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Effect of various yogic programmes on physiological variables of female students

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Abstract
The science of Yoga is related to living a healthy lifestyle inclusive of breathing exercises, posture, and clean practices. It contains five principles which include proper breathing, diet, exercise, and relaxation along with meditation and positive thinking. One of the techniques used in Yoga is Pranayama which helps to breathe in a controlled manner thus improving the functioning of the lungs. To achieve this purpose of the study, (n=40) forty female students studying from various department, at Sree Narayana College, Chempazhanthy, Trivandrum, Kerala, India. six weeks' duration Working towards this purpose, forty female subjects were selected and assigned into two sets; one being the experimental set and the other acting as control, with each consisting of 40 female subjects with ages ranging from 18 to 20 years. For checking the normality of data, Kalmogrove-Smirnove and Shapiro-Wilk tests were applied and to compare the pre - test and post - test of the data, dependent 't' test was used at $p<0.05$ level. The results reveal that the different yogic packages of six weeks had significantly influenced on VC, RHT and BHT of the experimental group.

Keywords: Vital capacity, Resting heart rate, Padmasana, Bhastrika Pranayama and Kapalabhati

Introduction
Yogic asanas including pranayama are a scientific way of life which originated with Maharsi Patanjali in ancient India. The meaning of the word 'yoga' is oneness or unity and its derivation is from the Sanskrit word 'yuj' meaning 'to join'. Mahari wrote the definition of paranayama in yoga-sutra: - "tasmin sati svasaprasvasayor-gativicchedahpranayamah" Regulation of breath or the control of Prana is the stoppage of inhalation and exhalation, which follows after securing that steadiness of posture or seat. According to the Gita, pranayama is "Apanejuhvatipranampranepanamtathapare; Pranapanagateeruddhvapranayamaparayanah" (Gita, Ch. IV-29).The respiratory system has a vital role in the functioning of the human body and is composed of the lungs, nose, mouth, sinuses, and the passages. This system supplies oxygen to the body and removes carbon dioxide from it; and enables the person to speak. Any blockage in this system can cause lack of oxygen supply to the body and, in the worst cases, can cause death. The regular practice of pranayama can improve the respiratory and cardiovascular efficiency and autonomic nervous system of individual. The autonomic nervous system plays a part in physical processes such as digestion, heart rate, immune function, peristalsis, respiration, and even sexual arousal. It consists of two parts, namely, the sympathetic system and the parasympathetic system. Training in yogic respiratory exercises selectively raises the respiratory sensation; maybe the effect of its conditioning of the breathing pattern. One of the most effective exercises in yogic practices is making use of the breath to bring the individual's consciousness in tune with the Divine Cosmic Breath. This cosmic breath is the rhythm of life itself.

2. Methodology
2.1 Selection of Subjects
To achieve this purpose of the study, (n=40) forty female students studying from various department, at Sree Narayana College, Chempazhanthy, Trivandrum, Kerala, India The chosen subjects were randomly split into two equal groups and each groups consisting of 20 subjects.

2.2 Selection of Variables

Being aware of the criterion of feasibility, the researcher chose the variables given below for this study:

- Independent variables: Different yogic packages (padmasana, bhujangasana, salabhasana, and savasana, ujjayi pranayama, Sheetkari pranayama, bhastrika pranayama, bharamari pranayama, kapalbhati pranayama).
- Physiological variables: vital capacity, resting heart rate and breath holding time.

2.3 Experimental Design

For the current research, pre-test - post-test randomized group design was used. The forty subjects were split into two groups of equal number. The first section underwent six weeks of different yogic training of six days (Monday to Saturday) a week and an hour per day from 5 a.m. to 6 a.m.; and the other group acted as a control.

2.4 Administration of test

Vital capacity (VC): The VC of the subject was taken using a Dry Spirometer and recorded in millimeters.

Resting heart rate (THR): Resting heart rate was gauged by gently pressing over the radial artery for one minute and measuring by a stop watch.

Breath holding time (BHT): Time was recorded after normal expiration and it was recorded in seconds.

2.5 Statistical procedure

For checking the normality of data, Kalmogrove- Smirnove and Shapiro-Wilk tests were applied. The descriptive statistics and comparison of the pre -test to post- test depend t test were applied at $p<0.05$ level with the help of SPSS software version 16.

