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Effect Of Kumbhaka Pranayama On Cardio Vascular Endurnace And Muscular Endurance

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Introduction

The word yoga comes from the sanskrit root "Yug" which means "union". In the spiritual sense yoga means "union of the mind" with the divine intelligence of the universe.It is the dynamic age of science and technology the human element is treated as every before. Its goals are indistinct and unsatisfying. The mechanism of modern living the force restriction of physical activity leading to a sedentary life.

Pranayama

Pranayama is a separate limb of yoga and is usually practiced separately to yogasana.Patanjali in the yoga sutras has defined pranayama as the fourth limb of yoga.

4 stages of breathing pranayama

- Inhalation (Puraka)
- Internal retention of air (antara kumbhaka)
- Exhalation (Rechaka)
- External retention (bahya kumbhaka)

Kumbhaka

The word Kumbhaka means 'vessel'. It implies holding or retaining something, in pranayama, this term is used to describe retention of breath.

Types

- Antara Kumbhaka – Internal retention
- Bahya Kumbhaka – External retention

Benefits of Kumbhaka Pranayama

- Helps in supply of oxygen properly and consistently.
- Carbon dioxide is efficiently removed from the lungs.
- Blood will be purified
- Stress and strain can be maintained effectively
- It improves anaerobic capacity.

Statement of the Problem

The purpose of the present study was to find out the effect of Kumbhaka Pranayama (Ujjayi Pranayama) on cardiovascular endurance and muscular endurance.

Limitations

- Initially there were 30 subjects who were given experimental treatment of Kumbhaka Pranayama. As a few subjects dropped out during the course of study, the sample size had to be reduced to 25 subjects only.
- Even though it was planned to have experimental treatment of Kumbhaka Pranayama for six weeks the total duration of experimental treatment was reduced to only 30 days, due to breaks of two or three days, in between on account of holidays.

Delimitations

- The study was delimited to twenty five male subjects (N=25) who were studying in the Pre-University course students of Mysore.
- The study was delimited to Kumbhaka Pranayama in Ujjayi pranayama.
- The study was delimited to two variables on cardiovascular endurance and muscular endurance.
- The study was delimited to the short form of Harvard Step Test and Burpee Test.
- The total duration of experimental treatment of Kumbhaka Pranayama in Ujjayi pranayama was limited to 30 days.
- The duration of pranayama practice were planned for 20 minutes every day of the week except holidays throughout the course of experimental treatment.

Definition of Terms

Yoga

Yoga means the union of bringing together of the two the “Jeevathma” with the “Paramathma”. The word Yuj, the root of word Yoga in Sanskrit means union. That is union of the soul with the universal soul.

Pranayama

The conscious guidance of life energy in our body through awareness and control of the breath process.

Kumbhaka

The word Kumbhaka means vessel, it implies holding or reciting something. In pranayama, this term is used to describe retention of breath.

Cardiovascular Endurance

It is the ability of the heart and lungs to extract and utilize oxygen in a manner that permits continue, exercise, physical work or physical activity.

Muscular Endurance

The capacity of the muscular system to generate force and perform repetitive contra indications.

Methodology

The purpose of the present study was to find out the effect of Kumbhaka pranayama on Cardiovascular Endurance and Muscular Endurance.In this chapter the selection of subjects samples size, variables selected experimental treatment administration of the test items, procedure of test administration, collection of data, statistical technique employed have been presented.

Sample

To achieve the purpose of the present study twenty five (N-25) male undergraduate students were selected. Who voluntarily, willingly served as subjects for the study variables for the present study.

Variables Selected for the Study

Independent variables selected for the present study was Kumbhaka pranayama. The dependant variables selected for the present study were cardiovascular endurance and muscular endurance as measured by Harvard step test and Burpee test, respectively.

Experimental Treatment

To find out the effect of Kumbhaka Pranayama on cardiovascular endurance and muscular endurance, the subjects were to be exposed for experimental treatment. The subjects were given Kumbhaka Pranayama for a period of six weeks and for a duration of 20 minutes everyday throughout the course of experimental treatment.

