

Yoga Practice Improves the Body Mass Index and Blood Pressure: A Randomized Controlled Trial

Abstract

Background: Yoga, an ancient Indian system of exercise and therapy is an art of good living or an integrated system for the benefit of the body, mind, and inner spirit. Regular practice of yoga can 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:** Aim of the present study is to evaluate the effect of 1-month yoga practice on body mass index (BMI), and blood pressure (BP). **Materials and Methods:** The present study was conducted to determine the effect of yoga practice on 64 participants (age 53.6 ± 13.1 years) (experimental group) whereas the results were compared with 26 healthy volunteers (control group). We examined the effects of yoga on physiological parameters in a 1-month pilot study. Most of the participants were learner and practiced yoga for 1 h daily in the morning for 1 month. BMI and BP (systolic and diastolic) were studied before and after 1 month of yoga practice. **Results:** Yoga practice causes decreased BMI (26.4 ± 2.5 – 25.22 ± 2.4), systolic BP (136.9 ± 22.18 mmHg to 133 ± 21.38 mmHg), and diastolic BP (84.7 ± 6.5 mmHg to 82.34 ± 7.6 mmHg). On the other hand, no significant changes were observed in BMI and BP of control group. **Conclusion:** This study concludes that yoga practice has potential to control BMI and BP without taking any medication.

Keywords: Body mass index, hypertension, pranayama, systolic and diastolic blood pressure, yoga practice

Introduction

Yoga, a union of one's personal consciousness with the cosmic, is a spiritual way of life, practiced by many over millennia. Researchers and practitioners have observed other benefits of yoga on the physical and mental health.^[1] Yoga is also beneficial for musculoskeletal functioning, cardiovascular health, diabetes, respiratory disorders, hypertension, hypotension, depression, and many other disorders. In essence, yoga is a process of creating a body and mind that are stepping stone not hurdles, to an exuberant and fulfilling life. A typical yoga program, usually consisting of Asana, Pranayama, Kriya, deep relaxation, and meditation, has a combined effect of relaxation of body, slowing of breath, and calming of mind. After attention to posture, deep breathing, and chanting, yoga practice often begins with a slow movement sequence to increase blood flow and warm muscles. This is followed by poses that include flexion, extension, adduction, abduction,

and rotation.^[2-4] Holding poses build strength by engaging muscles in isometric contraction.^[5,6] Moving joints through their full range of motion increases flexibility,^[7,8] whereas standing poses promote balance by strengthening stabilizing muscles and improving proprioception to reduce falls.^[9,10] Thus, yoga incorporates several elements of exercise that is beneficial for human health. Yoga leads to reduce the oxygen consumption and metabolism, thereby balancing the homeostasis.^[11,12] Various other researches confirmed the role of yoga and meditation against diabetes, hyperthyroidism, obesity, respiratory problems, mental stress, and oxidative stress.^[13]

One of the markers of physical well-being in adults is body mass index (BMI).^[14] Overweight (BMI 25.0–29.9 kg/m²) and obesity (BMI ≥ 30.0 kg/m²) are associated with hypertension and increased mortality.^[15] Hypertension is one of the most common disorders, affecting $\approx 26.4\%$ of the adult population worldwide. It ranks

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as the leading chronic risk factor for mortality, accounting for 13.5% of all deaths. Moreover, it is now projected to grow to affect >1.5 billion people by 2025.^[16] In the present scenario, the physical and clinical problem seems unchecked, and still, there is a possibility to prevent them through yoga practices.

Materials and Methods

Subject selection

All the participants included in this study were selected from 1-month free Yoga camps organized by our University at various places in Dehradun district, and sponsored by CCRYN, Ministry of AYUSH, Government of India. Out of total participants, 64 regular participants were considered under experimental group. These participants took part in every day's 1 h yoga and followed common yoga protocol given by the Government of India. The common yoga practices followed by the participants were Prayer, Sadilaja/Calana Kriyas/loosening practice (neck bending, trunk movement, and knee movement), Yogasana (standing posture: *tadasana*, *vrikshasana*, *padahasthasana*, *ardhachakrasana* and *trikonasana*; sitting posture: *bhadrasana*, *ardha-ustrasana*, *sasankasana* and *vakrasana*; prone postures: *bhujangasana*, *Salabhasana*, *Makarasana*; supine postures: *setubandhasana*, *Pavanamuktasana* and *Savasana*), *Kapalbhati* (breathing exercise), *Pranayama* (*Nadi shodhana/anulom viloma*, and *Bhramari*), *Dhyana* in *sambhari mudra* (meditation), *Sankalpa* (solemn vow), and finally, *Santih patha* (mantra for peace, harmony, and happiness). The control group was consisting of 26 healthy volunteers who did not participate in yoga practice although performed their daily routine as usual. Informed consent was obtained from all the participants and study conformed to the code of ethics of the World Medical Association (the Declaration of Helsinki). In addition, good clinical practice Guidelines of Ministry of AYUSH, Government of India (March 2013)^[17] were strictly followed. Participants were also given a questionnaire to fill the information. Participants having serious illness, spondylitis, rheumatoid arthritis, recently underwent surgery, and irregular in practice session were excluded from the study whereas participants other than these problems irrespective of their gender and age were only included in the present study.

