

## HOLISTIC APPROACH OF YOGA ON BLOOD PRESSURE MANAGEMENT

Prithviraj Karak<sup>1</sup>, Arindom Banerjee<sup>2</sup> & Aniraban Dasgupta<sup>2</sup>

<sup>1</sup>Assistant Professor, Bankura Christian College, P.O. + Dist- Bankura, Pin-722101

<sup>2</sup>Assistant Professor, Department of Anatomy, Konaseema Institute of Medical Science and Research Foundation, Amalapuram, A.P.

Email: [drpkarak@gmail.com](mailto:drpkarak@gmail.com)

### Keywords:

*Yoga, hypertension, coronary artery disease and body mass index.*

### Abstract

#### Background

Yoga is an ancient Indian system of exercise and therapy is an art of righteous living or an integrated system for the benefit of the body, mind and inner spirit. Regular practice of yoga can help to decrease stress and anxiety. Forward bends such as the Paschimottana Asana help to increase blood flow to the brain, reduce stress, have a calming effect on the nervous system, and greatly help in reducing hypertension.

#### Aim

The aim of yoga is the attainment of the physical, mental and spiritual health and to control the blood pressure. The present study was conducted to determine the effect of yoga training on confirmed coronary artery disease (CAD+) and without coronary artery disease (CAD-) patients.

#### Methods

We examined the effects of yoga on hemodynamic and laboratory parameters in a 1-year pilot study. A course of yoga was given to all the subjects for 1.5 Hours six days in week. Systolic and diastolic blood pressures, heart rate, body mass index (BMI) were all studied at before and after starting of yoga practice.

#### Results

This prospective cohort study included 200 subjects (mean age  $52 \pm 2$  years), both with (50%) and without (50%) established coronary artery disease (CAD). Yoga training produces decrease in systolic blood pressure (SBP) (average 20%), mean arterial pressure (MAP) (11%), heart rate (HR) (average 12.5%) and BMI (8%). SBP, HR and BMI value shows statistically highly significant ( $p < 0.05$ ). These results suggest that there is a significant reduction in blood pressure, heart rate, and BMI in the total cohort with yoga.

#### Conclusion

Our finding shows that yoga appears to control blood pressure of CAD patients.

## Introduction

Yoga is an ancient system of self-development which offers a holistic approach to man through its ideology & techniques. It is a science and its practice harmonizes the body and mind <sup>(1)</sup>. Yoga is immensely useful for promoting total health. Yoga is an alternative form of physical activity which may assist in achieving recommended levels of physical activity for some individuals. Yoga is increasing in popularity <sup>(2, 3 & 4)</sup> with a recent report suggesting that 15 million Americans have practiced yoga at least once in their lifetime <sup>(5)</sup>. It also works effectively as a therapy in three ways – preventive, curative, rehabilitative. The yoga therapy has proved its excellence in psychological disorders like Hypertension <sup>(6, 7 & 8)</sup>. Hypertension represents one of the most prevalent chronic conditions in Indian population <sup>(9)</sup>. The main cause of hypertension or blood pressure is stress and tension. Yoga can prove to be very effective in dealing with stress and blood pressure. It can fight the causes, as well as the effects of high blood pressure and stabilize blood pressure thus reducing high blood pressure and regulating low pressure. Asanas calm the mind and regularize and balance the nervous system, the center that controls stress. The

sympathetic and parasympathetic nervous system, which is involved in stress reaction also get stabilized in the practice of asanas resulting in regulation of the blood pressure. The asanas, which regulate blood pressure, belong to the forward bends, supine, sitting, and inversions group. However forward bends are the fundamental asanas to be practiced by persons suffering from high blood pressure, whereas Viparita Dandasana is the most beneficial asana for low blood pressure. The horizontal position of the spine in these asanas allows the heart to slow down, as there is no stress to pump the blood against gravity to the brain. The heart rate and the cardiac output simultaneously slow down and blood pressure is controlled.

## Methods

### Study population:

We have conducted this study with 200 subjects (mean age  $52 \pm 2$  years) both with (50%) and without (50%) established coronary artery disease (CAD). We examined the effects of yoga on hemodynamic and laboratory parameters in a 1-year pilot study.

