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## Effects of pranayama training on respiratory function of asthma patients in south region of Haryana

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### Abstract

Due to the rapidly alterations in lifestyle asthma a respiratory deficiency becomes a great health issue in present scenario. With this point of view the present study has been designed to investigate the effects of pranayama a yogic exercise related to respiration was developed for the asthma patients. For accomplish the present research work 30 samples were randomly selected as subjects. Out of total sample 15 subjects were considered as experimental group which attained the training of yogic exercise and 15 respondents were considered as control group who did not attained any training. A total 3 months training were provided to the patients of experimental group while no training was given to the control group. Vital capacity is measured as a functional capacity of respiration of asthmatic patients and the data was taken in three phase such as pretest, posttest after 1 month, posttest after 2 months, and finally posttest after 3 months. To find out the significance effects of training within given time phase and groups repeated measure ANOVA with covariate was used as a statistical method. The Age of the subjects was ranged from 45 to 60 years respectively. The level of Alpha was set at 0.05 respectively.

**Keywords:** Pranayama, yogic exercise, respiration, vital capacity

### Introduction

Yoga for Asthma and Bronchitis is a system inclusive of physical and mental training that can benefit people of all ages. It involves Asana (body postures) and Pranayama (art of breath control), among which of its physical uses are to reduce stress-related conditions, help with circulatory and respiratory disorders such as Asthma and Bronchitis, and improve over-all health. Asthma and Bronchitis are two chronic lung ailments that can cause damage to the lungs. These should be treated immediately to avoid any complications.

### Asthma

This is a very common respiratory complaint, which involves a severe narrowing of the bronchial tubes (bronchi). These tubes lead from the windpipe called the trachea into the lungs and they carry the oxygen we breathe in to all parts of the lungs and provide a path for the carbon dioxide to escape up the trachea when we breathe out. This narrowing of the bronchi causes difficulty in breathing, specifically when breathing out.

### Bronchitis

Bronchitis is a more critical lung ailment compared to Asthma a Chronic Obstructive Pulmonary Disease (COPD) and is the fourth leading cause of death in the United States. This is a serious infection of the lungs and bronchial tubes, which can become chronic. Breathing polluted air and smoking are mainly responsible for this ailment. This particular disorder has inflamed bronchial tubes caused by a bacterial or viral infection.

### Methodology and procedure

**Selection of the sample:** For accomplish the present research work 30 samples were randomly selected as subjects. Out of total sample 15 subjects were considered as experimental group which attained the training of yogic exercise and 15 respondents were considered as control group who did not attained any training. A total 3 months training were provided to the patients of experimental group while no training was given to the control group.

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**Selection of variable:** Vital capacity is measured as a functional capacity of respiration of asthmatic patients and the data was taken in three phase such as pretest, posttest after 1 month, posttest after 2 months, and finally posttest after 3 months.

**Statistical technique:** To find out the significance effects of training within given time phase and groups repeated measure ANOVA with covariate was used as a statistical method. To eliminate effects of different uncontrolled factors which affect the previous history of patients Pretest was considered as constant or covariate factor for the present study. The Age of

the subjects was ranged from 45 to 60 years respectively. The level of Alpha was set at 0.05 respectively.

**Training schedule:** The training program will be scheduled with the duration and load which is based on the result of the pilot study. The training program will be carried out for a period of 12 weeks. Training will be given for five day per week. Every training session will be 50 minutes. The training program will be scheduled in the morning between 6.00am to 7.00am. The subjects will participate in their respective program under strict supervision of researcher. The details of training program presented in Table 1.

