



## **INFLUENCE OF YOGASANA TRAINING ON SELECTED RESTING PULSE RATE AND MUSCULAR ENDURANCE**

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**Cite This Article:** Dr. P. Mahendiran, "Influence of Yogasana Training on Selected Resting Pulse Rate and Muscular Endurance", International Journal of Interdisciplinary Research in Arts and Humanities, Volume 3, Issue 1, Page Number 349-352, 2018.

### **Abstract:**

In this study, it was to design to find out the influence of yogasana training on selected resting pulse rate and muscular endurance. For this purpose, thirty male students studying in the Department of Physical Education and Sports Sciences, Annamalai University were selected as subjects and they were divided into two equal group of fifteen each. Each group consisted of the fifteen subjects. Group I underwent yogasana practice for five days per week for eight weeks and Group II acted as control group who did not participate in any special training apart from their regular curricular activities. The subjects were tested on selected criterion variables such as resting pulse rate and muscular endurance at prior to and immediately after the training period. The selected criterion variables such as resting pulse rate was measured by counting the pulse at resting condition for one minute and muscular endurance was measured by sit-ups test. The analysis of covariance (ANCOVA) was used to find out the significant difference if any, between groups on each selected criterion variables separately. In all the cases, .05 level of confidence was fixed to test the significance, which was considered as an appropriate.

**Key Words:** Yogasana, Resting Pulse Rate & Muscular Endurance

### **Introduction:**

Yoga is a science as well as an art of healthy living physically, mentally, morally and spiritually. It is not limited by race, age, sex, religion, cast or creed and can be practiced by those who want to have a more meaningful life. Today, Global recognition of Yoga virtually attracts the attention of intellectuals of varied fields including sports. Worldwide, there seems a considerable rise in scientific research in the field of Yoga. This has been supported through evidence of increased muscle size, strength and endurance (Brochu, 2002). Some simple Yoga postures that may be used by beginners with time improve flexibility, strength and endurance. The purposes of the asanas are to condition the body, which ultimately increase strength, flexibility and endurance. Mobility is defined as the ability to move body structures or parts of the body through the existing range of motion for a functional activity (Kisner C. & Colby L. A., 2007). Based on disease specific estimates of prevalence and incidence rates of heart failure, the prevalence of heart failure in India due to coronary artery diseases, hypertension, obesity, diabetes and rheumatic heart diseases range from 1.3 to 4.6 million, with an annual incidence of 4,91,600-1.8 million. Yoga is a mind-body technique, which combines set of physical exercises (asana) in sync with breathing techniques (pranayama), relaxation and meditation. Yoga techniques produce a variety of beneficial effects on CVD (Selvamurthy et al., 1998). A major goal in healthcare is to increase life expectancy and eminently improve healthy and happy aging by compressing morbidity into a shorter period in a later stage of the lifespan [Tesch-Römer et al, 2009]. Life expectancy has increased rapidly during the last century and disability-adjusted life expectancy has been extending as well. Regular exercise and physical activity throughout a lifespan can improve life expectancy [Reimers et al.,2012] and disability-adjusted life expectancy, as shown in many studies [May et al.,2015]. One possible mechanism explaining increases in life expectancy through exercise and physical activity might be the mediating effect of resting heart rate (RHR): possibly, regular exercise and/or physical activity cause a reduction in RHR [Huang, et al., 2005].Hence, in this study, we planned to examine the effects of a 9 week yogasana resting heart rate (RHR) and Muscular Endurance.

### **Methods and Materials:**

#### **Selection of Subjects:**

To achieve the purpose of the study 30 boys studying Bachelor Degree in the Department of Physical Education and Sports Sciences, Annamalai University were selected as subjects and their age ranged between 18 and 25 years. Subjects were selected at random by lot procedure. Group I underwent yoga practices (n = 15) and Group II acted as control (n = 15). The data were collected with the help of trained physical education scholars.

#### **Selection of Variable and Test:**

S.No	Dependent Variables	Test
1	Muscular Endurance	Timed sit-ups (one minute)
2	Resting Pulse Rate	Pulse rate per minute

### **Protocol:**

The subjects were divided into two groups, namely experimental group and control group. The control

group was not given any training. Only the experimental group underwent training in selected yogasana exercises. The experimental group practiced yogasana weekly five days i.e. Monday to Friday, between 6.00 A.M. to 8.00 A.M., for a period of nine weeks.

