Effect of Six Week Intervention Training of Breathing Exercises on Forced Ventilatory Capacity: An Experimental Study

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Abstract

This study was conducted to find out the influences of breathing exercises on Forced Ventilatory Capacity. For this study, thirty female students were selected randomly from a residential school age ranging 14 – 16 years. The subjects were randomly divided in to two groups; treatment group and control group. A six weeks training was given to the treatment group and placebo for the control group was scheduled with morning and evening sessions. The subjects were assessed before implementing the training and after six weeks of training program. Analysis of Covariance (ANCOVA) has been used to analyze the data and the level of significance was set at 0.05 level. Significant difference have been observed between the treatment group and control group ($p = 0.001$). Hence, the findings revealed that Breathing Exercises play a vital role in improving the Forced Ventilatory Capacity.

KEYWORDS: Breathing Exercises, Female, Intervention, Forced Ventilatory Capacity.

INTRODUCTION

The effects of breathing practices on physiological components have been observed dominating from the emergence of literature documenting its benefits, in the last decades. Breathing is a natural process responded by the body to inhale fresh air and exhale the old & stale air. In a deep breath, the air come in through the nose fully fills the lungs, and raises the lower belly. Deep breathing becomes unnatural due to several reasons like Age, smoking, inhaling pollutants, body image and other factors that cause a negative impact on respiration process by affecting lung functions of human beings. Breathing practices helps in strengthening this natural process by controlling one's breath for the purpose of restoring or enhancing one's health, it helps to maintain a decreased respiratory rate without disturbing respiratory homeostasis**. "**People cannot necessarily change their lung capacity in terms of how much oxygen their lungs can hold. However, they can perform exercises that may reduce shortness of breath when they have a lower lung function than is desirable" (Rachel Nall, 2018). Many reports and research works supported the beneficial effects of yoga practices on pulmonary functions of human beings.

MATERIAL AND METHOD

For the purpose of this study thirty female students were selected randomly from a residential school age ranging 14 – 16 years. The subjects were further divided into two groups; one is treatment group and the other is control group with fifteen subjects in each group. All the subjects were found to be physically fit for the type of training they were selected. A six weeks training was given to the treatment group and placebo

for the control group was scheduled with morning and evening sessions. Subjects were free to withdraw from the study at any time.

TOOLS

Peak Flow Meter was used to measure the Initial and Post-training responses of the subjects. Three trials were given to the subjects and the highest score from the three trials was taken as final reading of the subject.

STATISTICAL ANALYSIS

In order to see the impact of training, Descriptive statistics such as mean and standard deviation was used. To be more specific Analysis of Covariance (ANCOVA) have been used to analyse differences between the Initial and post-training data with the help of SPSS (Version 20.0). The level of significance was kept at 0.05 level.

RESULTS

To know the average values of FVC of both groups Descriptive statistics have been applied and has been presented in Table 1.

Table 1 Mean and standard deviation of FVC in both groups after treatment.

Treatment Groups	Mean	Std. Deviation	N
Breathing Exercises	392.67	62.16	15
Control Group	376.00	53.29	15
Total	384.33	57.52	30

Table 1 revealed the post mean and standard deviation of Forced Ventilatory Capacity for Breathing Exercises group (392.67 ± 62.16) and control group (376.00 ± 53.29) respectively. It can be seen that average FVC is highest in Breathing Exercises group, let's see whether this difference is significant or not after adjusting for the covariate (Forced Ventilatory Capacity before treatment).

Table 2 Adjusted mean and standard error for the data on FVC in both groups after treatment.

Treatment Groups	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Breathing Exercises	394.61[a]	3.90	386.62	402.61
Control Group	374.05[a]	3.90	366.06	382.05

a. Covariates appearing in the model are evaluated at the following values: Pre - Training = 366.0000.

Table 2 shows the adjusted mean and standard error of the criterion variable in both the groups. The data of the adjusted mean along with the initial and post-treatment mean has been shown graphically in Figure 1.

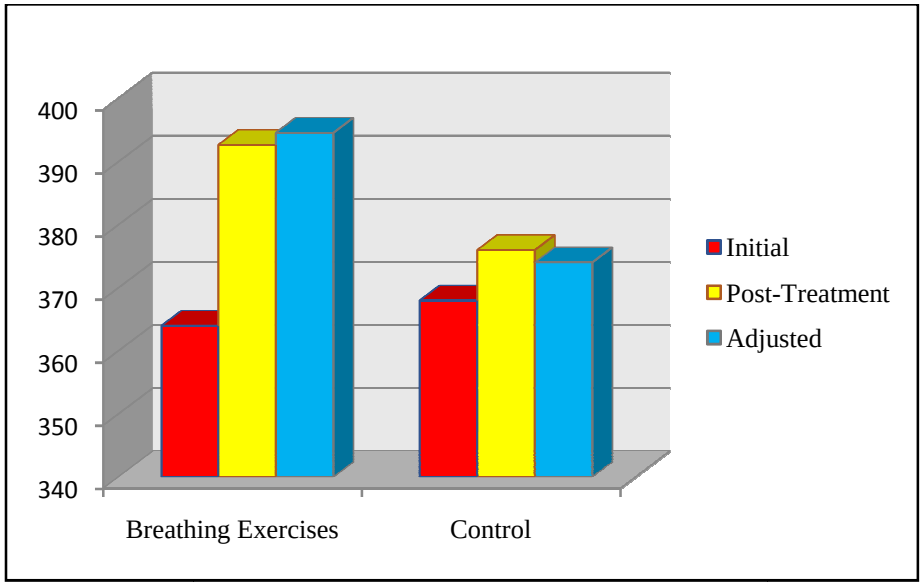

Figure 1. Graphical presentation of Mean scores for FVC.