Assessment of body mass index

Anthropometry standard procedures were followed to conduct anthropometric measurements by well-trained examiners. Weight was measured to the nearest 0.1 kg in light clothing using a Digital Weight Scale (Model No. WS2019; Narang Medical Ltd., New Delhi, India). Height was measured to the nearest 0.1 cm without shoes using a nonelastic tape.^[18] BMI was calculated as weight (kg) divided by height squared (m²).^[19]

Measurement of blood pressure

Blood pressure (BP) was measured by Omron-automatic BP monitor (Model No. HEM-7203-AP; Omron Healthcare Co. Ltd., Kyoto, Japan) in the right arm in the sitting positions. All the participants were made to rest for at least 15 min before taking the readings.

Statistical analysis

Data were expressed as mean \pm standard deviation and analyzed by paired *t*-test (Student's *t*-test). $P < 0.05$ was considered statistically significant. Data were analyzed using SPSS 14.0 software (SPSS Inc., Chicago, USA).

Results

Patient's characteristics

All 64 participants (25 males and 39 females) regularly practiced yoga for 1 month were included in the study. The age of participants in experimental group was ranged from 22 to 69 years (53.6 ± 13.1) whereas the age of control group (14 males and 12 females) was ranging from 28 to 60 years (49 ± 14).

Body mass index after practicing yoga

The BMI of all participants was found to reduce significantly from 26.4 ± 2.5 to 25.22 ± 2.4 ($P = 0.001$), whereas in control group, there were no significant changes observed as BMI slightly increased from 26.40 ± 4.36 to 26.49 ± 4.33 ($P = 0.068$) [Figure 1].

Systolic blood pressure after practicing yoga

There was a significant reduction recorded in the systolic BP of the experimental group. The initial systolic BP was recorded to 136.9 ± 22.18 mmHg whereas, after 1-month yoga practice, the BP was reduced to 133 ± 21.38 mmHg ($P = 0.026$). However, in control group, there were no significant changes observed as the initial systolic BP was measure to 136.45 ± 18.6 mmHg while the value at the end of the month was recorded to 136.36 ± 18.3 mmHg ($P = 0.576$) [Figure 2].

Diastolic blood pressure after practicing yoga

Diastolic BP was significantly reduced in the experimental group. The initial diastolic BP was recorded to 84.7 ± 6.5 mmHg while this value was found to reduce up to 82.34 ± 7.6 ($P = 0.002$) after 1 month. On the other hand, there were no significant changes observed in the control group as the initial value for this group was measured to 84 ± 9.7 mmHg whereas, at the end of the month, the diastolic BP was found to 83.9 ± 9.85 mmHg ($P = 0.81$) [Figure 3].

Discussion

Yoga practice is comprised of various asana (posture) and meditation, such as prayer, lessening practice (neck

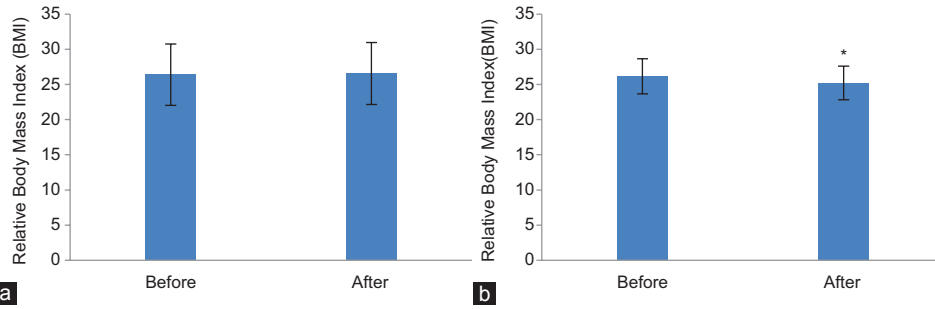


Figure 1: Comparison of body mass index before and after 1-month yoga practice. (a) Control group; (b) experimental group * $P < 0.05$