Instructions

- Sit in a comfortable meditative pose.
- Become aware of the natural breathing process and feel the air passing down the through the wind pipe, slightly contract the region at the back of ht throat as you do when you swallow.
- Inhale and exhale through the nose with the mouth closed.
- Make the inhalation and exhalation long, deep and controlled.
- Practice full yogic breathing and concentrate on the sound.
- Begin practicing for 3 minutes and progressively work your way up to 10 minutes.
- As you inhale say “Sa” to yourself and as you exhale say “Ha” repeat ten times.

Procedure of Performing Kumbaka Pranayama

Repetition and Ratio of Kumbhaka Pranayama

- Sit in a comfortable position
- Then begin counting from 1 to 4 for inhalation and 1 to 4 for exhalation, continue for a few minutes.
- Now begin Antara Kumbhaka or internal retention.
- Inhale for a count of 4, hold your breath for a count of 2, and then exhale for a count of 4.
- After completing this take normal breaths.
- When this retention has become comfortable, begin inhalation to a count of 3. Internal retention to a content of 4 and exhalation to a count of 4.

Tests Selected for the Study

Harvard step test and Burpee test were selected to measure cardiovascular endurance and muscular endurance respectively.

Test Procedures

Harvard Step Test

The equipment and materials : A stable bench or a platform 20 inches high and a watch with a second hand are the only equipment needed. The cadence is 30 steps per minute. The body should be erect when the subject steps onto the bench. The subject continues to exercise at the prescribed cadence for 3 minutes unless he fells that he must stop before then because of exhaustion. As soon as the stops exercising, he sits down and remains seated and quite throughout the purpose counts. In the short form the pulse is taken only once, 1 to ½ minutes after exercise.

Burpee Test

Stand on floor from a standing position, bend at the knees and waist and place the hands on the floor in front of the feet. Thrust the legs backward to a front leaning rest position. Return to the squat position and then stand erect. From the signal “Go” repeat this exercise at a constant rate of movement for as long as possible. The score is the number of correct repetitions executed. The score is recorded to the nearest whole number.[3]

Test Administration

The subjects were oriented to the purpose of the present study, they were represented to cooperate during test performance. The tests were administered to the selected subjects after ascertaining their health status. The tests were administered to all the subjects under study in a single day to ascertain identical condition of test administration for all the subjects under study.

Collection of Data

The data in respect of performance of the selected subjects is Harvard Step Test and Burpee Test were collected twice. Once before the experimental treatment and once after the experimental treatment of Kumbhaka for a period of 30 days. The data collected were in numerical form, there scores would represent the pre-test and post test (pre-experimental and post experimental) scores. The scores thus measured would represent the data for the present study.

Analysis and interpretation of data

The purpose of the present investigation was to study the effect of Kumbhaka Pranayama on Cardiovascular Endurance and Muscular Endurance. Twenty five (N=25) male undergraduate students of Mysore were drawn as subjects for the present study. Independent variable selected for the present study was Kumbhaka Pranayama. Dependent variables selected for the present study were Cardiovascular Endurance (as measured by short form of Harvard Step test) and Muscular Endurance (as measured by Burpee test). To achieve the purpose of the study, the subjects were measured for Cardiovascular Endurance and Muscular Endurance, before experimental treatment. The subjects were given practice of Kumbhaka Pranayama everyday for a period of 30 days, with practice of Kumbhaka Pranayama for twenty minutes each day in the ratio of 1:1:1 (4 counts inhalation and 4 counts breath retention and 4 counts of exhalation).

After experimental treatment, the subjects were again tested and measured for Cardiovascular Endurance and Muscular Endurance, the mean pre-test (pre-experimental) and Post-test (post experimental) performance scores of subjects in the tests of Cardiovascular Endurance and Muscular Endurance were tested for significance applying the 't' test. The statistical analysis of data revealed the following results, the details of which are presented in tables 1 to 6.