2. Results

Table I: Descriptive statistics and independent't' statistics of pre and post- test of Control Group

S. No	Variables	Pre- test		Post- test		t- values	Sig.
		MEAN	S.D.	MEAN	S.D.		
1	VC	2073.33	218.66	2066.67	220.82	0.090	0.926
2	RHR	76.00	5.02	76.88	5.10	0.06	0.77
3	BHT	30.50	1.40	31.26	1.33	0.19	0.7626

*significant at $P \leq 0.05$ level.

Table I: Indicate that three is insignificant result obtained between pre and post –test of VC $P \leq 0.05$ level for the control group. There is also insignificant result obtained between pre and post- test of RHR at $P \leq 0.05$ level for the control group. There is also insignificant result obtained between pre and post- test of RHR at $P \leq 0.05$level for the control group.

Table II: Descriptive statistics and independent't' statistics of pre and post- test of Experimental group

S. No	Variables	Pre- test		Post- test		t - values	Sig.
		MEAN	S.D.	MEAN	S.D.		
1	VC	2153.33	223.35	2506.67	262.50	-24.83*	0.00
2	RHR	76.77	5.953	72.36	71.36	7.27*	0.00
3	BHT	31.25	1.99	36.44	2.01	6.87*	0.00

*significant at $P \leq 0.05$ level.

Table II: Indicate that no. 3 is a significant result obtained between pre and post- test of VC at $P \leq 0.05$ level for the experimental group. There is also significant result obtained between pre and post- test of RHR at $P \leq 0.05$ level for the experimental group. There is also significant result obtained between pre and post- test of BHT at $P < 0.05$level for the experimental group.

3. Discussion of Findings

The effect types of different aerobic training on the functioning of the lung is well known. Yoga, an ancient Indian way of lifestyle for maintaining fitness, has gained many laurels in the field of health and fitness. Most studies are conducted with variations in time durations, geographical regions, ages and gender. Here I give the weight of male adolescents using yoga, pranayama and asanas on their VC, BHT and RHT. The study aimed to find out the different effects of six weeks yogic training on physiological functions namely VC, RHR and BHT on male students of Pondicherry University. There are numerous studies in line with my research namely, Kumar R.A (2013) [8], Mishra M.K *et al* (2015) [9], Ghuman& Singh (2014) [6], Bal B.S (2010) [3], Biswas D.A (2010) [4], Kondam A *et al*. (2012) [7].

Results pertaining to VC and BHT showed significant improvement due to six weeks' yogic training. But there were insignificant results obtained in the control group. VC and BHT are part of the respiratory function and depend on several factors namely chest expansion, lung dimensions, respiratory muscle strength, airway resistance and alveolar surface area. Pranayama, one of the limbs of Asthanga yoga, is known to have a profound effect on the pulmonary function than any other part of the human system. Pranayama consists of different kinds of breathing patterns such as alternate nostril breathing, kapalabhathi, and Bhrahmari pranayama. Pranayama is essentially a breathing exercise against resistance, and its positive effects on lung functions is well known (Saxena & Saxena; 2009, Chanavirut *et al* 2006) [11, 5].

In the present research yogic asana and pranayama indicate significant improvement in VC and max. ventilatory volume; this research is in line with the study carried by Bal, Baljinder Singh (2010) [3] which increases frequency and duration of inhibitory neural impulses by activating pulmonary stretch receptors when going more than tidal volume intake as in Hering Bruer reflex. This may be the reason as to the enhancing of the VC and breathing holding time of the experimental group.

There was significant decrease in the resting pulse rate after yogic asana and pranayama practice due to training

modulation of autonomic activity with parasympathetic predominance and relatively reduced sympathetic tone. This autonomic modulation in training is mediated through modification of breathing patterns which triggers various central and autonomic mechanisms as well as mechanical and hemodynamic adjustments causing both tonic and phasic changes in cardiovascular functioning (Raghuraj P *et al* 1998) [10].

The results obtained and their analyses support the application of yoga as part of a regular lifestyle in order to promote health and prevent cardiovascular and other age-related health issues.

4. Conclusion

1. The results obtained indicate that the significant difference was obtained in pre and post- test of vital capacity for the experimental group.
2. There was significant result obtained in experimental group for breath holding time.
3. The results obtained show that the significant difference was obtained in pre and post -test of resting pulse rate for the experimental group.

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