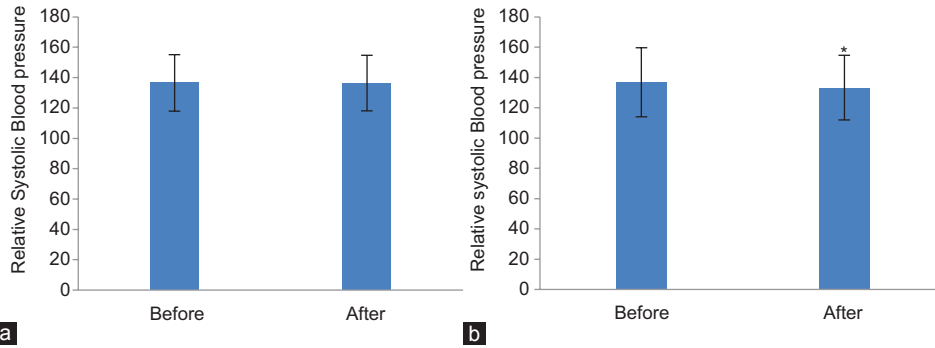


Figure 2: Comparison of systolic blood pressure before and after 1-month yoga practice. (a) Control group; (b) experimental group * $P < 0.05$

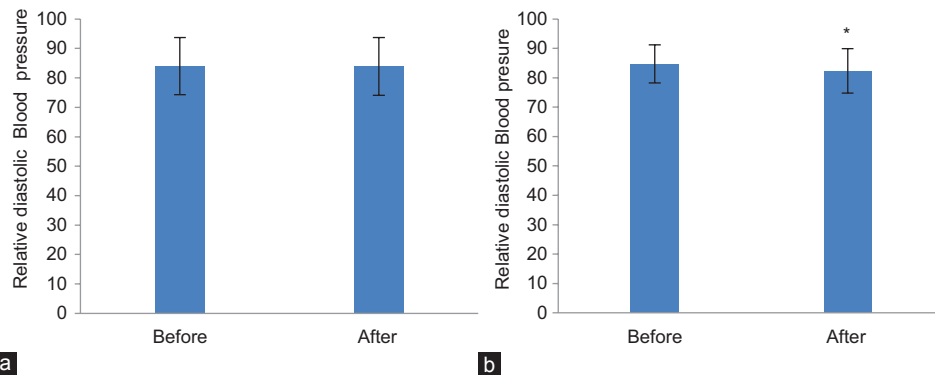


Figure 3: Comparison of diastolic blood pressure before and after 1 month yoga practice. (a) Control group; (b) experimental group * $P < 0.05$

bending, trunk movement, and knee movement), yogasana (standing position, setting position, prone position, and supine position), Kapalbhata, Pranayama, Dhyan, Sankalp, and santih patha. In our subset of participants, we had 22–69 years of age irrespective to their genders that performed yoga practice. In our study, we found that BMI of experimental group was significantly decreased within 1 month, that is, mainly because of asana which might be reduced the deposited fat on adipose tissue. We found better results in reducing BMI as compared to that of the previous study by Telles *et al.*^[20] Our findings clearly suggested that the complications of obesity can be reduced by yoga therapy. Similarly, the systolic and diastolic BP was significantly decreased in persons who performed yoga for 30 days.

The asanas calm the mind and regularize and balance the nervous system, the center that controls stress. Further, sympathetic and parasympathetic nervous system stabilized in the practice of asanas resulting in regulation of the BP. The asanas belong to the forward bends, supine, sitting, and inversions group regulate the BP. However, forward bends are the fundamental asanas which can be helpful for persons suffering from high BP. Among them, Adhomukha svanasana is the most beneficial asana for BP. 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. Besides, the heart rate and the cardiac output simultaneously slow down, and BP is controlled.^[21]

Our results support the findings which stated that the yoga practice reduces systolic and diastolic BP.^[21] In addition, all

participants were found to achieve good health, positivity, and vitality after performing yoga.

Conclusion

The tendency of increasing weight or obesity is being prevalent day-by-day in all aged person. Studies have shown that BMI and BP at low and high level indicate morbidity and mortality. Yoga therapy is beneficial in maintaining good health by regulating BMI and BP. Hence, from our study, it is concluded that the efficacy of yoga therapy on body weight and BP may have direct impact on its use as a safe therapeutic modality in combating obesity and abnormal BP borne diseases. In future, such studies are highly needed to be done on larger group of participants for investigation and validation of effect of yoga practice on health. Such studies can aware people to adopt yoga in their daily routine for better physical and mental health.

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Conflicts of interest

There are no conflicts of interest.

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