

## To Evaluate The Effect Of Yoga On Moderate Degree Hypertension And Lipid Profile

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**Abstract :** Yoga is a practice consisting of gentle stretching, breath control and mind-body intervention. So we aimed at yoga practice on blood pressure and lipid profile. **Methods:** Carried out at Dept of Cardiology, Owaisi Hospital and research centre. After taking written informed consent, we selected 60 Patients (30 females and 30 males) age 40 years to 60 years who attended our programs with moderate hypertension who is volunteered to participate in the study. They were trained in asanas (postures), Pranayama (breathing exercise) and relaxation techniques for 6 months. Blood pressure, Serum total cholesterol, LDL, VLDL, HDL cholesterol and total triglycerides were measured at the beginning (baseline, day 0) and at the end of the study (after 6 months). **Results:** The systolic blood pressure came down from  $164.0 \pm 1.9$  to  $140 \pm 1.9$  mmHg, Diastolic blood pressure  $96 \pm 0.8$  to  $82 \pm 0.6$  mmHg, pulse rate declined from  $85 \pm 1.2$  to  $77 \pm 0.7$  per min, the TC concentration decreased significantly from  $200 \pm 6.5$  to  $170 \pm 3.6$  mg/dl ( $p < 0.001$ ) the LDL reduced from  $166 \pm 4.2$  to  $148 \pm 3.7$  mg/dl ( $p < 0.001$ ) and the triglycerides showed a significant decrease from  $189 \pm 10.3$  to  $166 \pm 8.6$  mg/dl ( $p < 0.001$ ), while the HDL cholesterol showed a marked increase from  $39 \pm 1.4$  to  $46 \pm 1.2$  mg/dl ( $p < 0.05$ ). **Conclusion:** The results conclude that the Yoga practice in patients with moderate degree hypertension leads to decrease in blood pressure and lipid profile within the period of 6 months. [Noorjahan M et al NJIRM 2013; 4(3) : 109-114]

**Key Words:** Yoga, blood pressure, lipid profile, asanas and pranayama.

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**Introduction:** Yoga (Sanskrit word meaning “yoking” or “joining”) means techniques for transforming consciousness and attaining liberation (*moksha*) from karma<sup>1</sup> and rebirth (*samsara*). Yoga is an ancient discipline designed to bring balance and health to the physical, mental, emotional, and spiritual dimensions of the individual. Yoga is popularly understood to be a program of physical exercises (*asana*) and breathing exercises (*pranayama*). Yoga is defined as a practice consisting of three components: gentle stretching; exercises for breath control; and meditation as a mind-body intervention<sup>2</sup>.

The stress and stress-induced disorders like hypertension and angina are fast growing epidemics and bane of “modern” society. With increasing scientific research in yoga, its therapeutic aspects are also being explored. Health and natural remedies among people by yoga and pranayama has been proven an effective method for improving health in addition to prevention and management of diseases. Yoga is reported to reduce stress and anxiety, improves autonomic functions by triggering neurohormonal mechanisms by the suppression of sympathetic

activity. So we aimed to study the effects of yoga practice on blood pressure.

The benefits of yoga have been reported by many researchers in various diseases such as bronchial asthma<sup>3</sup> Multiple sclerosis<sup>4</sup> irritable bowel syndrome<sup>5</sup> depression<sup>6</sup> Osteoarthritis<sup>7</sup> diabetes<sup>8</sup> musculoskeletal and cardiopulmonary function<sup>9</sup>.

**Material and Methods:** After The Ethics Committee permeation the study was carried out at Dept of Cardiology, Owaisi Hospital and research centre.

After taking written informed consent, we selected 60 Patients (30 females and 30 males with the age of 40 years to 60 years) with moderate degree (Systolic BP 160-179, Diastolic BP 90-100mm Hg) hypertension that is volunteered to participate in the study as test group. 30 patients (15 females and 15 males) having cardiovascular disease who were not interested in practicing yoga served as control group. Patients in the test group were trained in hatha yoga<sup>36</sup> by 2 instructors (1 male and a female) for 6 months.

