

Evaluate the Impact of Yoga Practice on the Cardiovascular System in Healthy Individuals: A Comparative Study**Rashmi Sharma¹, Kumar Chaitanyam², Abhishek Kumar³, Rita Kumari⁴**¹Tutor, Department of Physiology, Nalanda Medical College, Patna, Bihar, India²PG 3rd year, Department of physiology Nalanda medical College, Patna, Bihar, india³Tutor, Department of Physiology, Nalanda Medical College, Patna, Bihar, India⁴Professor and HOD, Department of Physiology, Nalanda Medical College, Patna, Bihar, India

Received: 10-03-2024 / Revised: 21-04-2024 / Accepted: 20-05-2024

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Conflict of interest: Nil

Abstract**Aim:** The aim of the present study was to assess the effects of yogic practice on cardiovascular system in apparently healthy volunteers at tertiary health care center.**Methods:** This was a cross sectional study carried out in the department of physiology during the six-month period. 100 apparently healthy individuals were selected out of these with written and explained consent 50 individuals were instructed and trained in the yogic practices (Yogic group n=50) and rest 50 individuals were control (Non yogic group n=50).**Results:** The age was comparable 35.55 ± 4.36 and 36.18 ± 5.35 ($p > 0.05$). There was male predominance. The Pulse rate (beats/min) was significantly lower. Systolic B.P. (mm Hg) significantly lower and Diastolic B.P. (mm Hg) was significantly in Yogic as compared to non-yogic apparently healthy individuals.**Conclusion:** It can be concluded from our study that the yogic individual were having significantly lesser Pulse rate, Systolic and diastolic BP as compared to non-yogic individuals hence Yoga should be practiced for prevention of hypertension and its complications.**Keywords:** Yoga, cardiovascular system Hypertensions.

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Introduction

Modernization has brought increased comforts and limited mobility in our lives at the cost of increased prevalence of hypertension, diabetes mellitus, dyslipidemia, and obesity, which are predecessors of major cardiovascular disease. Evidence suggests most of these diseases were rare before the present century and their prevalence has increased during the past 50 years [1] with significant association with diet patterns, lifestyle changes, and mental stress. [2-4] The prevalence of metabolic syndrome has reached epidemic proportions in a developing country like India. [5]

Yoga, an effective alternative to traditional aerobic and strength training program, requires little space, no equipment and is with limited side effects. It focuses on relaxation, body awareness, and meditation and provides a qualitatively different exercise experience which may be perceived as less strenuous and more pleasurable. [6] The regular practice of yoga brings about the integration of the body, mind, and breath to produce structural, physiological, and psychological effects in an

individual who practices it. The effectiveness of yoga against stress management is well established. [7,8] It has been hypothesized that yoga causes a shift toward parasympathetic nervous system dominance, possibly via direct vagal stimulation. Yoga provides a holistic healing of the individual. The philosophy of yoga perceives the mind and body as an integrated unit, for which it is considered a mind-body science. It teaches that "given the right tools and the right environment, the mind-body can find harmony and heal itself." Yoga calms and relaxes the mind, strengthens and tunes the body, and brings them into harmony with one another.

There are many forms of yoga, starting from simple breathing exercise to complex physical exercises and postures. In short, during directing the mind and body, the ways of yoga passes through pranayama-controlled breathing exercises to asanas-postures, which are held for a certain period of time; thereby facilitating the development and integration of the body, mind, and soul. In a fast moving world, where time limits the daily exercise schedules, a

comprehensive yoga practice which does not take away too much of daily time can be a purposeful alternative. Yogic practice brings about beneficial effects on cardiovascular, respiratory, and metabolic functions as proven by available evidence. However, the predominant contributions in this series are studies analyzing the physiological effects of long-term yoga practice. Effects of short-term yoga practice on metabolic and autonomic functions need still to be consolidated.

The aim of the present study was to assess the effects of yogic practice on cardiovascular system in apparently healthy volunteers at tertiary health care center.

Materials and methods

This was a cross sectional study carried out in the department of physiology Nalanda Medical College, Patna, Bihar, India during the six month period. 100 apparently healthy individuals were selected out of these with written and explained consent 50 individuals were instructed and trained in the yogic practices (Yogic group n=50) and rest 50 individuals were control (Non yogic group n=50). The data like age sex and cardiovascular parameter at the end of 6 weeks duration were done. The data was analyzed by chi-square test and unpaired t-test and analyzed by SPSS 19 version software.

