

Effect of Short Term Yoga Practices on Blood Pressure in Medical Students

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Abstract

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Background: Yoga is a physical, mental, and spiritual discipline that began in India. Since its inception, around the 5th or 6th century BC, yoga has attained lot of importance as far as the physical and mental health of a common man is concerned. The most common parameter to assess the physical fitness is cardiovascular function usually blood pressure; more the stress, high the blood pressure. The young generation is facing more stress in present scenario in all walks of life and medical students are not exceptions. *Objective:* To study the effect of short-term yogic practices on blood pressure in young healthy medical students. *Methodology:* The study was conducted on 36 healthy medical students (21 males and 15 females) in the age group of 17-21 years in the Department of Physiology, M.G.M. Medical College, and Maharaja Yashwantrao Hospital, Indore. An informed consent was taken after fulfilling the inclusion and exclusion criteria. Blood pressure was measured by using mercury sphygmomanometer before the participants started yoga practices. The participants performed yoga practices in the morning for one hour daily, six days in a week, for four weeks under the guidance of yoga teacher. The yoga practices consisted of Prayer, Omkar recitation, asana, Pranayama, and breathing exercises. Blood pressure was again measured after the completion of yoga session. Data thus collected compiled, tabulated, and analyzed statistically by using students 't' test. *Observation and Result:* There was significant reduction in both systolic and diastolic blood pressure. The reduction in systolic blood pressure was more marked in males (p value 0.006) while reduction in diastolic blood pressure was more marked in females (p value 0.015). *Conclusion:* On the basis of these results we can conclude that yogic practices lowers blood pressure; which can be useful not only therapeutically but also as a preventive measure.

Keywords: Yoga; Blood Pressure; Sphygmomanometer; Students 't' Test.

Introduction

Yoga is a physical, mental, and spiritual discipline that began in India. Since its inception, around the 5th or 6th century BC, yoga has attained lot of importance as far as the physical and mental health of a common man is concerned.

Yoga is a mind-body therapy based on movement and breathing. Over the last few years, research into the potential health benefits of yoga, especially regarding blood pressure; have brought out some beneficial results. In addition to practicing asana, Yogic breathing has been shown to have a positive effect on blood pressure. ... conscious breathing

lowers blood pressure [1]. Yogic practices not only help in lowering down the high blood pressure in hypertensive patients [2]; but also prevents blood pressure to rise [3]. Pranayama can also be extremely beneficial in quickly lowering down blood pressure [4]. Even 15 days' yogic breathing like regular pranayama and meditation have beneficial effects on cardiovascular functions irrespective of age, gender, and BMI in normal healthy individuals [56]. Alternate-nostril breathing and bhastrika pranayam brings reduction in blood pressure [7].

The most common parameter to assess the physical fitness is cardiovascular function usually blood pressure; more the stress, high the blood pressure. The young generation is facing more stress in present

scenario in all walks of life and medical students are not exceptions. Hence the purpose of this study was to study the effect of short-term yogic practices on blood pressure in young healthy medical students.

Aims and Objectives

To assess the effect of short-term yogic practices on blood pressure in medical students.

Material and Method

This study was carried out in the department of physiology, Mahatma Gandhi Memorial Medical College, and Maharaja Yashwantrao hospital, Indore.

Study Design: Prospective

Sample type: Purposive

Sample Size: Thirty six (36) participants – first year medical students of Mahatma Gandhi Memorial Medical College, Indore.

Compliance: Participants had 80% attendance in yoga session

Material Used

- Electronic Weighing Machine for recording weight of the participants.
- Standard Stadiometer for measuring height of the participants.
- Mercury Sphygmomanometer for recording Blood Pressure of the participants.
- Stethoscope for measuring blood pressure

Inclusion Criteria

1. Participants giving consent for participation in the study
2. Participants free from any cardiovascular or other chronic illness
3. Participants not involved in yoga practices previously
4. Participants not involved in any other physical activities

Exclusion Criteria

1. Participants not ready to give consent for participation in the study

2. Smokers (bidhi, cigarette etc), alcoholics
3. Participants suffering from any cardiovascular or any other illness

Methodology

This study was carried out on healthy medical students (21 males and 15 females) of age group 17-21 years. After obtaining the informed consent, all the participants were subjected to a self-made questionnaire to obtain details regarding their present, past, personal and medical history. Once the inclusion & exclusion criteria have been satisfied, height and weight were recorded using standard protocol along with recording of pulse and temperature. Then a complete general physical examination was done to rule out any physical ailments. Then the blood pressure of the participants was measured on the first day before starting of yoga practices. Then the participants were briefed about the yoga programme and made oriented with the programme for initial 2 days. Then the participants performed the yoga practices every morning for one hour for four weeks under the supervision of expert yoga teacher. The yoga practices include Prayer, Omkar recitation, Asana, Pranayama and scheduled as follows -

