help in controlling asthma and associated breathing disorders. At the core of the Buteyko breathing method is a list of reduced- breathing exercises that focused on nasal breathing, breath-holding and relaxation exercise.⁵

Buteyko method contained subsequently power of controlling the breathing-related problems which bring the respiratory parameters of the body to the normal condition and helps to adopt a normal life pattern.

Objective:

1. To assess the respiratory parameters among children (5-12 years) with bronchial asthma before the Buteyko breathing technique.
2. To assess respiratory parameters among children (5-12 years) with bronchial asthma after the Buteyko breathing technique.
3. To determine the effect of Buteyko breathing technique in both the experimental group and the control group

Material & Method

Design for this study was a quantitative research approach with a Quasi-Experimental design – pretest-posttest control group design. The study was conducted in Capital Hospital Bhubaneswar, Odisha. The non-probability purposive sampling technique was adopted to collect 120 samples for this study where 60 samples belonged to the experimental group and other groups belonged to the control group. The study was conducted for one month for data collection and intervention. This study included patients of both sexes of age group 5-12 years and who understood Odia, Hindi and English and critically ill patients were excluded in this study. The written consent was taken from all the parents of participants in the hospital and the institutional ethical Committee was approved the study to continue. Two self-structure tools were developed: Demographic data was collected through a structured questionnaire with eight items comprising

age, gender, educational status, Type of family, history of asthma, duration of hospitalization and acceptance of asthma. frequency of asthmatic attack respectively. Secondly, Self –structured observational checklist for assessing respiratory parameters such as respiration rate, breath sound, oxygen saturation and respiratory distress respectively. Both the tools were Validated and modified by the experts before data collection. Interrater reliability was applied and it was calculated to be 0.85 which was acceptable. A pilot study was done to determine the feasibility of study.

The study was conducted in the following phases.

Phase 1: The investigator has assessed the respiratory parameters which include, respiration rate, abnormal breath sounds and oxygen saturation by using a pulse oximeter, observation and auscultation respectively.

Phase 2: Buteyko breathing technique was demonstrated by the investigator to the experimental group for 10 - 15 minutes. This will be followed for five days and will be given twice a day. There was no intervention for the control group.

Phase 3: After the end day of the intervention (fifths day), the post-test score of respiratory parameters was assessed by using a pulse oximeter, observation and auscultation.

Intervention:

Investigator has developed a protocol on the Buteyko breathing technique. The steps as followed:

- Provide a calm and quiet environment.
- Make the child to sit in a relaxed manner, with an upright posture
- Instruct the child to close the mouth, teach the children to take breath in through the nose and breathe out through the nose.
- Pinch the nose with fingers to hold the breath and nod the head up and down as long as possible.
- Count BHT (Breath-holding time) in seconds by using the stopwatch.
- Release the nose to resume breathing when the first need of breath and record time of control pause feel.

The above was repeated three-four times followed by a duration of 1 min for 5 consecutive days. The entire procedure will take for 10-15 minutes.

- **Control Pause (40 to 60 seconds):** It indicated a normal, healthy breathing pattern and excellent physical endurance of patients.
- **Control Pause (20 to 40 seconds):** It indicated mild impairment in breathing of patients.
- **Control Pause (10 to 20 seconds):** It indicated impairment of breathing and weak tolerance to physical exercise; inhalation and exhalation training and modifications of life were encouraged.
- **Control pause under 10 seconds:** It indicated the vigorous impairment of breathing, very slow exercise tolerance, and chronic health issues.

Result

Excel Sheet (Microsoft Corporation) was used to enter the data. The results had been expressed in mean with & a standard deviation. The mean pretest and post-test and standard deviation of respiratory parameters in the control group of 5-12 years of children were 0.6 ± 2.60 , 0.03 ± 0.50 , 1.53 ± 2.72 , and 0.06 ± 0.40 respectively. The paired' value were for respiration rate ($t_{59}=1.91$, $p>0.060$), breath sound ($t_{59}= 0.52$, $p>0.60$), oxygen saturation($t_{59}=4.35$, $p<0.0001$)and respiratory distress($t_{59}=0.90$, $p>0.20$)respectively which presented that there were no significant

difference was noted except oxygen saturation. Hence it was indicated that there were no significant differences found.

Mean pretest, the post-test and standard deviation of respiratory parameters in the experimental group of 5-12 years of children were 1.56 ± 3.21 , 0.30 ± 0.49 , 5.4 ± 3.23 , 5.4 ± 3.23 respectively. The paired t-test value was for respiratory rate ($t_{59}=3.76$, $p>0.0004$), breath sounds ($t_{59}=4.73$, $p<0.0001$), oxygen saturation ($t_{59}=12.9$, $p<0.0001$), & respiratory distress ($t_{59}=3.14$, $p<0.0026$) respectively which was statistically significant. Hence this was concluded there were statistically significant differences in pretest and post-test scores of the experimental group. Thus Buteyko breathing technique was effective on respiratory parameters of 5-12 years of children with bronchial asthma.