After knowing the nature of data, ANCOVA have been used to find out the significant differences and the output is presented in Table 3.

Table 3 ANCOVA table for the data on FVC in both groups after treatment.

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Initial	86623.645	1	86623.645	380.490	.000
Treatment groups	3166.107	1	3166.107	13.907	.001
Error	6146.914	27	227.663		
Corrected Total	95936.667	29			

Table 3 shows that, the computed F-value of Breathing Exercises is significant because p-value associated with it is 0.001 which is less than 0.01 level of significance. Since F-statistic is significant, post hoc comparison has been made for the adjusted means of both the groups, which is shown in Table 4.

Table 4 Pairwise comparisons.

(I) Treatment Groups	(J) Treatment Groups	Mean Difference (I-J)	Sig.[b]
Breathing Exercises	Control Group	20.560*	.001
Control Group	Breathing Exercises	-20.560*	.001

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Table 4 shows that, there is significant difference found between the adjusted means of criterion variable in both the groups. Hence, it may be inferred that Breathing Exercises are effective for enhancing the Forced Ventilatory Capacity. That has been graphically presented with the help of mean plot (Figure 2).

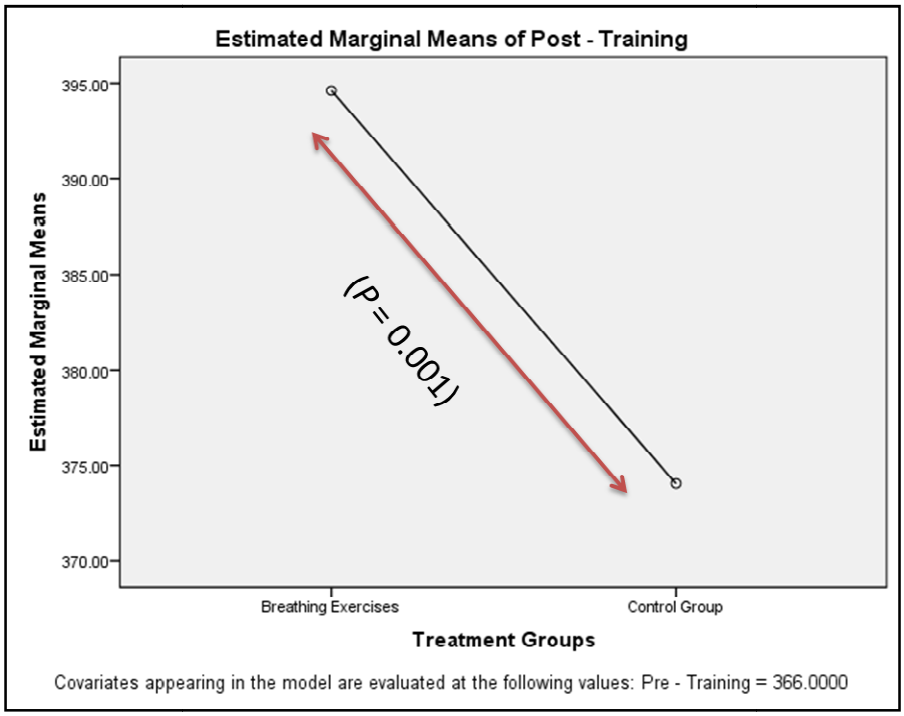

Figure 2 Marginal Mean Plot for Forced Ventilatory Capacity.

DISCUSSION OF FINDINGS

On the basis of the above findings it may be concluded that, Breathing Exercises play a key role in enhancing the Forced Ventilatory Capacity. As the study was conducted for a six week time period, far better results can be obtained by increasing the period of training. The positive results obtained from the study might apply to sports persons to improve their physiological efficiency. Banstola D (2016) have found out in his research work that "There was significant increase in inspiratory reserve volume, expiratory reserve volume, vital capacity, forced expiratory volume in one second and forced vital capacity after yoga breathing exercise. The researchers Keshur A. Karmur & et. al (2015) have revealed from their study that yoga practice can be advocated to improve respiratory efficiency for healthy individuals as well as an alternative therapy or as adjunct to conventional therapy in respiratory diseases as Forced Vital Capacity (FVC), Forced Expiratory Volume during 1st second (FEV1), Peak Expiratory Flow Rate (PEFR) and Maximum Expiratory Pressure (MEP) were found to be increased in all subjects.

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