Table 1

Computation of mean and standard deviation values For pulse count immediately after exercise

Pulse Count	N	Mean	Std. Deviation	Std. Error Mean
Pre-experimental Immediate Pulse	25	160.1200	12.6773	2.1355
Post-experimental Immediate pulse	25	161.1000	11.0968	2.1194

It may be seen from the figures presented in table 1 that the mean pulse count immediately after the cessation of 3 minutes of exercise in Harvard Step Test was 160.12 (pre-experimental) and 161.10 (post-experimental) with the standard deviation values of 12.67 and 11.09 respectively.

Table 2

Table showing significance of difference between mean pulse count scores

Pulse Count	Paired Mean	t	df	Sig (2-tailed)
Pre-experimental Immediate Pulse Post-experimental Immediate pulse	4.2800	15.286	24	.000

The figures presented in table 2 reveal that the 't' value obtained was 15.28 for 24 degree of freedom, which was found to be statistically significant. That means, to say, that practice of Kumbhaka pranayama for 20 minutes a day for duration of 30 days has a significant effect on recovery of heart rate (pulse count).

Table 3

Computation of mean and standard deviation values for pulse count one minute after exercise

Pulse Count	N	Mean	Std. Deviation	Std. Error Mean
Pre-experimental After 1 minute	25	114.0800	11.7719	2.3544
Post-experimental After 1 minute	25	110.2400	11.5804	2.3161

Figures presented in table 3 reveal the mean pulse count, one minute after the cessation of exercise in Harvard step test, which was 114.08 (pre-experimental) and 110.24 (post-experimental) with the standard deviation of 11.77 and 11.58 respectively

Table 4

Table showing significance of difference between mean pulse count scores

Pulse Count	Paired Mean	t	df	Sig. (2-tailed)
Pre-experimental After 1 minute Post-experimental After 1 minute	3.8400	6.946	24	.000

The figures presented in table 4 reveal that the 't' value obtained was 3.84 for 24 degree of freedom, which was found to be statistically significant. That means, to say, that practice of Kumbhaka pranayana for twenty minutes each day for a period of thirty days has a significant effect on recovery of heart rate (pulse count).

It may therefore, be inferred that practice of Kumbhaka pranayana for 20 minutes a day for a period of one month has a significant effect on cardiovascular endurance, and measured by the recovery of heart rate (pulse rate).

Table 5

Computation of mean and standard deviation values for muscular endurance

Muscular Endurance	N	Mean	Std. Deviation	Std. Error Mean
Pre-experimental Muscular Endurance	25	14.4000	1.6073	.3215
Post-experimental Muscular Endurance	25	15.8400	1.4629	.2969

It may be seen from the figures presented in table 5 that the mean and standard deviation values for muscular endurance as measured by Burpee test were M = 14.40 and s.d. = 1.60 (post-experimental) and M =15.84 and s.d. =1.46 (post experimental) respectively.

Table 6

Table showing significance of difference between mean scores of muscular endurance

Muscular Endurance	Paired Mean	t	df	Sig. (2-tailed)
Pre-experimental Muscular Endurance Post-experimental Muscular Endurance	-1.4400	-12.348	24	.000

The figures presented in table 6 reveal that the 't' value obtained was -12.34 for 24 degree of freedom, which was found to be statistically significant. That means, to say, that practice of Kumbhaka 20 minutes each day for a period of one month, has a significant effect on muscular endurance.

With the limitations of the present study the hypothesis formulated in the present study was rejected and the alternative hypothesis was accepted. It was concluded that Kumbhaka has significant effect on cardiovascular endurance and muscular endurance of subjects selected for the present study as measured through the short form of Harvard Step test and Burpee test respectively.

Conclusion

The practice of kumbhaka pranayama for 20 minutes a day for a period of 30 days has a significant effect on cardiovascular endurance and muscular endurance.

Recommendation

Similar studies may be undertaken with emphasis of yogic exercises and other variations of pranayama in relation to health related physical fitness.

- Variations of pranayama with different duration of practice and their effect on physical and physiological parameters may be studied.
- Effect of pranayama and its variations on hematological variables, may be studied
- Large sample of subjects may be considered for studies on the effect of pranayamic breathing on certain selected variables.
- Long duration of practice of pranayama and its effect on skill related fitness may be studied.

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