

## Effect of Kapalbhathi Pranayama on Vital Capacity and Total Lung Capacity in Long Distance Runners

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### Abstract

The Purpose of the study was to investigate the Effect of Kapalbhathi Pranayama on Vital capacity and Total Lung Capacity in Long distance runners. For the purpose of the study, 62 male Long distance runners subject were selected from Sigra stadium Varanasi. The age ranged between 18 to 25 years. Vital capacity and Total Lung Capacity was measured by Spiro meter and performance was recorded in Litre. The study delimited to experimental period of eight (08) weeks. The data were collected before and after the eight weeks of *Kapalbhathi Pranayama* training programme. To find out the effect of *Kapalbhathi Pranayama* on Vital capacity and Total Lung Capacity in Long distance runners, Analysis of Paired t-test and unpaired t test was applied and the level of significance was set at 0.05. The result of the study shown that eight weeks *Kapalbhathi Pranayama* training programme was significant in case of Vital capacity and Total Lung Capacity in Long distance runners.

**Keyword:** *Kapalbhathi Pranayama*, Vital capacity, Total Lung Capacity, Long distance runners

### INTRODUCTION:

Yoga for runners may be a wonderful option to improve running performance. *Asanas* and *Pranayama*, tunes our nervous system and provides the body with much needed relaxation after a run. *Pranayama* practice slows the heart beat and reduces blood pressure, producing calm and a sense of stability. Most of us are shallow breathers, not utilizing the full capacity of our lungs. There by, less oxygen is absorbed by our lungs in a single breath. A regular practice with *Pranayama* can increase your breathing capacity resulting in more oxygen supply to your blood. This oxygen rich blood can boost performance and endurance for runners.

Long distance running is a form of continuous running over distance of at least 5 kilometers (3.1 miles). Physiologically it is largely aerobic in nature and requires more stamina. In the sport of Athletics, long distance events are defined as races covering 3 kilometers and above.

The summer Olympics features includes three long distance running events that is 5000 Meter, 10000 Meter and Marathon (42.195 kilometers or 26 miles and 385 yards).

The word *Kapalbhathi* is made up of two words: *Kapal* meaning 'skull' and *Bhati* means 'shining, illuminating.' Due to the process, the organs under the skull mainly the brain and the spinal cord are influenced in a good manner. The technique of *Kapalbhathi* involves short and Strong forceful exhalations which happens automatically.

### Objective of the study

The objective of the study was to find out the “Effect of Kapalbhathi Pranayama on Vital capacity and Total Lung Capacity in Long distance runners.”

### Methodology

For the purpose of the present study 62 long distance runners of the College and University level were selected. The ages of the subjects were between 18-25 years. All the subjects were divided into two group's namely experimental group and control group including 31 subjects in each.

### Selection of Variables:

The variables selected for this study were as follows-

1. Vital capacity
2. Total lung capacity

**Criterion Measures:**

The following tests were selected and score was considered as criterion measure for this study.

- Vital capacity was measured by Spiro meter and performance was recorded in Litre.
- Total lung capacity was measured by Spiro mete and performance was recorded in Litre.

**Research Design:** Pre-post randomise group design was selected for this study.

**Administration of training:**

The training of *Kapalbhati pranayama* has been given to experimental group. During the training period, the experimental group performed six sessions weekly for total 8 weeks. The training of *Kapalbhati pranayama* has been given per day before the practice session of the Long distance runners.

**Statistical Technique:**

The data collected from all the two groups (*Experimental group and Control group*) before and after experimentation on Physiological variables which were statistically analyzed by applying the Paired t-test and unpaired t test. The level of significant was set at 0.05 levels.

**RESULTS OF THE STUDY:**

The analysis of the data on selected variables (Vital capacity and Total Lung Capacity) were collected by 62 subjects out of which 31 subjects were taken from each group (i.e. experimental group and control group) at Sagra stadium, Varanasi. The data was analyzed by Paired t-test and unpaired t test to find out the Effect of *Kapalbhati Pranayama* on Vital capacity and Total Lung Capacity in Long distance runners.