1. Prayer and Omkar recitation meditative postures - Padmasana/Sukhasana (Easy pose)
2. Loosening or stretching exercises – Warm ups: starting from the head working towards the toes. Neck rotation, shoulder rotation, arm rotation, elbow movements, wrist movements, finger movements, waist movements, knee rotation, ankle rotation, and toe movements.
3. Quick relaxation in Shavasana (Corpse Pose)
4. Asana
Standing Yogic Postures
Tadasan
Tiryak Tadasan
Trikonasana
Pawanmuktasana
Katichakrasana
Padhastasana
Sitting Yogic Postures
Shshankasana
Padangusthan
Bhunamanasana
Janushirasana

Paschimuttanasana
 Utthit Padmasana
 Surya Namaskar

5. Deep relaxation in Shavasana (Corpse Pose)
6. Pranayama (Breathing Exercises)
 - ssKapalbhati (forceful exhalation)
 - Nadi shuddhi (alternate nostril breathing)
 - Bhramari (Honeybee sound during expiration)
7. Omkar recitation in Padmasana/ Sukhasana (Easy Pose)

After the completion of yoga session of four weeks, again the blood pressure of all the participants was measured using the same mercury sphygmomanometer.

Blood pressure was measured by using mercury sphygmomanometer. All the participants were explained regarding the method of measuring the blood pressure. Blood pressure of all the participants was measured with standard size riva rocae cuff in the right arm in sitting position on the same time of the day before and after yoga to avoid the effect of posture and diurnal variation respectively. All the participants were asked to sit completely relaxed with no anxiety for at least 10

minutes then the blood pressure was measured taken 2 times for accuracy with a one minute interval between each test on the right arm. All the data thus obtained were compiled, tabulated and analyzed statistically by using students 't' test.

Observations

Table 1 shows that mean systolic blood pressure is less in all the three groups after yoga but the reduction is statistically significant in males with p value of 0.006 as compare to females with p value of 0.457.

Table 2 shows that before yoga 30.56% (n=11) participants were in a range of systolic blood pressure 90-110 mm Hg which is increased by 16.66% after yoga while 11.11% (n=4) participants were having SBP >130 mmHg which got reduced to 0% after yoga. The reduction was less marked where SBP was in a range of 110-130 mm Hg. The similar trend followed when the analysis was gender-wise which is more significant in males than females.

Table 3 shows that mean diastolic blood pressure is less in all the three groups after yoga but the reduction is statistically significant in females with p value of 0.015 as compare to males with p value of

Table 1: Mean Systolic Blood Pressure (mm Hg) before and after yoga

Group	Number of Participants	Mean Systolic Blood Pressure (mm Hg)		t value	P value
		Before Yogsa ± SD	After Yoga ± SD		
Male	21	122.381 ± 9.604	117.904 ± 6.495	3.108	0.006
Female	15	112.933 ± 9.346	111.2 ± 7.513	0.765	0.457
Total	36	118.444 ± 10.486	115.111 ± 7.611	2.635	0.012

Table 2: % of participants in various range of Systolic Blood Pressure (mm Hg) before and after yoga

Range of Systolic Blood Pressure in mm Hg	Male				Female				Total			
	Before Yoga		After Yoga		Before Yoga		After Yoga		Before Yoga		After Yoga	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
90-110	3	14.29	7	33.33	8	53.33	10	66.67	11	30.56	17	47.22
111-130	14	66.67	14	66.67	7	46.67	5	33.33	21	58.33	19	52.78
>130	4	19.05	0	0	0	0	0	0	4	11.11	0	0
Total	21	100	21	100	15	100	15	100	36	100	36	100
Total	21	100	21	100	15	100	15	100	36	100	36	100

Table 3: Mean Diastolic Blood Pressure (mm Hg) before and after yoga

Group	Number of Participants	Mean Diastolic Blood Pressure (mm Hg)		T value	P value
		Before Yoga ± SD	After Yoga ± SD		
Male	21	75.238 ± 8.52	73.238 ± 5.309	1.345	0.194
Female	15	75.333 ± 6.789	70.80 ± 4.647	2.767	0.015
Total	36	75.277 ± 7.741	72.222 ± 5.122	2.757	0.009

0.194.