Weeks: I to III: Padmasana, Supta Vajrasana, Gomukasana, Bhujangasana, Dhanurasana and Chakrasana

Weeks: IV to VI: Halasana, Sarvangasana, Paschimottasana, Salabhasana, Padahasthasana and Savasana

Weeks: VII to IX: All Asanas.

**Statistical Technique:**

The purpose of the study was to find out the interference effect of training methods. So the data collected from experimental and control groups prior to and after experimentation on selected muscular endurance and resting pulse rate were statistically examined for significant differences, if any, by applying the analysis of covariance (ANCOVA). Step 1: The pre-test means of experimental and control groups were tested for significance by applying ANOVA. Step 2: The post-test means of experimental and control groups were tested for significance by applying ANOVA. Step 3: After the eliminating the influence of pre-test, the adjusted post-test of control and experimental groups were tested for significance by using ANCOVA. In all the cases, to test the significance .05 level of confidence was fixed. Since two groups were involved post-hoc test was not used.

**Results of Study in Resting Pulse Rate:**

The analysis of data on resting pulse rate for control and experimental group prior to and after the experimental period was statistically analysed and presented in Table - I.

Table 1: Analysis of Covariance for the data on Resting Pulse Rate for Experimental Group and Control Group

Test	Exp-Group	Con- Group	SOV	SS	df	MS	F
Pre-Test (Mean ± SD)	78.00 ± 2.204	78.20 ± 0.941	B	0.30	1	0.30	0.104
			W	80.40	28	2.871	
Post Test (Mean ± SD)	75.73 ± 1.981	78.67 ± 1.35	B	64.53	1	64.53	22.51*
			W	80.26	28	2.86	
Adjusted (Mean ± SD)	75.817	78.583	B	57.19	1	57.19	63.20*
			W	24.43	27	0.905	

\* Significant at .05 level of confidence. (The table values required for significance at .05 level of confidence with df 1 and 28 and 1 and 27 were 4.20 and 4.21 respectively).

Table1 showed that the pre-test mean values of resting pulse rate for yoga practice group and control group were 78.00 ± 2.204 and 78.20 ± 0.941 respectively. The obtained 'F' ratio value of 0.104 for pre test scores of yoga practice group and control group on resting pulse rate was less than the required table value of 4.20 for significance with df 1 and 28 at .05 level of confidence. The post-test mean values for resting pulse rate for yoga practice group and control group were 75.73 ± 1.981 and 78.67 ± 1.35 respectively. The obtained 'F' ratio value of 22.51 for posttest scores of yoga practice group and control group was greater than the required table value of 4.20 for significance with df 1 and 28 at .05 level of confidence. The adjusted post-test mean values of resting pulse rate for yoga practice group and control group were 75.817 and 78.583 respectively. The obtained 'F' ratio value of 63.20 for adjusted post-test scores of yoga practice group and control group were greater than the required table value of 4.21 for significance with df 1 and 27 at .05 level of confidence. The results of this study showed that there was a significant difference between yoga practice group and control group on resting pulse rate.

The mean values of yoga practice group and control group on resting pulse rate were graphically represented in Figure 1.

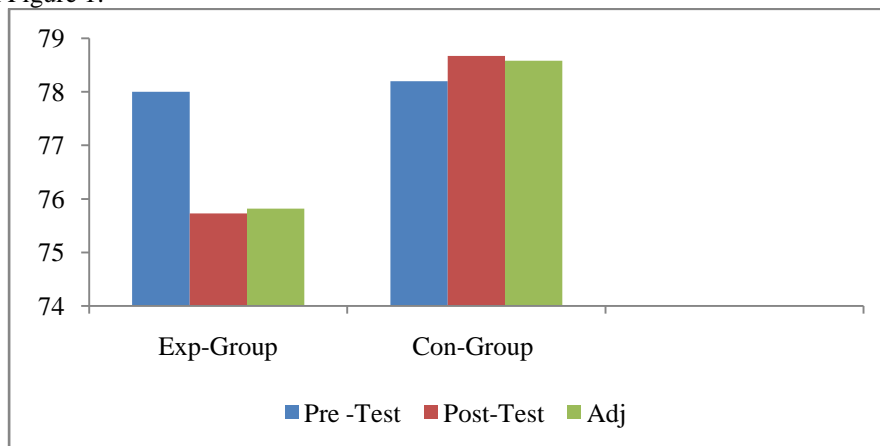


Figure1: Bar Diagram Showing the Mean Values of Yoga Practice Group and Control Group on Resting Pulse Rate.

