

Research Article

Effect of Yoga on obesity, hypertension and lipid profile

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ABSTRACT

Background: Hypertension is a major chronic lifestyle disease and an important public health problem worldwide. Mind-body therapies i.e., the transcendental meditation and Yoga have raised interest as they represent an alternative to medication; also contribute to an increased feeling of empowerment for patients in preventing and treating hypertension. Yoga, as a therapeutic regimen, has been shown to be useful to individuals with cardiovascular diseases and diabetes. The objective of our study is to study the effect of Pranayama and certain Yogic Asana's on BP, BMI & lipid profile.

Methods: 50 male subjects in the age group of 35-55 years were randomly selected based on exclusion criteria. BP, BMI and lipid profile was estimated before any intervention. They were subjected to pranayama and other Asana's for a period of 3 months. After 3 months of Yoga intervention, BP, BMI and lipid profile was estimated.

Results: We observed a statistically significant decrease in Systolic BP, Diastolic BP and BMI after 3 months of Yoga training. Also, we observed a decrease in total cholesterol, VLDL, triglycerides and an increase in HDL cholesterol which is not statistically significant.

Conclusion: A significant decrease in systolic blood pressure and diastolic blood pressure in subjects who have practiced Yoga, Asanas along with pranayama technique for 3 months duration.

Keywords: Asana's, Body mass index, Hypertension, Yoga

INTRODUCTION

Yoga is based on 1 of 6 systems of Indian philosophy that have been transmitted orally through generations. Patanjali, the father of Ayurvedic medicine, wrote a treatise called the Yoga Sutras in which he formalized this discipline. The word yoga originates from the Sanskrit for union and aims to harmonize mind, body, and spirit. Traditional yoga incorporates the 8 limbs as set out by Patanjali: Yamas and Niyamas (moral and ethical restraints), Asanas (postures), Pranayama (regulation of breathing), Pratyahara (internalization of the senses), Dharana (concentration), Dhyana (meditation), and Samadhi (self-realization).

Yoga provides one of the best means of self-improvement and gaining full potential of one's body, mind & soul. It has been proved beyond doubt that pranayama and certain Asana's are a very important means for preventing and curing many ailments.¹ Yogasana and Pranayama has beneficial effect on different system of body thereby increasing longevity, bringing equipoise between psychic and somatic aspect of bodily function. Yoga represents a body of practices and is gaining increasing popularity in many countries around the world, consisting of various postures (Asana), breathing and meditation techniques (Pranayama).²

Over the last 10 years, research studies have shown that the practice of Yoga improves strength and flexibility and

may help in control parameters as blood pressure, respiration and heart rate, and metabolic rates. Now a day, Stress is significant problem of World as it affects physical, mental, behavioral & emotional health. Yoga has been reported to control stress and found to be beneficial in treating stress related disorders, improving autonomic functions, lower blood pressure, increase strength & flexibility of muscles, improve the sense of well-being, slow ageing process, control breathing, reducing signs of oxidative stress & improving spiritual growth. Yoga is reported to reduce stress and anxiety, improves autonomic functions by triggering neurohormonal mechanisms by the suppression of sympathetic activity.³ There are several non-pharmacological methods of controlling high blood pressure. Physical activity, yoga, relaxation techniques and reduction in daily salt intake have been proved to modify the risk factors responsible for the development of hypertension. The physiological effects of Yoga training that have been previously reported include the inhibition of body weight gain, reduction in cholesterol levels and blood pressure along with improvement in immune function as well as beneficial psychological effects.⁴⁻⁹

Asana Yoga uses various postures to develop physical strength, flexibility and endurance which can be used as a moderate-intensity exercise for patients with limited aerobic capacity or restricted ability to exercise.¹⁰ Yoga has been shown to decrease hypertension and cardiac inflammation, stabilize the sympathetic nervous system, and improve psychological health and the cardiac function.¹¹⁻¹³ Nowadays, Yoga used alone or combined with conventional therapy has been widely used as an alternative method for the treatment of essential hypertension.

METHODS

50 male subjects in the age group of 35-55 years were randomly selected based on exclusion criteria. Inclusion criteria: Adult patients suffering from obesity, hypertension and dyslipidemia either singly or in combination, two or all the three, have been included in this study.

Exclusion criteria: Patients suffering from other disorders like liver disease, pulmonary diseases, malabsorption, thyrotoxicosis, alcoholism and non-co-operative patients were excluded from the study.

