

# Effects of Yogic Practices and Physical Activity on Systolic and Diastolic Blood Pressure among Obese Men

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## Abstract

The present study was designed to find out the effects of yogic practices and physical activity on systolic and diastolic blood pressure among obese men. To achieve the purpose of the study, 45 obese men from Chennai city aged between 30 to 50 years were selected randomly into two experimental and one control groups of 15 each. Experimental group (I) underwent yogic practices and experimental group (II) underwent physical activity for the period of 6 weeks, six days per week for the maximum of an hour in morning. The control group was not exposed to any specific training. The pre and post-test were conducted before and after the training for above three groups. The systolic and diastolic blood pressure was measured by sphygmomanometer. The data pertaining to the variables collected from the three groups before and after the training period were statistically analyzed by using Analysis of Covariance (Ancova) to determine the significant difference and tested at 0.05 level of significance. The results of the study showed that systolic and diastolic blood pressure controlled significantly as a result of yogic practices and physical activity. Hence, the hypothesis was accepted at 0.05 level of confidence. The conclusion is that the yogic practices and physical activity significantly influence and helped to control blood pressure among obese men.

**Key words:** Yogic practices, Physical activity, Systolic and Diastolic blood pressure

## Introduction

Obesity is an excessive storage of fat in adipose tissue beneath the skin. Obesity is from the Latin *obesitas*, which means "stout" fat, or "plump" in Medical term, It may be defined as an abnormal growth of the adipose tissue due to enlargement of fat cell size (Hypertrophic) or an increase in fat cell number (Hyperplastic). It can be 2 types, first is abdominal obesity and second is gluteus obesity. Generally 20% of excess weight is considered as health risk. Obesity people have been found several times to have higher level of blood pressure. High blood pressure is one of the most common cardiovascular problems. As per studies carried out among urban, semi-urban and rural population, its prevalence is as at least as high as 20 per cent if the cut-off 150/90 mm is kept as its definition. In a recent study conducted by the author the prevalence of hypertension was seen in 46% of the population in 6 metropolitan cities of India. In India alone, 15 crore patients need medical treatment. Untreated high BP is a common cause of brain stroke, heart attack and kidney failure. High BP is a major cardiovascular problem in our state with all the parts valley, Jammu and Ladakh being victims of this major

problem. It is an important risk factor for the genesis of heart attacks, strokes and kidney failure. High salt intake, bad life style and genetic factors are important predisposing issues. Mental Stress is another important factor which perpetuates it. Yogic practices and physical Activity may lead to control systolic and diastolic blood pressure. Obesity and hypertension are both major public health problems in Western society. Results from the Framingham Study have shown that high blood pressure and overweight are both independent risk factors for cardiovascular disease. Hypertension is one of the most common obesity-related complications, and about 30% of hypertensive individuals can be classified as being obese. In a group of hypertensive women taken from the Nurses' Health Study, the relative risk of fatal and nonfatal coronary heart disease increased from the lowest to the highest quintile of obesity. Weight loss has been recommended for the obese hypertensive patient. Hypertension is generally defined as a systolic blood pressure of  $\geq 140$  mm Hg or a diastolic blood pressure of  $\geq 90$  mm Hg or use of antihypertensive medications. Classification of blood pressure for adults aged 18 years and older according to the sixth report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. Yogic practices and physical Activity provides relaxation to the mind as well as the body. It frees the body from the excessive tension and undue pressure on the body. Pressure is caused on the veins and arteries and yoga helps to reduce the unnecessary pressure caused on the mind and the body of the individual. The chief cause of hypertension can be stress or injury and if the cause is known, it can greatly help in the treatment of blood pressure.

### **Purpose of the Study**

The present study was designed to find out the effects of yogic practices and physical activity on systolic and diastolic blood pressure among obese men.

### **Hypothesis**

It was hypothesized that there would be significant improvements in yogic practices and physical Activity than the control group on systolic and diastolic blood pressure among obese men.

It was hypothesized that yogic practices would be slightly better than the physical activity.

