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Research Article

EFFECTIVENESS OF BUTEYKO BREATHING TECHNIQUE ON RESPIRATORY PHYSIOLOGICAL PARAMETERS AMONG PATIENTS WITH BRONCHIAL ASTHMA

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ABSTRACT

Background: Asthma is the most frequent chronic respiratory condition worldwide, and its prevalence is increasing. Since asthma cannot be cured, there are alternative therapies, namely Buteyko Breathing Technique.
Objective: To assess the effectiveness of Buteyko Breathing Technique on respiratory physiological parameters.
Materials and methods: A quantitative approach with Quasi-experimental (pre-test post-test control group) design was adopted for the study. Modified observational tool was developed to assess the respiratory physiological parameters. Non probability purposive sampling technique was adopted to select 60 samples for the study, 30 samples each for the experimental and control groups.
Results: The study showed that Buteyko Breathing Technique was effective in improving the respiratory physiological parameters among patients with bronchial asthma and there is significant difference between experimental pre-test and post-test(t_{29}=16.6,$p<0.05$)and there is significant difference between experimental and control group(t_{58}= 17.4,$p<0.05$). Demographic variable age was found to have significant association ($p<0.05$) with respiratory physiological parameters.
Conclusion: Buteyko Breathing Technique was found to be significantly effective in improving the respiratory physiological parameters among patients with bronchial asthma.

INTRODUCTION

Asthma is the most frequent chronic respiratory condition worldwide, and its prevalence is increasing.[1] Asthma affects up to 5% of the population in the United States, and the total prevalence of asthma has increased 61% since 1970. There are an estimated 9.9 million cases of asthma, with 3.2 million of these in children less than 18years of age.[2]

In a morbidity and mortality report from the Centers for Disease Control and Prevention for the period 2006 to 2008, asthma prevalence was estimated as 7.8% for the United States population. The Centers for Disease Control and Prevention has estimated a significant rise in asthmatic patients of 12.3% since 2001 in the United States. Statistical figures for 2009 show that 24.6 million people had asthma, compared with 20.3 million at the beginning of the decade. This increase has come with a cost to society of 56 billion dollars in medical expenses and lost productivity. Global Initiative for Asthma estimated that by 2025, 400 million people around the world will have a diagnosis of asthma.[1]

Asthma cases are increasing at a rate of 50% every decade in worldwide, and according to the World Health Organization, by 2020, asthma, along with Chronic obstructive pulmonary disease will become the third leading cause of death. In India, it is estimated that 57,000 death were attributed to asthma in 2004 (WHO 2004) and it was seen as one of the leading cause of morbidity and mortality in rural India (Smith2000). In India, by 2009, the total estimated burden of asthma is an overall prevalence of 3% (30 million patients), and among adults over the age of 15, a median prevalence of 2.4% (Aggarwal *et al* 2006).[3]

Asthma cannot be cured but the symptoms can be control with other complementary or alternative physical therapy. One of the most effective breathing therapy is Buteyko Breathing Technique. The late Professor Konstantin Buteyko was a Russian physiologist (1923—2003) who gave his name to a novel treatment approach that is currently being applied to patients with asthma in a number of countries.[4] Buteyko Breathing Technique is currently being taught in Europe, Australia, New Zealand, and the USA.[5]

Objectives of the Study

1. To assess the respiratory physiological parameters before intervention among patients with bronchial asthma in both experimental and control groups.

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2. To assess the respiratory physiological parameters after intervention among patients with bronchial asthma in experimental group.
3. To compare the post test scores on respiratory physiological parameters among patients with bronchial asthma in experimental group and control group.
4. To associate the respiratory physiological parameters among patients with bronchial asthma in both experimental and control groups with selected demographic variables.

Hypothesis

1. H_0: Buteyko Breathing Technique will have no significant effect on the respiratory physiological parameters among patients with Bronchial asthma in experimental group.
2. H_1: Buteyko Breathing Technique will have significant effect on the respiratory physiological parameters among patients with Bronchial asthma in experimental group.