Table 4 shows that before yoga 41.67% (n=15) participants were in a range of diastolic blood pressure 60-70 mm Hg which is increased by 22.22% (n=8) after yoga while 16.67% (n=4) participants were having DBP in a range of 81-90 mmHg which got

reduced to 0% after yoga. The reduction in diastolic blood pressure was less marked where DBP was in a range of 71-80 mm Hg. The similar trend followed when the analysis was gender-wise which is more significant in females than males

Table 4: % of participants in various range of Diastolic Blood Pressure (mm Hg) before and after yoga

Range of Diastolic Blood Pressure in mm Hg	Male				Female				Total			
	Before Yoga		After Yoga		Before Yoga		After Yoga		Before Yoga		After Yoga	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
60-70	9	42.86	12	57.14	6	40	11	73.33	15	41.67	23	63.89
71-80	9	42.86	9	42.86	6	40	4	26.67	15	41.67	13	36.11
81-90	3	14.29	0	0.00	3	20	0	0.00	6	16.67	0	0.00
Total	21	100	21	100	15	100	15	100	36	100	36	100

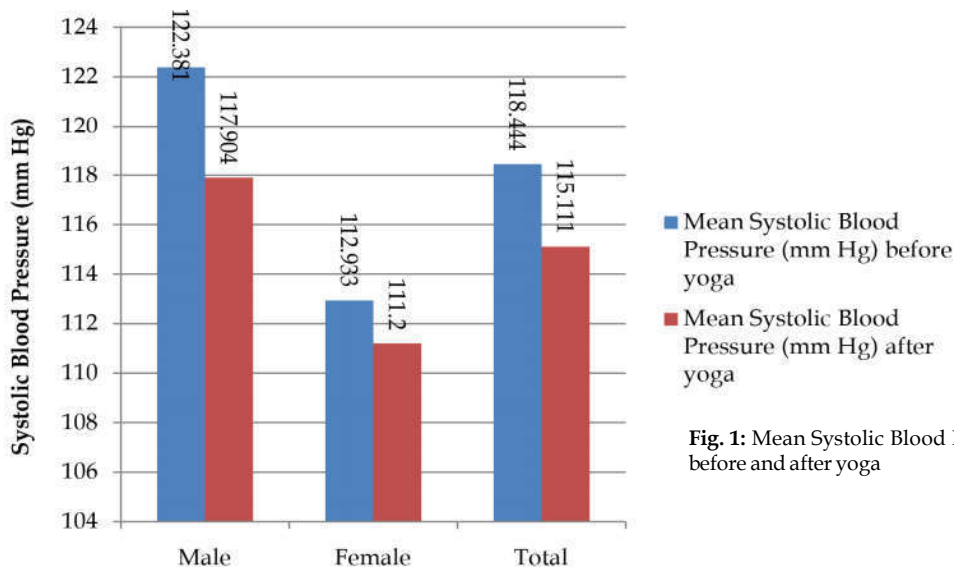


Fig. 1: Mean Systolic Blood Pressure (mm Hg) before and after yoga

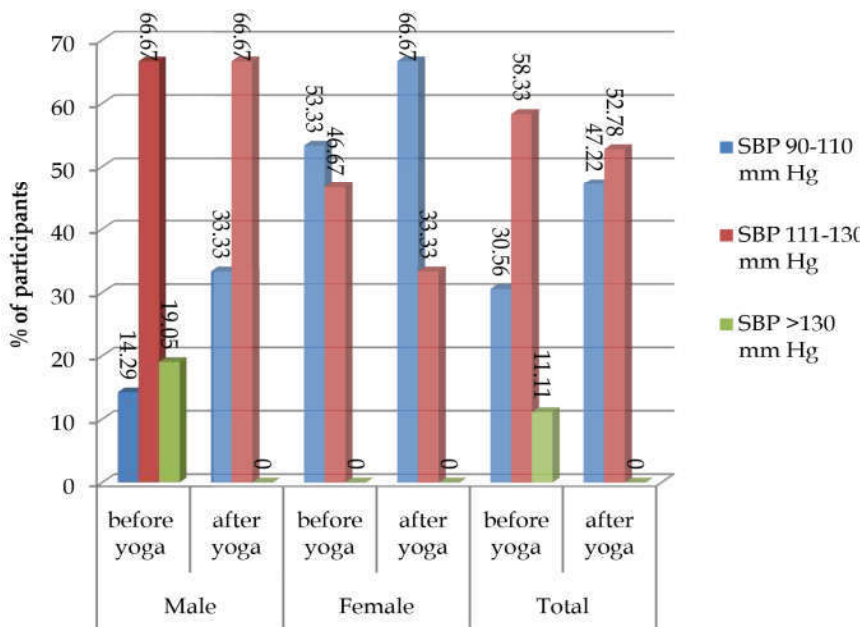


Fig. 2: % of participants in various range of systolic blood pressure (mmHg)