### **Review of Related Literature**

Murugesan(2000) conducted a study on effect of selected yogic practices on the management of hypertension. On the basis of medical officers diagnosis, thirty three (N = 33) hypertensive, aged 35-65 years, from Govt. General Hospital, Pondicherry, were examined with four variables viz, systolic and diastolic blood

pressure, pulse rate and body weight. The subjects were randomly assigned into three groups. The exp. group-I underwent selected yoga practices, exp. group-II received medical treatment by the physician of the said hospital and the control group did not participate in any of the treatment stimuli. Yoga imparted in the morning and in the evening with 1 hr/session. day-1 for a total period of 11-weeks. Medical treatment comprised drug intake every day for the whole experimental period. The result of pre-post test with ANCOVA revealed that both the treatment stimuli (i.e., yoga and drug) were effective in controlling the variables of hypertension.

Mendelson et al (2013) examined the relationship between BP and anthropometrics, severity of sleep apnea and objectively measured physical activity and sedentary behaviors. Ninety-five adults presenting with OSA (Apnea-Hypopnea Index (AHI) >10 events/hr) and high cardiovascular risk (63.3±8.8 years; BMI: 29.9±4.9 kg/m<sup>2</sup>; AHI: 41.3±17.5/hour; cardiovascular risk SCORE: 13.5±3.7) were included. Physical activity and sedentary behaviors were objectively assessed by actigraphy and self-measured home BP monitoring was measured. Logistic regression models adjusted for sex, age and BMI were built to identify the predictors of self-measured morning and evening BP. Physical activity was significantly related to obesity but not with the severity of sleep apnea or sleepiness. Sedentary behaviors were associated with self-measured morning and evening systolic BP ( $r=0.32$ ;  $p=0.0021$ ;  $r=0.29$ ;  $p=0.0043$ ). Steps per day were inversely associated with evening BP ( $r=-0.27$ ;  $p=0.0095$ ). Univariate analysis identified steps per day and time spent in vigorous physical activity as determinants for evening self-measured BP. In multivariate analysis, only steps per day were identified as a significant determinant of evening BP. Physical activity is the major determinant for evening BP in adults with OSA presenting high cardiovascular risk. Our results emphasize the need for lifestyle.

### **Methodology**

To achieve the purpose of the study, 45 obese men from Chennai district were selected as subjects and their age ranged between 30 to 50 years. All the subjects were assigned to two experimental groups' I. Yogic practices II. Physical Activity and III. Controls group each consisting 15 subjects. In this study yogic practices were given to experimental group (I) and physical activity were given to experimental group (II) for the period of six weeks, six days per week for the maximum of an hour in the morning. The control group was not given any specific training but they participated in the regular activities.

**Training Programme**

Yogic Practices	Physical Activity
Tadasana	Brisk walking
Eka padasana,	abdominal curl
Sasangasana	squat thrust
Vakrasana	dorsal
Shanthiasana	Side line
Nadi suddhi pranayama	Integrated hip and arm stretch
Ujjai pranayama	Arm swings
Bhramari pranayama	Hip flexor series
Chandra bhedana pranayama	Leg swings

**Results and Discussions**

The data pertaining to the variables collected from the three groups before and after the training period were statistically analyzed by using Analysis of Covariance (ANCOVA) to determine the significant difference and tested at 0.05 level of significance.

**Results and Discussion of Systolic Blood Pressure**

The Analysis of Covariance (ANCOVA) on Systolic Blood pressure I- Yogic practices and II-.Physical Activity Group and III-.control group was analyzed and are presented in table - I

**Table - I**  
**Analysis of Co-Variance of the Means of Two Experimental Groups**  
**and the Control Group in Systolic Blood Pressure**  
**(Score in mmHg)**

	Yogic Practices	Physical Activity	Control group	Source of variance	Sum of squares	Df	Mean squares	Obtained F-ratio
<b>Pre test mean</b>	137.40	132.00	134.33	Between	220.04	2	110.02	2.46
				Within	1876.93	42	44.68	
<b>Post test mean</b>	123.93	121.53	134.33	Between	1388.80	2	694.4	14.55*
				Within	2004.00	42	47.71	
<b>Adjusted post test mean</b>	121.38	123.87	134.55	Between	1460.13	2	730.06	64.15*
				Within	466.54	41	11.37	

Table F ratio at 0.05 level of confidence for 2 and 42 (df) = 3.22, 2 and 41 (df) = 3.23

\*Significant at 0.05 level of confidence.