MATERIALS AND METHODS

The research design selected for this study was Quantitative approach with Quasi Experimental design –pretest-posttest control group design. The study was conducted in Dhankawadi, Padmavati and Bibwewadi, Pune city. Non probability purposive sampling technique was adopted to collect 60 samples for the study. Demographic data was collected through structured questionnaire with 8 items which comprises of age, gender, education, occupation, family income, smoking status, duration of bronchial asthma and treatment. Validity and reliability of the tool was done before data collection. Pilot study was conducted to determine the feasibility of the study.

Table 1 Description of samples (patients with bronchial asthma) based on their personal characteristics in terms of frequency and percentages

N=30,30

emographic Variable	Experimental group		Control group	
	Freq	%	Freq	%
Age				
21-30 years	9	30.0%	5	16.7%
31-40 years	7	23.3%	9	30.0%
41-50 years	8	26.7%	10	33.3%
51-60 years	6	20.0%	6	20.0%
Gender				
Male	9	30.0%	15	50.0%
Female	21	70.0%	15	50.0%
Education				
Illiterate	1	3.3%	0	0.0%
Primary	12	40.0%	10	33.3%
Secondary & higher secondary	8	26.7%	14	46.7%
Graduate & post-graduate	9	30.0%	6	20.0%
Occupation				
Private service	6	20.0%	10	33.3%
Government service	1	3.3%	1	3.3%
Unemployed	10	33.3%	11	36.7%
Factoryworkers/Laborers/daily wages	13	43.3%	8	26.7%
Family income (in rupees)				
< 5000	1	3.3%	3	10.0%
5,001-10,000	10	33.3%	8	26.7%
10,001-15,000	10	33.3%	10	33.3%
15,0001-20,000	3	10.0%	6	20.0%
20,001 & above	6	20.0%	3	10.0%
Smoking status				
Non-smoker	20	66.7%	18	60.0%
Passive smoker	2	6.7%	2	6.7%
Smoker	3	10.0%	5	16.7%
Ex- smoker	5	16.7%	5	16.7%
Duration of bronchial asthma				
Since childhood	1	3.3%	2	6.7%
< 2years	8	26.7%	11	36.7%
2-5 years	12	40.0%	7	23.3%
>5 years	9	30.0%	10	33.3%
Treatment				
Yes	30	100.0%	30	100.0%
No	0	0.0%	0	0.0%

Pre-test was conducted for both the experimental and control groups to assess respiratory physiological parameters - (pulse rate, respiratory rate, oxygen saturation and peak expiratory flowmeter) by using modified structured observational tool. After the pre-test, Buteyko Breathing Technique was administered only to the experimental group and subjects performed the technique daily thrice a day for 10 minutes each. Post-test for both the experimental and control groups were carried out on the fifth day. Data was analyzed by using descriptive and inferential statistics.

RESULTS

The data presented in Table 1 shows that in experimental group, majority 30% of the patients with bronchial asthma belongs to age 21-30 years. In control group, majority 33.3% of patients belong to age 41-50 years.

In experimental group, 70% were females and 30% of them were males. In control group 50% were females and 50% of them were males.

In experimental group, 40% of patients with bronchial asthma had primary education. In control group, 46.7% of them had secondary and higher secondary education.

In experimental group, 43.3% of them were factory workers/Labourers/daily wages. In control group, 36.7% of them were unemployed.

In experimental group, 33.3% of patients with bronchial asthma had family income Rs.5001-10000, 33.3% of them had family income Rs. 10001-15000. In control group, 33.3% of them had family income Rs. 10001-15000.

N=60

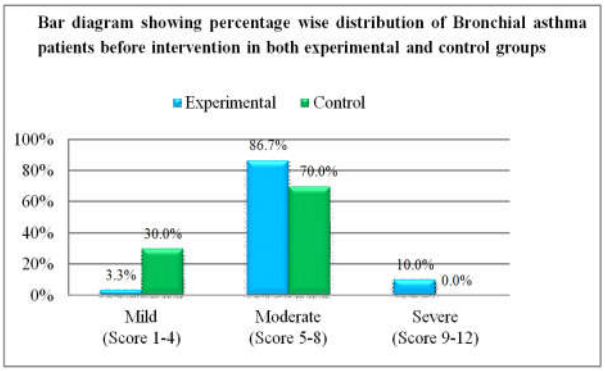

Figure 1 Percentage wise distribution of Bronchial asthma patients before intervention in both experimental and control groups

In experimental group, 66.7% of patients with bronchial asthma were non-smokers. 60% of them from control group were non-smokers.