### Yoga practice:

A course of yoga [like certain asanas (postures), meditation and pranayama (breathing exercise)] was given to all the subjects for 1.5 Hours six days in week.

### Assessment of body mass index:

BMI was calculated from self-reported weight (converted from pounds to kilograms) divided by height (converted from inches to meters) squared by Quetelet index<sup>(10, 11 & 12)</sup>.

### Measurement of pulse rate:

Pulse rate was measured in right radial artery, after participants had rested for at least 10 minutes. Pulse rate was measured by using three fingers and for a complete minute in supine, in sitting and standing positions. The results were recorded as pulse rate per minute and then analyzed.

### Measurement of blood pressure:

Blood pressure was measured by the auscultatory method in the right arm in supine, sitting and standing positions, using a mercury sphygmomanometer with a cuff of 12cm width. All the subjects were made to rest for at least 10mins before taking the readings. The manometer cuff was snugly tied around the arm with tubing on the medial and the lower side. Systolic blood pressure was recorded to the nearest 2mm of Hg at appearance of first Korotkoff sound, and diastolic blood pressure was recorded to the nearest 2 mm of Hg at the disappearance of Korotkoff sound. Systolic and diastolic blood pressure was recorded first in supine position, and then the standing position, with cuff tied to the arm. Readings were taken in all three positions and were analyzed<sup>(13)</sup>.

## Result

200 subjects (mean age  $52 \pm 2$  years) were recruited in this study and they are categorized into two groups based on their heart disease. In the first group (50% or 100 subjects) were established coronary artery disease (CAD) whereas the second group (50% or 100 subjects) without established coronary artery disease (CAD).

The baseline criteria of before starting yoga practicing in CAD subjects and without CAD subjects all cardiovascular and BMI parameters were measured by maintain standard procedure. Results were depicted in (Table 1 & Table 2). There were significant differences regarding cardiovascular parameters and BMI parameters were observed.

**Table 1: baseline recording of age and bmi before starting yoga practice after completion of yoga programme.**

SUBJECTS (100)	AGE	BMI
CAD + (Before starting yoga)	51.7±2.5	28.6±3
CAD + (After completion of yoga practice)	51.7±2.5	26.8±4

**Table 2: baseline recording of blood pressure before starting yoga practice after completion of yoga programme.**

SUBJECTS (100)	HR	SBP	DBP	MAP
CAD + (Before starting yoga)	90.2±9.8	152.4±8.3	90.8±4.2	110.2±8.1
CAD + (After completion of yoga practice)	82.8±6	130.7±10.1	88.3±3.9	100.6±6.4

After completion of twenty four week yoga course again all the parameters were analyzed and results were depicted in (Table 3 & Table 4). Yoga training produces decrease in SBP, MAP, HR and BMI. SBP, HR and BMI value shows statistically highly significant ( $p < 0.05$ ). These results suggest that there is a significant reduction in blood pressure, heart rate, and BMI in the total cohort with yoga (Fig 1).

**Table 3: baseline recording of age and bmi before starting yoga practice after completion of yoga programme.**

SUBJECTS (100)	AGE	BMI
CAD - (Before starting yoga)	50.7±1.8	25.2±2.6
CAD- (After completion of yoga practice)	50.7±1.8	24.2±3

**Table 4: baseline recording of blood pressure before starting yoga practice after completion of 24 weeks yoga programme.**

SUBJECTS (100)	HR	SBP	DBP	MAP
CAD - (Before starting yoga)	86.6±6	140.6±10.1	84.2±4.5	106.4±6.4
CAD - (After completion of yoga practice)	78.6±4.2	124.2±9.3	82.7±3.4	98.4±3.2

From the above result we can find there is positive co-relation between BMI and hypertension. Men having CAD with higher BMI reported higher systolic and diastolic BP at baseline. As expected, men having CAD with higher BMI were more likely to have diabetes and high cholesterol.