The obtained F value on pre test scores 2.46 was lesser than the required F value of 3.22. Hence, the pre test was not significant at 0.05 level. The post test scores analysis proved that there was significant between the groups, as obtained F value 14.55 was greater than the required F value of 3.22. This proved that the differences between the post test means of the subjects were significant. Taking into consideration the pre and post test scores among the group's adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 64.15 was greater than the required F value of 3.23.

Since significant influences were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in table - I (A)

**Table - I (A)**

**Scheffe's Post-Hoc Test for Systolic Blood Pressure**

Means			Mean difference	Required C.I
Yogic Practices	Physical Activity	Control group		
121.38	123.87		2.48	<b>3.57</b>
121.38		90.37	13.17*	3.57
	123.87	90.37	10.68*	3.57

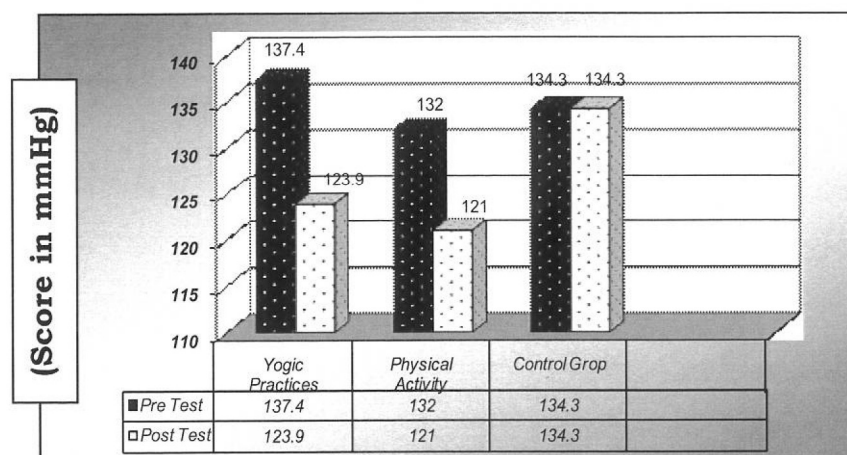
\* Significant at 0.05 level of confidence

The multiple mean comparisons shown in table II (A) proved that there existed significant differences between the adjusted means of Yogic practices and control group, physical activity and control group.

The ordered adjusted means on Systolic Blood pressure were presented through bar diagram for better understanding of the results of this study in Figure - 1.

**Figure - 1**

**Bar Diagram Showing the Mean difference among Yogic Practices Physical Activity and Control Group on Systolic Blood Pressure**



**Discussion on the Findings of Systolic Blood Pressure**

Systolic blood pressure was measured through sphygmomanometer. Result presented in table-1 proved that there was a significant influence in blood pressure due to yogic practices and physical activity compared to control group. Furthermore yogic practices group was slightly better than the physical activity and control group. The result presented in the figure -I confirmed that yogic practices significant improvements in systolic blood pressure than physical activity.

The results of the present study Yogic practice and Physical Activity reduce the Systolic blood pressure compared with control group. The result of the present study correlates with the study of Murugesan (2000) and Sarvottam(2013).

**Discussion on Hypothesis**

It was mentioned in the hypothesis that there would be significant improvements in systolic blood pressure among obese men due to yogic practices and physical activity the result of the study showed that systolic blood pressure significantly improved. Hence, the hypothesis was completely accepted at 0.05 level of confidence.

