



Effect of Yoga on Selected Cardiovascular Parameters in College Women

Dr. A. SenthilKumar

Physical Director, Idhaya Engineering College for Women, Chinnasalem, Tamilnadu, India.

Received 12th October 2016, Accepted 15th November 2016

Abstract

A study was done to find out the effects of simple yogic exercise programs (asanas and pranayamas) on selected cardiovascular function tests in thirty college women, between 20 and 25 years of age, with no active medical disorders. The study was conducted at a Idhaya engineering college for women chinnasalem district of TamilNadu. Mean Arterial Pressure (MAP), Resting Heart Rate (RHR), Heart Rate Post Exercise (HRPE) and Heart Rate Recovery Time (HRRT) were measured, once initially and again after six weeks of yoga training under supervision. There was definite improvement of cardiovascular functions as revealed by significant decrease in MAP, RHR, HRPE & HRRT after 6 weeks.

Keywords: Mean Arterial Pressure (MAP), Resting Heart Rate (RHR).

© Copy Right, IJRRAS, 2016. All Rights Reserved.

Introduction

Yoga is an ancient Indian art which is considered a way of life and encompasses ethical conduct, social responsibility, nutrition and physical health practices. The term “yoga” and the English word “yoke” are derived from Samskrit Root “yuj” which means union. Yoga is a psycho-somatic-spiritual discipline for achieving union and harmony between our mind, body and soul and the ultimate union of our individual consciousness with the Universal consciousness. It produces consistent physiological changes and have sound scientific basis. There has been many studies to describe the effect of yogasana over cardiovascular system. Khanam et al (1996) showed decreased heart rate and sympathetic reactivity following a brief period of yogic exercise practice in asthmatic patients. Bowman et al (1997) performed a study comparing the effect of yoga and aerobic exercise on the bar reflex over healthy elderly persons. It revealed that heart rate decreased significantly following yoga but not after aerobic training. There was also an increment in VO₂max by 11 percent in yoga practitioners. Patel & North (1975) published a randomized control study on the effect of yoga on 34 hypertensive patients which showed a significant decrease in blood pressure in those subjects. Statistically significant reduction in pulse rate was found in several other studies after regular practice of yoga. Which were attributed to increased vagal tone and decreased sympathetic activity Madanmohan et al (2002) showed that exercise induced rise in heart rate and mean arterial pressure following Harvard step test

was less marked in yoga group among Pondicherry school children. This is consistent with the findings of Muralidhara & Ranganathan (1982) who have reported an improvement in cardiac recovery index after 10 weeks yoga training program as indicated by Harvard step test. Our study was aimed to find out the effect of yogic exercises on selected cardiovascular function tests on healthy college women.

Materials and Methods

The study was conducted at a Idhaya Engineer college for women in chinnasalem at district of TamilNadu. Thirty college women subjects, the age group of 20 to 25 years, with no clinically detectable respiratory, cardiovascular and other medical disorders, were selected for the study. Each subject was separately explained about the study procedure and her consent was obtained. They were then taught different yogic exercises by yoga instructor and advised to practice specifically those exercises in 30 minutes' session regularly for 6 (six) weeks under supervision.

Approval from the institutional ethics committee was obtained. Before the actual yogic exercise training programme commenced, measurement of the following parameters were done in each subject:

1. Mean Arterial Pressure (MAP)- Defined as average arterial pressure during a single cardiac cycle. It's important since it reflect the haemodynamic perfusion pressure of organs. It's calculated as $=\frac{2}{3}$ diastolic blood pressure + $\frac{1}{3}$ systolic blood pressure.
2. Resting Heart Rate (RHR)- The resting heart rate is measured while the subject is relaxed but awake, in a neutrally temperate environment, and not having recently exerted himself or

Correspondence

Dr.A.Senthilkumar

E-mail: a_sk7777@yahoo.co.in, Ph. +9176677 12472

herself nor having been subject to a stress or even a surprise. A three minute step test was then carried out on each subject under supervision and the the following parameters were measured:

3. Heart Rate Post Exercise (HRPE)
4. Heart Rate Recovery Time (HRRT)- time interval for recovery of heart rate to the pre-exercise level.

the data from the study was Paired Sample 't' test. This procedure compares the 'mean' of two variables for a single group. $P < 0.05$ was considered significant. Tables I, II, III & IV show the comparison of the results of the four parameters measured. Table V shows the comparative study of all the parameters measured before and after the exercise training. The tables are given at the end. Results showed that there was significant decrease in MAP, RHR, HRPE & HRRT in subjects after the exercise programme.