Discussion

The present study finding reported that respiration rate ($t_{59}=3.76$), and breath sound ($t_{59}=4.73$), oxygen saturation level ($t_{59}=12.9$) and respiratory distress ($t_{59}=3.14$) respectively at $p=0.0001$ which was statistically significant. Therefore, the investigator felt that, Buteyko breathing technique for children with bronchial asthma reduced the respiratory signs & improved the respiratory parameter. The present research study was supported by a similar study conducted by Kimita Huidrom, et al; 2016. This was done to assess the effect of Buteyko breathing exercise on respiratory parameters between the patients with bronchial asthma of children where 60 samples were taken. The study showed that it was effective in improving the respiratory physiological parameters and there were significant differences between the experimental and control group ($t_{58}=17.4$, $p<0.05$). Demographic variables were found to have a significant association ($p<0.05$) with respiratory physiological parameters.⁵ The present study also supported by Hassan ZM *et al* (October 2012) to determine the effect of the Buteyko Breathing Technique on respiratory parameters among Bronchial asthma patients. 40 samples have participated in the study, the sample age ranges from 30-50 years of age. The study showed Buteyko breathing exercise was effective in asthma. The therapeutic program was continued with two sessions. Peak expiratory flow rates (PEFR), Control pause test and asthma daily symptoms (asthma control questionnaire) were measured respectively at the beginning and after the treatment program. The study concluded that the Buteyko Breathing Technique improves the function of the patient and the capacity for independent living by decreasing the severity of asthma symptoms and prolapsed of asthma attacks again.⁶ Similarly, the present research study was also supported by Cowie RL *et al* (May 2008). The study findings indicated that the Buteyko Breathing Technique group the proportion of asthma control increased from 40%-79% and the control group from 44% -72% and concluded that Buteyko technique has improved the quality of life among adult clients with asthma who were being treated with inhaled corticosteroid.⁷ This present research study was similar to Mc Hugh P, *et.al* (December 2003) to determine the impact of the Buteyko breathing technique on medication consumption for asthma. The results depicted that there was no change of steroid use in the control group and concluded that the Buteyko Breathing Technique was safe and efficacious and had clinical and possibilities on pharmaco-economic benefits that convinced for future study.⁸ This study was confined to a small group, undergoing the procedure which limited the generalization of the present research study findings.

Conclusion

The following conclusions were drawn from this study, there was significant improvement of children with bronchial asthma after receiving the Buteyko breathing technique. This breathing

technique was found useful for reducing the respiratory signs and improved the respiratory parameters. The Buteyko breathing technique can be considered as a primary prevention measure for asthma. In future this technique can be educated to the public and health professionals through the conference, seminar, and workshop and health education. More research can be conducted based on this technique.

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Conflict of Interests: None

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Reference

[1] Dorothy R. Marlow, Barbara A. Redding. Textbook of Pediatric Nursing. Sixth Edition, Elsevier, p8-9.
 [2] Becker A, Lemièrè C, Bérubé D, et al. Summary of recommendations from the Canadian Asthma Consensus guidelines, 2003. CMAJ 2005;173(6): S3–S11.
 [3] Ukena D, Fishman L, Niebling WB. Bronchial asthma: diagnosis and long-term treatment in adults. Dtsch Arztebl Int. 2008;105(21):385–394.
 [4] Buteyko practical elements. Available from:URL:htpp//www.Butyeko.com
 [5] Girish D Sharma, Michael R Bye. Pediatric Asthma. Available from:URL:http//ww w.emedicine.medscape.com .
 [6] Huidrom K, Shiroom G, Ray SP. Effectiveness of the Buteyko breathing technique on respiratory physiological parameters. Int J Sci Res 2016 7(5): 11328-11331
 [7] Hassan ZM, Riad NM, Ahmed FH.Effect of Buteyko breathing technique on patients with bronchial asthma. Egyptian J Chest Dis Tuberculosis 2012;61(4):235-41
 [8] Cowie RL, Conley DP, Underwood MF, Reader PG. A randomized controlled trial of the Buteyko technique as an adjunct to conventional management of asthma. Respir Med 2008 102(5):726- 32.
 [9] McHugh P, Aitchison F, Duncan B, Houghton F.Butyeko Breathing Technique for asthma: an effective intervention. NZ Med J 2003;12; 116 (1187); U710

Table1. Mean, standard deviation, standard error, t value of the obtained post-test score on respiratory parameters of 5-12 years of children by using unpaired t-test in both experimental and control groups

Respiratory parameters	Mean ±SD	SE	n1+n2=60+60=120	
			t value	P Value
Respiration rate	9.2±5.27	0.68	13.4	0.0001***
Breath sound	0.02±0.49	0.06	3.19	0.001**

Oxygen saturation	2.41±2.12	0.27	8.79	0.0001***
Respiratory distress	0.15±0.43	0.05	2.73	0.007**
p<0.05		**very significant *** extremely significant		

Table 2. mean, standard deviation, standard error, t value of pretest and post-test score on respiratory parameters of 5-12 years of children by using paired t-test in the control group

n=60

Respiratory parameters	Mean ±SD	SE	t value	P Value
Respiration rate	0.64±2.60	0.33	1.91	0.060
Breath sound	0.03±0.50	0.06	0.52	0.60
Oxygen saturation	1.53±2.72	0.35	4.35	0.0001***
Respiratory distress	0.06±0.40	0.05	1.28	0.20
p<0.05		*** extremely significant		

Table 3. Mean, standard deviation, standard error, t value of pretest and post-test score on respiratory parameters of 5-12 years of children by using paired t-test in the experimental group.

n=60

Respiratory parameters	Mean ±SD	SE	t value	P Value
Respiration rate	1.56 ±3.21	0.41	3.76	0.0004***
Breath sound	0.30±0.49	0.64	4.73	0.0001 ***
Oxygen saturation	5.4±3.23	0.41	12.9	0.0001***
Respiratory distress	5.4±3.23	0.06	3.14	0.0026**

p<0.05

very significant, *=extremely significant