**Muscular Endurance:**

The analysis of data on Muscular Endurance for control and experimental group prior to and after the experimental period was statistically analysed and presented in Table 2.

Table 2: Analysis of Covariance for the data on Muscular Endurance for Experimental Group and Control Group

Test	Exp Group	Control Group	SOV	SS	df	MS	F
Pre-Test (Mean ± SD)	24.33 ± 1.175	24.47 ± 0.915	B	0.133	1	0.133	0.120
			W	31.067	28	1.11	
Post Test (Mean ± SD)	25.67± 1.047	23.87± 1.407	B	24.30	1	24.30	15.80*
			W	43.067	28	1.538	
Adjusted (Mean ± SD)	25.734	23.80	B	27.98	1	27.98	69.154*
			W	10.924	27	0.405	

\* Significant at .05 level of confidence. (The table values required for significance at .05 level of confidence with df 1 and 28 and 1 and 27 were 4.20 and 4.21 respectively).

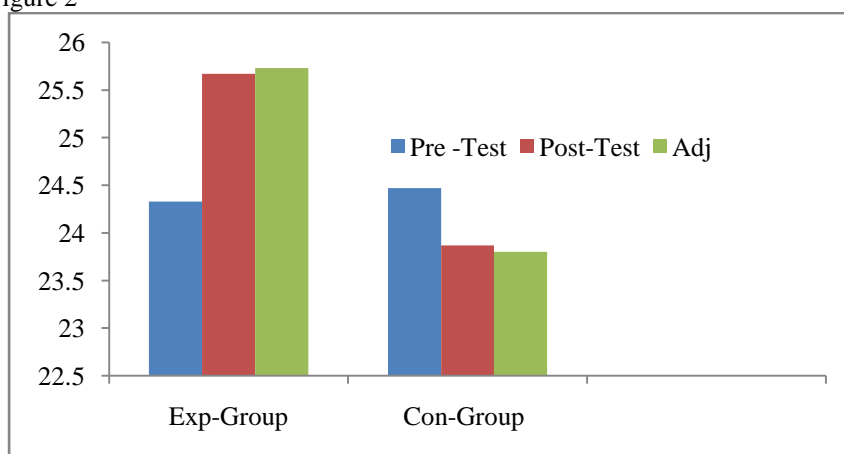
Table 2 showed that the pre-test mean values of muscular endurance for yoga practice group and control group were 24.33 ± 1.175 and 24.47 ± 0.915 respectively. The obtained ‘F’ ratio value of 0.120 for pre test scores of yoga practice group and control group on muscular endurance was less than the required table value of 4.20 for significance with df 1 and 28 at .05 level of confidence.

The post-test mean values for muscular endurance for yoga practice group and control group were 25.67 ± 1.047 and 23.87 ± 1.407 respectively. The obtained ‘F’ ratio value of 15.80 for post test scores of yoga practice group and control group was greater than the required table value of 4.20 for significance with df 1 and 28 at .05 level of confidence.

The adjusted post-test mean values of muscular endurance for yoga practice group and control group were 25.734 and 23.80 respectively. The obtained ‘F’ ratio value of 69.154 for adjusted post-test scores of yoga practice group and control group were greater than the required table value of 4.21 for significance with df 1 and 27 at .05 level of confidence.

The results of this study showed that there was a significant difference between yoga practice group and control group on muscular endurance.

The mean values of yoga practice group and control group on muscular endurance were graphically represented in Figure 2



**Discussion and Conclusion:**

The results of the study revealed that the training has lower the resting pulse rate and improved the breath holding time as compared to the control group. This result is in line with that of the study earlier conducted by (Raju et al., 1997) who have reported that after un-intensive yoga training there was a significant lower the resting pulse rate and lower respiratory quotient. Also shown that the hatha yogic exercise along with games helps to improve aerobic capacity (Roy., 2001). Based on the findings of the study the following conclusions were made: It was also concluded that the resting pulse rate has decreased and the muscular endurance has improved significantly after the yoga practice when compared with the control group.

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