**Table 1:** Training schedule for yogic exercise pranayama

Sr. No.	Name of pranayama	1 to 30 Days		30 to 60 days		60 to 90 Days	
		Duration	Rest	Duration	Rest	Duration	Rest
2	Bhastrika	2 MIN.	5 MIN.	3 MIN	4 MIN.	4 MIN.	2 MIN.
3	Kapalbhati	2 MIN.	5 MIN.	3 MIN	4 MIN.	4 MIN.	2 MIN.
4	Anulom Vilom	2 MIN.	5 MIN.	3 MIN	4 MIN.	4 MIN.	2 MIN.
5	Cooling Down	10 Minutes					

## Results of the study

**Table 2:** Descriptive statistics of groups in relation to their time phase of measurement

Measure: Vital capacity					
Group	Time	Mean	Std. error	95% Confidence interval	
				Lower bound	Upper bound
Experimental	1	1391.099 <sup>a</sup>	25.619	1338.533	1443.665
	2	1612.756 <sup>a</sup>	37.561	1535.687	1689.824
	3	1889.444 <sup>a</sup>	39.757	1807.868	1971.019
Control	1	1186.901 <sup>a</sup>	25.619	1134.335	1239.467
	2	1203.911 <sup>a</sup>	37.561	1126.842	1280.980
	3	1177.223 <sup>a</sup>	39.757	1095.647	1258.798

The table 2 explores the descriptive statistics in the terms of mean and standard error. The mean score Experimental Group in their vital capacity at first month was 1391.099 mL/kg and second month was 1612.75mL/kg and at the measure of third month the mean score was 1177.22 mL/kg while the mean

score of control group at first phase was 1186.90 mL/kg, at second stage was 1203.91 and at third stage was 1177.22 respectively. The mean value of pretest which was also considered as Covariate for the present model was 1225 respectively.

**Table 3:** Mauchly's test of sphericity<sup>a</sup>

Measure: Vital capacity							
Within subjects effect	Mauchly's W	Approx. Chi-square	DF	Sig.	Epsilon <sup>b</sup>		
					Greenhouse-geisser	Huynh-feldt	Lower-bound
Time	0.725	8.363	2	0.015	0.784	0.886	0.500

Table 3 shows the statistics of test of sphericity which illustrate the equal variance of dependent variable across the groups. It was observed that the assumption of equal variance among the groups was violated because of Sig. value (0.015)

of Mauchly's W test (0.725). Therefore, the value of Greenhouse-Geisser was (0.784) was considered for equality of variance which does not violate the any assumption of equal variance.

**Table 4:** Tests of between-subjects effects

Measure: Vital capacity						
Transformed variable: Average						
Source	Type III Sum of squares	DF	Mean square	F	Sig.	Partial Eta squared
Intercept	1441990.703	1	1441990.703	44.056	0.000	0.620
Pretest	10121328.347	1	10121328.347	309.230	0.000	0.920
GROUP	4381923.946	1	4381923.946	133.878	0.000	0.832
Error	883729.431	27	32730.720			

The Table 4 depicts the statistic of between subjects' effects. It was taking into notice that the F value of Groups was 133.878 which was significant at 0.05 level of alpha. It was clearly reveals that the given training has significant effects on the respiratory function of asthma patients observed across

the given time phase and groups. The value of partial Eta Squared (.832) which is a measure of effects size (ES) shows 83% of magnitude of growth in three time phase of measurement after the training of Yogic Exercise on asthma patients.