The program includes Asanas (Shavashan, Uttanpadasan, pavan muktasan, bhujangasan, shalabhasan, vakrasan and ardhmastyendraasan), Pranayama and Relaxation techniques.

Each patient carried out these asanas for about 20 min, followed by Pranayama, which include suryaanuloma-viloma, chandranuoma-viloma and nadishuddi for 10 min then relaxation techniques were performed for 10 min and finally concluded with prayers and bhajans total duration of 1 hour of yogic exercise.

The subjects Pulse rate was recorded with the "Finger on the Wrist" technique for 60 seconds. Blood pressure was measured by a standard mercury sphygmomanometer (Industrial Electronic and Allied Products, Pune, India). Venous blood were obtained after a 14 hours of overnight fast and Total cholesterol (TC), High Density Lipoprotein- Cholesterol (HDL-C) and Triglycerides (TG) in plasma were measured by enzymatic methods using auto analyzer in the central clinical laboratory ( De Behring Dimension RXL Max with HM). Low-Density Lipoprotein- Cholesterol (LDL-C) was calculated by Friedewald's <sup>10</sup> formula. The parameters were recorded on the day of the beginning and ending of the study.

Result: The statistical analysis of the data was done by using student t-test. There were significant improvements in cardiovascular endurance upon practicing yoga for a period of 6 months. 1 hour of yogic exercise daily for 6 months contributed to an improvement in the patients. The physiological parameters showed marked difference in the test groups as compared to the control.

The systolic blood pressure (SBP) came down from 164.0± 1.9 (baseline) to 140±1.9 mmHg (after 6 months) in study group i.e. there was significant decrease in the SBP (p<0.001) as compared to control group which was 164.3±2.1 (baseline) to 161±5.0 (after 6 months)

The Diastolic blood pressure (DBP) which was 96±0.8(baseline) fell down to 82±0.6 mmHg ( after 6 months) in test group while no such change was

observed in the control group, the DBP remains almost same from baseline to 6 months follow up. Similarly the pulse rate declined in the test group from 85±1.2 (baseline) to 77 ± 0.7 per min (after 6 months). However there was no difference in the PR in control group (Table 2).

There was reduction in Total cholesterol (TC) and low density lipoprotein (LDL) and increase in high density lipoprotein levels (HDL) (p<0.001) in the test group as compared to the control groups.

In the test group the TC concentration decreased significantly from 200± 6.5 to 170± 3.6 mg/dl (p< 0.001) the LDL reduced from 166± 4.2 to 148±3.7 mg/dl (p<0.001) and the triglycerides showed a significant decrease from 189±10.3 to 166±8.6 mg/dl (p<0.001), while the HDL cholesterol showed a marked increase from 39±1.4 to 46±1.2 mg/dl (p<0.05). In the control group significant changes were not observed in all the parameters (Table 3).

**Table 1: Patients categorized based on group, age, height and sex**

Group	Age	Weight	Height
	Mean ± S.E	Mean ± S.E	Mean ± S.E
Control	51.41±1.781	78.12±1.555	161.88±1.114
Test	51.33±1.652	74.93±1.827	162.7±1.205

**Table 2: Systolic blood pressure, Diastolic blood pressure and Pulse rate on the day of start (Baseline) and end (6 months) of yoga practising in patients with cardiovascular diseases.**

Group	Variable	Baseline Mean + S.E	After 6 months Mean + S.E
Control	SBP	164.3±2.172	161±5.032
	DBP	91±0.481	92±1.037
	PR	85±1.609	80±1.118* <sup>a</sup>
Test	SBP	164.0±1.900	140±1.937* <sup>a</sup>
	DBP	96±0.805	82±0.695* <sup>a</sup>
	PR	85±1.242	77±0.751

SBP: systolic blood pressure, DBP: diastolic blood pressure, PR: pulse rate. Value represents mean ± S.E.\*p<0.05; a: statistically significant different from baseline.