In experimental group, 40% of them had bronchial asthma since 2-5 years. In control group, 36.7% of them had asthma since less than 2 years.

Figure 1: Bar diagram showing percentage wise distribution of Bronchial asthma patients before intervention in both experimental and control groups

Figure 1 represents the percentage distribution of Bronchial asthma patients before intervention in both the groups.

In experimental group, majority 26(86.7%) of Bronchial asthma patients had moderate asthma (score 5-8). In control group, 21(70%) of Bronchial asthma patients had moderate asthma (Score5-8).

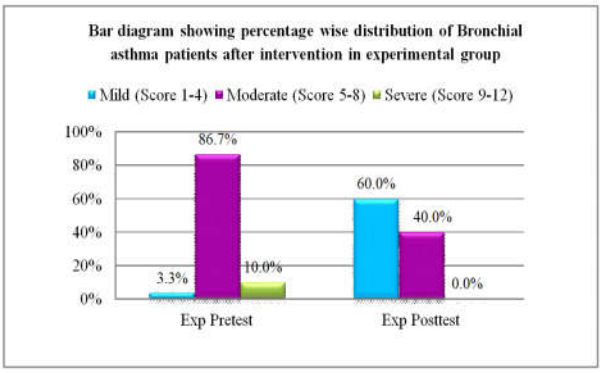

Figure 2 Percentage wise distribution of Bronchial asthma patients after intervention in experimental group

Figure 2: Bar diagram showing percentage wise distribution of Bronchial asthma patients after intervention in experimental group

Figure 2 represents percentage wise distribution of Bronchial asthma patients after intervention in experimental group. In experimental group pretest, majority 26(86.7%) of Bronchial asthma patients had moderate asthma (score 5-8). In posttest, 18(60%) of Bronchial asthma patients had mild asthma (score 1-4).

Table 2 Mean, SD, t- value of intervention on respiratory physiological parameters among patients with bronchial asthma in experimental group

	Mean	SD	T	Df	p-value
Pretest	6.6	1.2	16.6	29	0.000
Posttest	4.7	1.1			

Table 2 depicts the data related to the paired t-test which the researcher applied for effectiveness of intervention in experimental group. Average score in pre-test was 6.6 which reduced to 4.7 in post-test. t-value for significance of correlation was 16.6 at 29 degrees of freedom. The obtained mean difference is not by chance it is a true difference (t29= 16.6, p-value <0.05), hence the null hypothesis (H0) is rejected and research hypothesis (H1) is accepted. Hence it proved that Buteyko Breathing Technique was found to be significantly effective in improving the respiratory physiological parameters among patient with bronchial asthma.

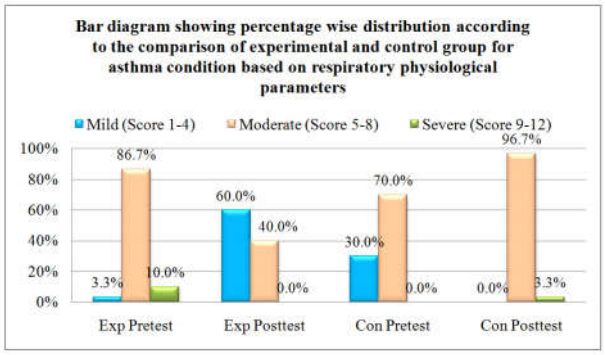

Figure 3 Comparison of experimental and control group for asthma condition based on respiratory physiological parameters

Figure 3: Bar diagram showing percentage wise distribution according to the comparison of experimental and control group for asthma condition based on respiratory physiological parameters.

In experimental group, majority of 86.7% of the patients with bronchial asthma had moderate asthma (score 5-8), 10% of them had severe asthma (Score 9-12) and 3.3% of them had mild asthma (score 1-4) in pretest. In posttest, 60% of them had mild asthma (score 1-4) and 40% of them had moderate asthma (score 5-8). In control group, 70% of them had moderate asthma (Score 5-8) and 30% of them had mild asthma (Score 1-4) in pretest. In posttest, majority of 96.7% of the control group patients had moderate asthma (score 5-8) and 3.3% of them had severe asthma (score 9-12). This indicates that there is remarkable improvement in the respiratory physiological parameters of patients with bronchial asthma.