BP, BMI and lipid profile was estimated before any intervention. They were subjected to Pranayama and other Asana's for a period of 3 months. After 3 months of yoga intervention, BP, BMI and lipid profile were estimated. The subjects were asked to perform Yoga, which includes pranayama for 30 min and Yogic Asana's for another 30 min everyday. All the patients selected for the study performed Yoga in the Yoga centre under the guidance of yoga master. Blood pressure was measured using sphygmomanometer in sitting posture (both systolic and diastolic blood pressures were recorded). The fasting blood samples were taken for testing lipid profile.

The Total Cholesterol (TC) was estimated by using CHOD/PAP method (cholesterol oxidase/peroxidase), HDL by using PEG precipitation method, triglycerides (TG) by GPO/PAP (glycerol phosphate oxidase/peroxidase method where as LDL and VLDL by using Friedwald's formula [$LDL=TC-(TGL+HDL)$] and ($VLDL=TGL/5$). Statistical analysis was done by using Z-test for comparison of two mean values. P value < 0.05 was considered as significant. The study was approved by the institute research council and institute ethics committee. Informed consent was obtained from all the participants of the study.

RESULTS

Among all the subjects before yoga, the mean value of systolic blood pressure is 135.6 ± 4.39 mmHg and mean diastolic blood pressure is 88.86 ± 3.51 mmHg and the mean BMI was observed as 27.040 ± 2.03 kg/m². The mean value of total cholesterol and HDL were 174.5 ± 30.12 mg/dl and 42.12 ± 4.78 mg/dl respectively. The mean value of LDL, VLDL and triglycerides were 102.68 ± 33.54 mg/dl, 29.7 ± 15.44 mg/dl and 136.22 ± 41.11 mg/dl respectively.

Table 1: BP, BMI & lipid profile parameters before and after Yoga.

	Before Yoga	After Yoga	P value	Inference
SBP (Mean \pm SD) mmHg	135.6 ± 4.39	125.18 ± 9.29	P < 0.05	HS
DBP (Mean \pm SD) mmHg	88.86 ± 3.51	83.2 ± 4.8	P < 0.05	HS
BMI (Mean \pm SD) Kg/m ²	27.040 ± 2.03	26.278 ± 1.94	P = 0.027	HS
TC (Mean \pm SD) mg/dl	174.5 ± 30.12	172.58 ± 27.50	P = 0.371	NS
HDL (Mean \pm SD) mg/dl	42.12 ± 4.78	42.34 ± 7.06	P = 0.426	NS
LDL (Mean \pm SD) mg/dl	102.68 ± 33.54	101.04 ± 33.54	P = 0.397	NS
VLDL (Mean \pm SD) mg/dl	29.7 ± 15.44	26.44 ± 9.47	P = 0.104	NS
TG (Mean \pm SD) mg/dl	136.22 ± 41.11	134.12 ± 41.11	P = 0.410	NS

After 3 months of yoga, the mean value of systolic blood pressure is 125.18 ± 9.29 mmHg and diastolic blood pressure is 83.2 ± 4.8 mmHg and mean BMI was observed as 26.27 ± 1.94 kg/m². The mean values of total cholesterol and HDL were 172.58 ± 27.50 mg/dl and 42.34 ± 7.06 mg/dl respectively. The mean values of LDL, VLDL and triglycerides were 101.04 ± 33.54 mg/dl, 26.44 ± 9.47 mg/dl and 134.12 ± 41.11 mg/dl respectively.

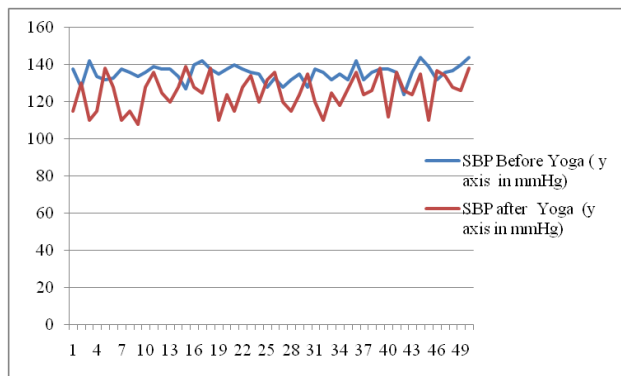


Figure 1: Showing SBP in mmHg before and after Yoga.