Ethical Approval was taken from Institutional ethical committee.

Results

Table 1: Distribution of the patients as per the age and sex

	Yogic	Non-yogic	P Value
Age in years	35.55 ± 4.36	36.18± 5.35	>0.05
Gender			
Male	32	35	>0.05
Female	18	15	

The age was comparable 35.55 ± 4.36 and 36.18± 5.35 (p>0.05). There was male predominance.

Table 2: Distribution of the patients as per the cardiovascular

	Yogic	Non-yogic	P Value
Pulse rate (beats/min)	75.55±3.82	84.16±5.75	<0.001
SBP	129.21±4.28	136.54±8.52	<0.001
DBP	72.24±5.75	93.17±6.44	<0.001

The Pulse rate (beats/min) was significantly lower. Systolic B.P. (mm Hg) significantly lower and Diastolic B.P. (mm Hg) was significantly in Yogic as compared to non-yogic apparently healthy individuals.

Discussion

Yoga is a psycho-somatic-spiritual discipline for achieving union and harmony between our mind, body, and soul and the ultimate union of our individual consciousness with the universal consciousness. [8] Pranayama is derived from two Sanskrit words, namely, prana, which means vital force or life energy, ayama means to prolong. Transcendental meditation (TM) is one of the techniques of meditation, which involves allowing the mind to dwell on a series of words (called a mantra) given by the meditation teacher, with no effort. If the attention wanders it is allowed to wander till it returns to the mantra. When a person practices yoga, with yogic attitude (attitude of patience, persistent practice, overcoming obstacles within self, that is, trouncing laziness, anger, delusion, and desire for being different or better than others), there are several changes in physiology. [9]

The age was comparable 35.55 ± 4.36 and 36.18± 5.35 (p>0.05). There was male predominance. The Pulse rate (beats/min) was significantly lower. Systolic B.P. (mm Hg) significantly lower and Diastolic B.P. (mm Hg) was significantly in Yogic as compared to non-yogic apparently healthy individuals. Asanas fulfill various needs of musculoskeletal, digestive, circulatory, respiratory, and nervous system. [10-12] Regular practice of yogic exercises helps in reducing the incidence and controlling highly prevalent diseases such as diabetes, hypertension, digestive, and endocrinal disorders. Arthritis, asthma, and chronic fatigue can also reduced. [13,14] The combination of biofeedback, yogic breathing, and relaxation techniques lowers the blood pressure.

Effects on pulmonary functions and metabolism were promising. FVC, FEV1, and PEFR improved significantly (FVC - 6.77%, FEV1- 7.14%, and PEFR - 4.8%) while FEV1/FVC change was insignificant (0.4%). FVC is a measure of lung size which is increased more compared with FEV1 which is a measure of bronchial airflow capacity. This might be the reason why there was no significant change in FEV1/FVC ratio. These results

support the findings of prior research that examined the effects of yoga training for a comparable frequency and duration. [15-17]

Liu et al [18] evaluated the effects of yogic training in patients with chronic obstructive pulmonary disease in their meta-analysis. The primary outcomes studied were FEV1, FEV1% predicted (% pred). Secondary outcomes were 6 min walking distance (6 MWD), arterial oxygen tension (PaO₂), and arterial carbon dioxide tension (PaCO₂). Weighted mean differences (WMDs) and 95% CIs were calculated, and heterogeneity was assessed. Yoga training significantly improved FEV1 (WMD: 123.57 mL, 95% CI: 4.12–243, P = 0.04), FEV1% pred (WMD: 3.90%, 95% CI: 2.27–5.54, P < 0.00001), and 6 MWD (WMD: 38.84 m, 95% CI: 15.52–62.16, P = 0.001). However, yoga training had no significant effects on PaO₂ (WMD: 1.29 mmHg, 95% CI: –1.21–3.78, P = 0.31) and PaCO₂ (WMD: –0.76 mmHg, 95% CI: –2.06–0.53, P = 0.25). Improvements in lung function were subject to the length of yoga training and the type of practice used.

Conclusion

It can be concluded from our study that the yogic individual were having significantly lesser Pulse rate, Systolic and diastolic BP as compared to non yogic individuals hence Yoga should be practiced for prevention of hypertension and its complications.

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