Table 3 Two sample t-test for comparison of effectiveness for comparison of average change in respiratory physiological parameters in experimental group and control group.

N=30,30

Group	Mean	SD	t	df	p-value
Experimental	1.9	0.6	17.4	58	0.000
Control	-1.1	0.7			

Table 3 depicts the data related to two sample t-test for comparison of average change in respiratory physiological parameters in experimental group and control group. Average score in experimental group was 1.9 and that for control group was -1.1. t-value for this comparison was 17.4 at 58 degrees of freedom.

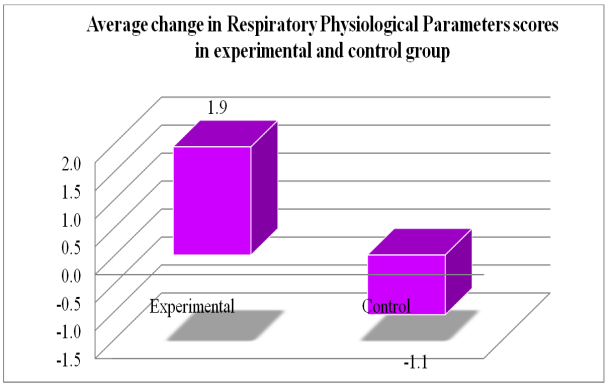

Figure 4 Comparison between experimental and control groups on respiratory physiological parameters

The obtained mean difference is not by chance it is a true difference (t58= 17.4, p-value <0.05), hence the null hypothesis (H0) is rejected and research hypothesis (H1) is accepted. Hence it proved that Buteyko Breathing Technique was found to be significantly effective in improving the respiratory physiological parameters among patients with bronchial asthma.

Figure 4: Bar diagram showing comparison between experimental and control groups on respiratory physiological parameters

Fisher's exact test was done to find out the association of respiratory physiological parameters with demographic variables of bronchial asthma patients under study. Age ($p < 0.05$) was found to have significant association with the respiratory physiological parameters among patients with bronchial asthma that is with the increase in age patients suffer bronchial asthma more.

DISCUSSION

The findings of the study showed that there is significant difference between experimental pre-test and post-test (t_{29}=16.6, $p<0.05$)and there is significant difference between experimental and control group(t_{58}= 17.4,$p<0.05$).

These findings are supported by an experimental study conducted by Hassan ZM *et al* (October 2012) to assess the effect of Buteyko Breathing Technique on parameters among Bronchial asthma patients. The study was done among 2 groups(1st group: received Buteyko Breathing Technique and medications prescribed by physician and 2nd group: didn't perform any physical therapy program just their medications prescribed by physician). After the post-test, the study showed significant decrease in asthma daily symptoms, significant improvement in PEFR in the Buteyko group, but no significant change in the other group. The study concluded that Buteyko Breathing Technique improves patient's function level and the capacity for independent living by decreasing the severity of asthma symptoms and recurrence of asthma attacks.[6]

Similarly, a study was conducted by Cowie RL *et al* (May 2008) to assess the effectiveness of a non–pharmacological intervention (Buteyko Breathing Technique) in clients with asthma on conventional therapy including inhaled corticosteroid among a group of adults with asthma. The study findings indicated that in 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 provide additional benefit and prevented the exacerbations there by improved the quality of life among adult clients with asthma who are being treated with inhaled corticosteroid.[7]

This present study is also supported by a study conducted by Mc Hugh P, *et al* (December 2003) to assess the impact of Buteyko Breathing Technique on medication use in Asthma. The results showed that a reduction in inhaled steroid use of 50% and beta-2 agonist use of 85% at 6 months from baseline and no change of steroid use in control group and concluded that Buteyko Breathing Technique is safe and efficacious and has clinical and potential pharmaco-economic benefits that merit further study.[8]

CONCLUSION

The following conclusions can be drawn from the study findings. Buteyko Breathing Technique was found to be significantly effective in improving the respiratory physiological parameters among patients with bronchial asthma.

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