**Results and Discussion of Diastolic Blood Pressure**

The Analysis of Covariance (ANCOVA) on diastolic Blood pressure I-Yogic practices and II-.Physical Activity Group and III-.control group was analyzed and are presented in table - II

Table - II

**Analysis of Co-variance of the Means of Two Experimental Groups and  
the Control Group in Diastolic Blood Pressure  
(Score in mmHg)**

	Yogic Practices	Physical Activity	Control group	Source of variance	Sum of squares	Df	Mean squares	Obtained F-ratio
<b>Pre test mean</b>	103.13	107.53	104.53	Between	151.6	2	75.8	1.16
				Within	2743.2	42	65.3	
<b>Post test mean</b>	95.13	99.40	104.53	Between	664.58	2	332.28	4.06*
				Within	3435.07	42	81.78	
<b>Adjusted post test mean</b>	97.21	96.75	105.11	Between	659.82	2	329.91	51.18*
				Within	264.2538	41	6.445214	

Table F ratio at 0.05 level of confidence for 2 and 42 (df) = 3.22, 2 and 41 (df) = 3.23

\* Significant at 0.05 level of confidence.

The obtained F value on pre test scores 1.16 was lesser than the required F value of 3.22. Hence; the pre test was not significant at 0.05 level. The post test scores analysis proved that there was a significant improvement between the groups, as obtained F value 4.06 was greater than the required F value of 3.22. This proved that significant. Taking into consideration the pre and post test scores among the groups' adjusted mean scores were calculated and subjected to statistical treatment. The obtained F value of 51.18 was greater than the required F value of 3.23.

Since significant improvements were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in table - II (A).

**Table - II (A)**

**Scheffe's Post-Hoc Test for Diastolic Blood Pressure**

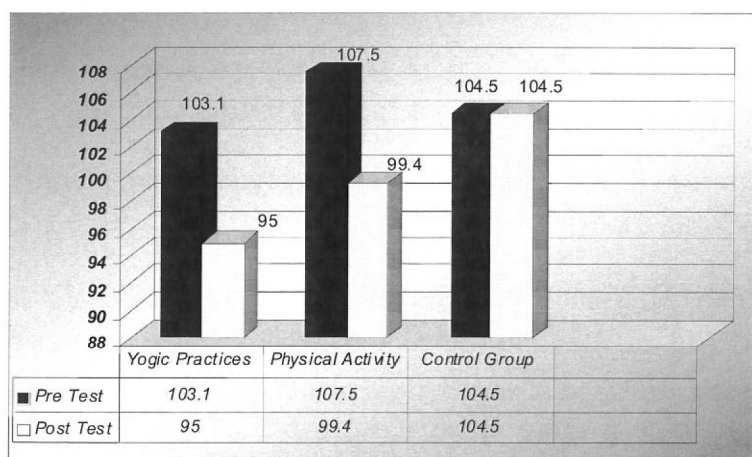
Means			Mean difference	Required C.I
Yogic Practices	Physical Activity	Control group		
97.21	96.75		0.464	<b>2.68</b>
97.21		105.11	7.895*	2.68
	96.75	105.11	8.359*	2.68

\* Significant at 0.05 level of confidence

The multiple mean comparisons shown in table II (A) proved that there existed significant differences between the adjusted means of Yogic practices and control group, physical activity and control group. The ordered adjusted means on diastolic blood pressure were presented through bar diagram for better understanding of the results of this study in Figure II.

**Figure - 2**

**Bar Diagram Showing the Mean Difference among Yogic Practices Group Physical Activity Group and Control Group on Diastolic Blood Pressure**



**Discussion on the Findings of Diastolic Blood Pressure**

Diastolic blood pressure was measured through sphygmomanometer. Result presented in table-II proved that there was a significant influence in diastolic blood pressure due to yogic practices and physical activity compared to control

group. Furthermore yogic practices group was slightly better than the physical activity and control group. The result presented in the figure -II confirmed that yogic practices significant improvements in diastolic blood pressure than physical activity.

The results of the present study Yogic practice and physical Activity reduce the Diastolic blood pressure compared with control group. The result of the present study correlates with the study of Ramos-Jiménez et al. (2009).

### **Discussion on Hypothesis**

It was mentioned in the hypothesis that there would be significant improvements in Diastolic blood pressure among obese men due to yogic practices and physical activity the result of the study showed that Diastolic blood pressure significantly improved .Hence, the hypothesis was completely accepted at 0.05 level of confidence.

### **Conclusion**

Based on the results obtained, the following conclusions were drawn:

It was concluded that there was significant improvements in yogic practices and physical Activity than the control group on systolic and diastolic blood pressure among obese men.

It was concluded that yogic practices were slightly better than the physical activity.

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