**Table 3: Lipid profile in patients on the day of start (Baseline) and end (6 months) of yoga practicing in patients with mild hypertension.**

GROUP	Variable	Baseline Mean + S.E (mg/dl)	After 6 months Mean + S.E (mg/dl)
Control	TC	199±3.761	195±3.954
	HDL	40±.997	38±0.979
	LDL	166±3.668	172±3.147
	TRIG	190±4.160	196±4.378
Test	TC	200±6.558	170±3.617**
	HDL	39±1.400	46±1.236*
	LDL	166±4.205	148±3.75**
	TRIG	189±10.329	166±8.646**

**Discussion:** Studies reported evidence of an anxiolytic effect<sup>11</sup>, with aerobic exercise possibly more beneficial than non-aerobic exercise<sup>12, 13</sup>. There is also some evidence that exercise may be particularly beneficial in people with more severe anxiety<sup>12, 14</sup>. There is evidence suggesting that the practice of yoga may improve the lipid profile<sup>15, 16</sup>. Our study showed that yoga for 1 hour daily for 6 months contributed to an improvement in moderate degree hypertension and lipid profile. The systolic hypertension and the diastolic hypertension were reduced significantly. Our results are similar to that of McCaffrey R et al<sup>17</sup>, Bijlani RL et al<sup>18</sup>, Latha et al<sup>19</sup>, Damodaran A et al<sup>20</sup>, Vijayalakshmi P et al<sup>21</sup>, Murugesan R et al<sup>22</sup>, Selvamurthy W et al<sup>23</sup>. Other studies found that yoga practice was effective in lowering BP in healthy samples, regardless of the type of yoga<sup>24-32</sup>.

Haber D et al<sup>33</sup> selected a group of low-income elderly people, his study conclude that effects on systolic BP did not differ between a yoga class and an aerobic exercise class, both held three times a week for 10 weeks.

The practice of yoga was associated with significant decrease in cholesterol among subjects with moderate degree hypertension in our study.

The study reports shows reduction in Total cholesterol, low density lipoproteins and increase in high density lipoprotein levels (HDL) ( $p < 0.001$ ) in the test group as compared to the control groups. Our reports are similar to that of Bijlani RL et al<sup>18</sup> who found significant improvements ( $P < 0.01$ ) in total cholesterol, triglycerides, LDL, HDL and very-LDL (VLDL, defined as total cholesterol minus LDL minus HDL) after short-term intensive yoga practice (3–4 h per day for 8 days). Mahajan AS et al<sup>16</sup> examined a regimen involving 4 days of a yoga program at a residential course, followed by 1 year of yoga practice at home. In both men with angina and asymptomatic participants with CAD risk factors, all lipid variables except HDL decreased, beginning the fourth week of yoga practice (e.g. total cholesterol fell from 206.6 to 193.6 mg/dl), and the level of total cholesterol continued falling to 176.06 mg dl<sup>1</sup> at 14 weeks.

There is also mounting evidence to suggest that yoga may reduce sympathetic activation and enhance cardiovagal function, yoga has been reported to decrease perceived stress and reactivity to stressors, enhance stress-related coping, reduce symptoms of depression and anxiety, and decrease anger, tension, and fatigue<sup>34</sup>.

Although the mechanisms underlying the putative beneficial effects of yoga therapy on cardiovascular risk profiles are not yet well understood, the observed changes probably occur primarily through 2 pathways. First, by reducing the activation and reactivity of the sympathoadrenal system and the hypothalamic pituitary adrenal (HPA) axis and promoting feelings of well-being, yoga may alleviate the effects of stress and foster multiple positive downstream effects on neuroendocrine status, metabolic function and related inflammatory responses. Second, by directly stimulating the vagus nerve,

yoga may enhance parasympathetic output and thereby shift the autonomic nervous system balance from primarily sympathetic to parasympathetic, leading to positive changes in cardiac-vagal function, in mood and energy state, and in related neuroendocrine, metabolic, and inflammatory responses<sup>35</sup>.

**Conclusion:** Yoga may be instrumental in improving in lipid profiles and blood pressure. However, the methodological and other limitations characterizing most of these studies preclude drawing firm conclusions. Additional high quality Randomized controlled trials are needed to confirm and further elucidate the effects of standardized yoga programs.

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