**Division of Age, Height and Weight:**

Group	Age(Year)	Frequency (n)	Height (cm)	Frequency (n)	Weight (Kg)	Frequency (n)
<b>Experiment Group (n-31)</b>	18-20	17 (54.8%)	154-165	7 (26.6%)	41-58	11 (36%)
	21-23	14 (45.2%)	166-179	24 (77.4%)	59-75	20 (64%)
	Mean ± SD=		Mean ± SD=		Mean ± SD=	
		20.290±1.509		167.806±3.919		60.06±6.999
<b>Control Group (n-31)</b>	18-21	23(74.2%)	154-169	16(51.7%)	40-60	19(61.4%)
	22-24	8 (25.8%)	170-179	15(48.3%)	61-83	12 (38.6%)
	Mean ± SD=		Mean ± SD=		Mean ± SD=	
		19.967±1.834		169.419±4.856		60.096±7.807

**Table N: 1- Group Wise Comparison of the Subjects Showing Effect of Kapalbhati on Vital Capacity**

Groups	Vital Capacity (L) Mean ± SD		Paired 't' test (Mean-SD)
	Pre	Post	

Experimental N=31	4.740 ± 0.269	5.118 ± 0.191	-0.378 ± 0.212 t = -9.922 P = 0 .000
Control N=31	4.829 ± 0.360	4.880 ± 0.332	-0.051 ± 0.059 t = -4.871 P = 0.003
Un Paired 't' test	t = 1.101 P = 0.275	t = -3.443 P = 0 .000	

Initially, the Mean ± SD of Vital Capacity, of **experimental group**, in pre-test was 4.740 ± 0.269 and after post-test, the Mean ± SD of Vital Capacity, of experimental group was seen 5.118 ± 0.191. The difference of Mean-SD was found -0.378 ± 0.212, having, 't' value is -9.922 and 'p' value is 0.000, which was found statistically highly significant result.

In **control group**, the Mean ± SD of Vital Capacity, of control group, in pre-test was 4.829 ± 0.360 and after post-test, the Mean ± SD of Vital Capacity, of control group became 4.880 ± 0.332. The difference of Mean-SD was found -0.051 ± 0.059, having 't' value is -4.871 and 'p' value is 0.003 which was found statistically significant result.

**Table N: 2- Group wise Comparison of the Subjects Showing Effect of Kapalbhathi on Total Lung Capacity**

Groups	Total Lung Capacity (L) Mean ± SD		Paired 't' test (Mean-SD)
	Pre	Post	
Experimental N=31	5.214 ± 0.331	5.326 ± 0.280	-0.112 ± 0.180 t = -3.466 P = <b>0.002</b>
Control N=31	5.285 ± 0.349	5.299 ± 0.330	0.014 ± 0.182 t = 0.434 P = 0.068
Un Paired 't' test	t = 1.012 P = 0.315	t = -0.514 P = <b>0.009</b>	

Table number 2 shows that Initially, the Mean ± SD of Total Lung Capacity, of **experimental group**, in pre-test was 5.214 ± 0.331 and after post-test, the Mean ± SD of Total Lung Capacity, of experimental group became 5.326 ± 0.280. The difference of Mean-SD was found -0.112 ± 0.180, having, 't' value is -3.166 and 'p' value is 0.002, which was found statistically significant result.

In **control group**, the Mean ± SD of Total Lung Capacity, of control group, in pre-test was 5.285 ± 0.349 and after post-test, the Mean ± SD of Total Lung Capacity, became 5.299 ± 0.330. The difference of Mean-SD was found 0.014 ± 0.182, having, 't' value is 0.434 and 'p' value is 0.068, which was found statistically not significant result.

### Discussion of Findings:

Study reveals that there was significant difference between pre and post result of **vital capacity** in experimental group as well as post test in between the groups. *Kapalbhati* involves forced but rapid, voluntary abdominal breathing thus reduces the dead space in lungs and result into availability of more space for oxygen which leads to increase in tidal volume. One of the study also supported by **Thakur, (2015)** on “effects of *Kapalbhati* or cardio respiratory variables.” He found that there was significant increase in vital capacity. This intern supports the present study result.

Analysis of results reveals that there is significant difference between pre and post result of **total lung capacity** of experimental group. Whereas, there is no significant difference between pre and post result of control group as well as post result among the group. Practice of *Kapalbhati* not only work on respiratory track but also regulate sympathetic and parasympathetic nervous system which improves Total lung capacity. One of the study also supported by **Arumugam et, al (2016)** on “Impact of *yoga* Breathing exercise on total lung capacity among women soccer players”. They found in their study *yoga* breathing exercise significantly increases total lung capacity. This intern supports the present study result.

### Conclusions

- Eight weeks of regular *Kapalbhati Pranayama* practice leads to improve the Physiological parameters in Long distance runners of University and district level players.
- In Universities and District sports stadium, the running courses of sports training/ physical education, *Kapalbhati pranayama* may be used as an effective, feasible, time-saving and easy to learn intervention to improve physiological parameters & overall improvement in the sports activity.

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