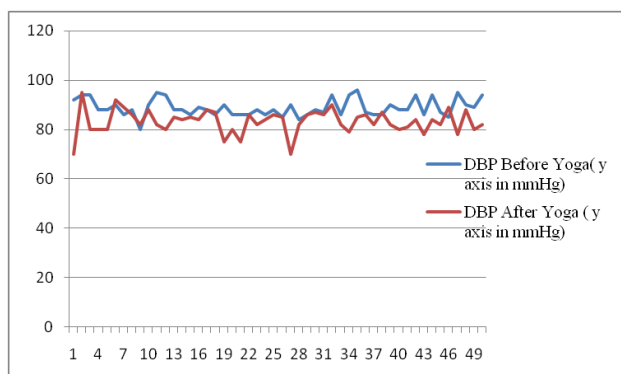


Figure 2: Showing DBP in mmHg before and after Yoga.

The systolic blood pressure when compared in subjects before Yoga and after Yoga, we found highly significant decrease in systolic blood pressure after 3 months of Yoga ($P < 0.05$).

The diastolic blood pressure when compared in subjects before Yoga and after Yoga, we found highly significant decrease in diastolic blood pressure after 3 months of Yoga ($P < 0.05$).

The Body Mass Index (BMI) when compared before and after Yoga, we found significant decrease in BMI after 3 months of Yoga ($P = 0.027$).

Total Cholesterol (TC), LDL, VLDL and triglycerides (TG) when compared before and after 3 months Yoga training, we observed a decrease in total cholesterol,

VLDL and Triglycerides which is not statistically significant ($P = 0.371$, $P = 0.426$, $P = 0.397$ and $P = 0.104$ respectively).

The HDL cholesterol when compared before and after Yoga, a slight increase in HDL after Yoga was observed which is not statistically significant ($P = 0.426$).

DISCUSSION

The effect of Yoga on different parameters observed in our study correlate with the findings of Tundwala V et al. i.e., a significant decrease in the parameters of obesity like BMI, significant decrease in both systolic and diastolic blood pressure and improvement in various lipid profile parameters i.e., decrease in total cholesterol, LDL, triglycerides, VLDL and increase in HDL.¹⁴ Yoga has been proven to be highly effective in reducing BP by numerous Indian as well as international studies. Singh et al. reported a significant reduction in BP (12mm Hg in SBP; 11.2 mm Hg in DBP) with a 40-day Yoga regimen among type 2 diabetics.¹⁵ Schwickert et al. and Frumkin et al. considered yoga to be a relaxation technique that is highly effective in reduction of elevated BP and management of stress.^{16,17} Bijlani et al. concluded that a short lifestyle modification and stress management education program (with yoga as the major component) led to favorable metabolic effects within nine days.¹⁸ Aivazyan et al. demonstrated a significant reduction in SBP and DBP, peripheral vascular resistance, and hypertensive response to emotional stress, and an improvement in psychological adaptation, quality of life, and capacity for work.¹⁹ Several studies have confirmed that the Yoga training significantly increases HDL-C and decreases TG, and LDL-C.^{20,21}

Significant reduction in systolic BP and diastolic BP observed after Yoga in our study was consistent with the studies of Murugesan et al., Sahay et al., Calle Pascual et al.,²²⁻²⁴ Sahay et al. also observed a significant reduction in cholesterol after 6 months of Yoga treatment and observed a significant decrease in FFA, LDL & VLDL cholesterol and increase in HDL cholesterol. After 6 months of Yoga practice, a significant reduction in heart rate, systolic blood pressure and diastolic blood pressure was observed in a study by Devasena I et al.²⁵

Reduction blood pressure indicates a shift in the autonomic nervous system towards parasympathetic dominance as reported by Joseph S et al., Anand BK et al.^{26,27} This modulation of autonomic nervous system activity might have been brought about through the conditioning effect of Yoga on autonomic functions and mediated through the limbic system and higher areas of central nervous system Selvamurthy W et al.²⁸ Regular practice of Yoga increases the baroreflex sensitivity and decreases the sympathetic tone; thereby restoring blood pressure to normal level in patients of essential hypertension Vijaya Lakshmi P et al.²⁹

CONCLUSION

From our study we observed a significant decrease in BMI, both systolic and diastolic blood pressure's in subjects who were practicing yoga for a period of 3 months. Yoga and certain Asana's have beneficial effect on certain cardiovascular risk factors like obesity, hypertension and dyslipidemia. Randomized controlled trials are needed to confirm and elucidate the effects of standardized yoga programs. There is a need to provide a better recognition of yoga by the health care community as a complement to conventional medical care.

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Conflict of interest: None declared

Ethical approval: The study was approved by the institutional research council and the institutional ethics committee

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