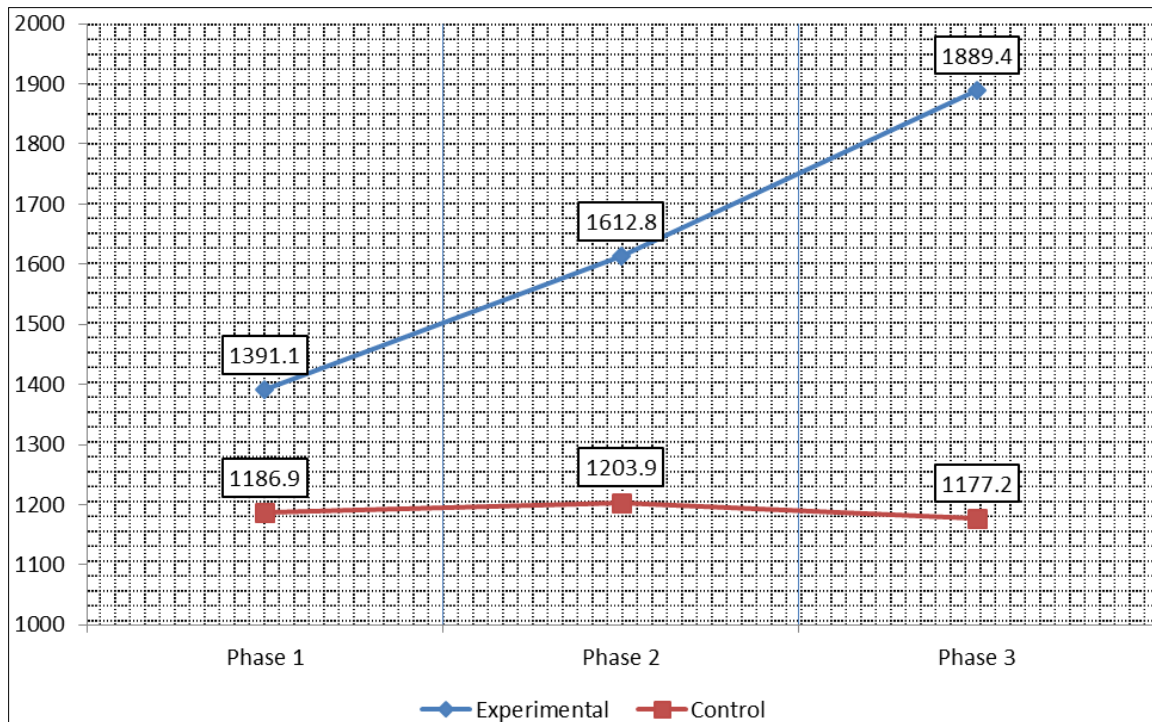
**Table 5:** Post hoc analysis among different time phases of measurements

Pairwise Comparisons						
Measure: Vital capacity						
(I) Time	(J) Time	Mean difference (I-J)	Std. Error	Sig. <sup>b</sup>	95% Confidence interval for difference <sup>b</sup>	
					Lower bound	Upper bound
1	2	-119.333*	19.317	0.000	-168.638	-70.029
	3	-244.333*	32.078	0.000	-326.212	-162.455
2	1	119.333*	19.317	0.000	70.029	168.638
	3	-125.000*	28.124	0.000	-196.786	-53.214
3	1	244.333*	32.078	0.000	162.455	326.212
	2	125.000*	28.124	0.000	53.214	196.786

Based on estimated marginal means  
 \*. The mean difference is significant at the .05 level  
 b. Adjustment for multiple comparisons: Bonferroni

The analysis in table 5 reveals the pair wise comparison between the different time phases of measurements after the training provided. In the table given above see the time column, 1 indicate the posttest after one month, 2 for two months and 3 refers the posttest after three months of training. The mean difference between 1<sup>st</sup> and 2<sup>nd</sup> phase was -119.333, between 1<sup>st</sup> and 3<sup>rd</sup> phase was -244.333 and mean difference between 2<sup>nd</sup> and 3<sup>rd</sup> phase was -125.00 respectively. The

highest difference was observed between 2<sup>nd</sup> and 3<sup>rd</sup> phase of measurement. The obtained mean difference was statistically significant at 0.05 level of alpha. After taking into notice the obtained results it was observed that a considerable effect of yogic exercise was noticed on the respiratory function of asthma patients and high variation was observed between 2<sup>nd</sup> and 3<sup>rd</sup> phase of posttest.



**Fig 1:** Estimated marginal means profile of experimental and control group in their vital capacity after covariate pretest

Covariates appearing in model are evaluated at the following values Vital Capacity Pre=1225.00

**Conclusions**

On the basis of the obtained results it was concluded that the training of Pranayama have influenced significantly on the vital capacity of asthmatic patients. The training period was designed for 3 months as per the feasibility of asthmatic patients and after each measure was assessed via vital capacity a measure of respiratory function. The pretest was considered as covariate to eliminate the other factors which can effects the dependent variable such as the medication used before the training of asthmatic patients. It was concluded that after the training of Pranayama significant

results were observed on the vital capacity of asthmatic patients and high variance was noticed between 2<sup>nd</sup> and 3<sup>rd</sup> phase of measure of posttest.

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