## Discussion

Hypertension is a major public health problem in India and in other developing countries<sup>(14-15)</sup>. This study demonstrates that continuous yoga training is associated with a significant increase of cardiac vagal modulation among healthy yoga practitioners. Since this method is easy to apply with no side effects, and leads to a deep physical and mental relaxation, it could be a suitable intervention during cardiac rehabilitation to shift the autonomic balance towards an increase of vagal activity and possibly decrease cardiac mortality.

Our analysis showed significant correlation between hypertension with higher age, body mass index which was an indicator of obesity and history of target organ dysfunction, multivariate analysis using the logistic regression only documented older age, non vegetarian diet and increasing BMI had significant influence on prevalence of hypertension. The relation of hypertension with advancing of age and BMI has already been documented in the past among Indian subjects<sup>(16)</sup>.

In this study, progressively higher BMI was positively and significantly associated with an increased risk of incident hypertension. Our findings are consistent with a cohort of coronary artery disease for 1-year. In this study, baseline BMI was associated with increased risk of hypertension defined as new antihypertensive medication use.

## Conclusion

Hypertension has been perceived as a common and serious problem in the community. Yoga practice with a portion of sun salutation postures exceeding the minimum about of 10 minutes may contribute some portion of sufficiently intense physical activity to improve cardio-respiratory fitness in CAD individuals.

## References

1. Nayak NN, Shankar K. Yoga: a therapeutic approach. *Phys Med Rehab Clin N Am* 2004; 15:783–98.
2. Garfinkel M, Schumacher HR., Jr. Yoga. *Rheum Dis Clin North Am.* 2000; 26:125–32, x. doi: 10.1016/S0889-857 X (05)70126-5.
3. Chandler K. The emerging field of yoga therapy. *Hawaii Med J.* 2001; 60:286–287.
4. Raub JA. Psychophysilogic effects of Hatha Yoga on musculoskeletal and cardiopulmonary function: a literature review. *J Altern Complement Med.* 2002; 8:797–812. doi: 10.1089/10755530260511810.
5. Saper RB, Eisenberg DM, Davis RB, Culpepper L, Phillips RS. Prevalence and patterns of adult yoga use in the United States: results of a national survey. *Altern Ther Health Med.* 2004; 10:44–49.
6. Kreitzer MJ, Gross CR, Ye X, Russas V, Treesak C. Longitudinal impact of mindfulness meditation on illness burden in solid-organ transplant recipients. *Prog Transplant* 2005; 15:166–72.
7. Madanmohan, Udupa K, Bhavanani AB, Shatopathy CC, Sahai A. Modulation of cardiovascular response to exercise by yoga training. *Indian J Physiol Pharmacol* 2004; 48:461–5.
8. McCaffrey R, Ruknui P, Hatthakit U, Kasetomboon P. The effects of yoga on hypertensive persons in Thailand. *Holistic Nurs Prac* 2005;19:173–80.
9. Vasan RS, Beiser A, Seshadri S, Larson MG, Kannel WB, D’Agostino RB, Levy D. Residual lifetime risk for developing hypertension in middle-aged women and men: The Framingham Heart Study. *JAMA* 2002;287:1003–1010.
10. Garrow J.S., Webster J.D. Quelet’s index (W/H<sup>2</sup>) As a measure of fatness. *Int J of Obesity* 1985; 9(2):147-53.
11. The clinical guidelines of the Identification, evaluation, and Treatment of overweight and obesity in adults: The evidence Report. National Institute of Health Publication 98-4083, *Obes Res* 1998; (suppl2):51S-209S.
12. World Health Organization. Obesity: Preventing and managing the Global Epidemic. Report of a WHO Consultation of Obesity. Geneva, 3-5 June 1997.
13. He J., Klag M.J., Whelton P.K., Chen J.U., Qian M.C. and He G.Q. Body mass and blood pressure in a lean population in Southwest China. *Am J Epidemiol* 1994; 139:380-9.
14. Nissien A, Bothig S, Grenroth H, Lopez AD. Hypertension in developing countries. *World Health Stat Q.* 1988; 41:141–154.
15. Reddy KS. Hypertension control in developing countries: generic issues. *J Hum Hypertension.* 1996; 10:S33–38.
16. Gupta R. Meta analysis of prevalence of hypertension in India. *Indian Heart Journal.* 1997; 49:43–48.