Observations & Results

The statistical method applied for analysis of

Table I. Comparison of MAP (mm hg) readings before & after yogic exercise

	Smallest Observation	1 st quartile (Q1)	Median (Q2)	3 st quartile (Q3)	IQR	Largest Observation
Befour Yoga	79.33	84.33	89.33	93.66	9.33	99.33
After Yoga	78	83.33	88	90.67	7.33	97.33

Table II. Comparison of RHR (beats/minute) readings before & after yogic exercise

	Smallest Observation	1 st quartile (Q1)	Median (Q2)	3 st quartile (Q3)	IQR	Largest Observation
Befour Yoga	62	69.5	74	78.5	9	91
After Yoga	62	68	71	78	10	94

Table III. Comparison of HRPE (beats/minute) readings before & after yogic exercise

	Smallest Observation	1 st quartile (Q1)	Median (Q2)	3 st quartile (Q3)	IQR	Largest Observation
Befour Yoga	117	121	128	130	9	138
After Yoga	113	120	124	128.5	8.5	138

Table IV. Comparison of HRRT (minute) readings before & after yogic exercise

	Smallest Observation	1 st quartile (Q1)	Median (Q2)	3 st quartile (Q3)	IQR	Largest Observation
Befour Yoga	5	6	6	7	1	8
After Yoga	5	5.5	6	6.5	1	8

Table V. Comparison of readings of the parameters before and after yogic exercise. (all values are mean +/- sd, n=39 in each group.)

	MAP(mm hg)	RHR ±(beats/minute)	HRPE (beats/ minute)	HRRT(minute)
Befour Yoga	89.156±5.944	74.3157 ± 6.497	127.1315 ±3.54	6.5±0.8230
After Yoga	87.4828±5.12	72.5526 ± 6.88	124.6315± 3.3736	6.0526 ±0.8255
Significance	S	S	S	S

S: $P < 0.05$. This study shows that there was significant reduction of MAP, RHR, HRPE and HRRT in all subjects after 6 weeks of regular yoga training.

Discussion

Thirty college women subjects, the age group 20 to 25 years with no active respiratory, cardiovascular and other medical illness were selected for the study. After taking pre-exercise recordings of MAP, RHR, HRPE & HRRT, subjects were made to undergo a 6 week yogic exercise training programme and then post-exercise recordings of the same parameters were obtained. Data analysis revealed that, there were significant increase in all the parameters. The Tables I, II, III & IV show the comparison of results of MAP, RHR, HRPE & HRRT respectively, performed before and after exercise training. Table V shows the comparative study of all the parameters, performed once before and then after yogic training for 6 weeks. The changes were significant in all the cases.

Various studies on autonomic functions indicate that yoga in general bring about a tilt towards parasympathetic dominance which may explain the decrease in heart rate and blood pressure. Jyotsna R et al (2003) conducted a study in 50 subjects above 40 years of age in which they found that rise in blood pressure may be slowed down in elderly practitioners of yoga. In their study conducted with nine bronchial asthma patients, Khanam et al (1996) found that yogic exercise decreased resting heart rate. Wenger & Bagchi (1961), in a study on the pulse rate and BP in 5 yogic students and 6 yogic practitioners, found that there were decrease in above parameters. Pratima et al (2008) observed that 6 months yoga practice on 78 subjects decreases resting pulse rate & blood pressure alongwith a increased cardiorespiratory efficiency as evaluated by bicycle ergometry. Patel & North (1975) published their randomized controlled study of over 34 hypertensive subjects in Lancet in which they showed that 6 weeks of yoga relaxation method significantly decreased BP in control group compared to placebo group. Health and physical fitness depend highly on cardio-respiratory efficiency of an individual. Practice of asanas & pranayamas result in an overall improvement in cardio-respiratory function & physical fitness which improve one's tolerance to stressors.

Conclusion

It was observed that six weeks of regular yoga training in college women in aged between 20 to 25 years showed definite improvement in their cardiovascular functions, as observed from improvement in their MAP, RHR, HRPE and HRRT. This may be due to an overall parasympathetic dominance over sympathetic system with an improvement in cardiovascular endurance. Further study is needed to find out other causes.

References

1. Patal s. Yoga therapy [Graduate seminar in physical therapy]. Fredrick Pociask; 2001.
2. Farrell S, Ross A, Sehgal K. Eastern movent therapies. *Phys Med Rehabil Clin N Am* 1999; 10(3): 617-629.
3. Madanmohan, Mahadevan SK, Balakrishnan S, Gopalakri shnan M, Prakash ES. Effect of six weeks yoga training on weight loss following step test, respiratory pressures, handgrip strength and handgrip endurance in young healthy subjects. *Indian J Physiol Pharmacol* 2008; 52: 164-170.
4. Iyengar BKS. *Light on Yoga*, George Allen and Unw in Ltd, London, 1968; 243–245
5. Khanam AA, Sachdeva V, Gulera R, Deepak KK. Stud y of pulmonary and autonomic functions of Asthma patients after Yoga training. *Indian J Physiol Pharmacol* 1996; 40(1): 318–321.