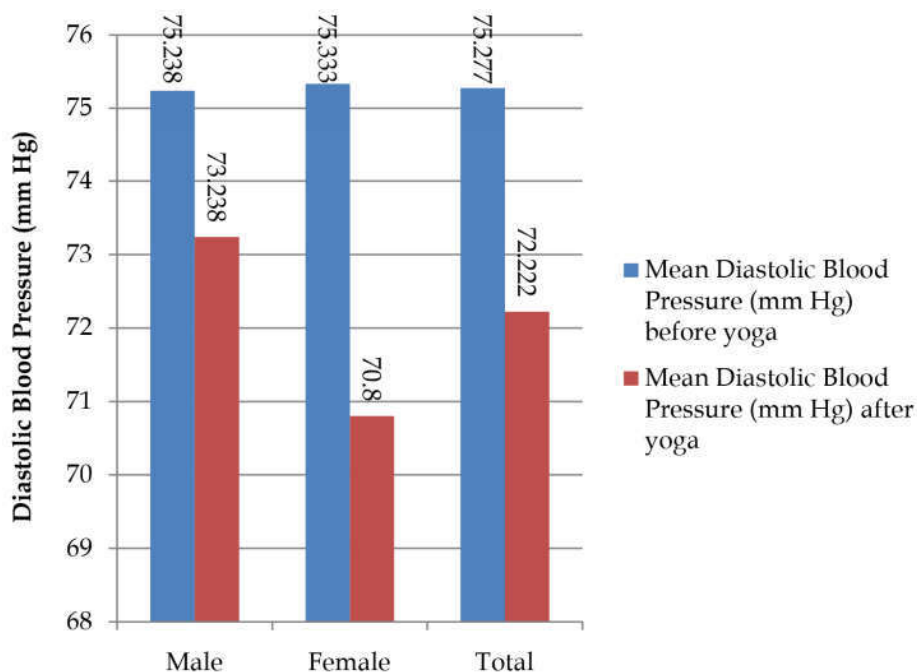


Fig. 3: Mean Diastolic Blood Pressure (mm Hg) before and after yoga

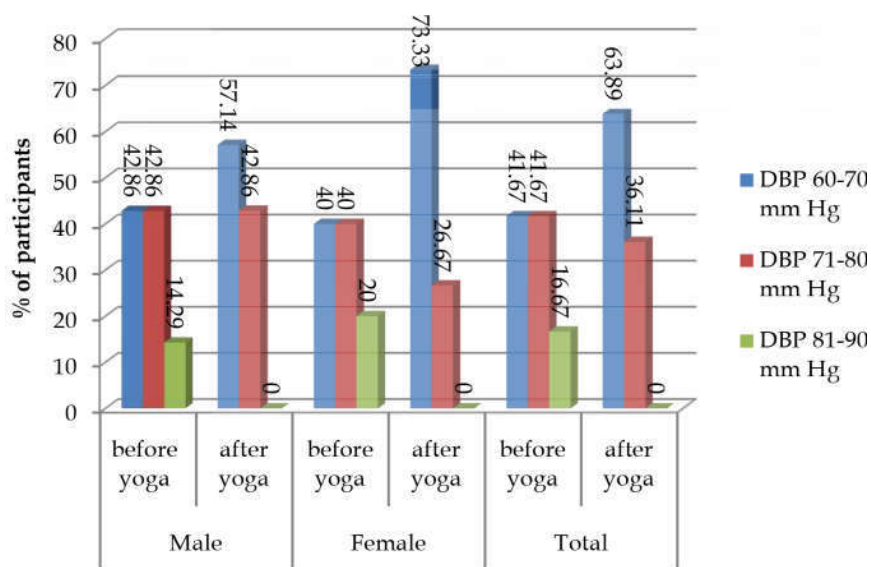


Fig. 4: % of participants in various range of Diastolic Blood Pressure

Discussions

Yoga is known to have beneficial effects on blood pressure. Data obtained for blood pressure before and after yoga for four weeks when analyzed showed a

definite decrease in both systolic and diastolic blood pressure; but the change in systolic and diastolic blood pressure did not follow the same trend in all the three groups. The whole group showed decrease in both systolic and diastolic blood pressure; while systolic blood pressure showed greater reduction in

males and diastolic blood pressure showed greater reduction in females. The reduction is more from a higher range (>130 mm Hg) to lower range (90-110mmHg) as compare to from optimal range (110-130 mmHg) to lower range in case of systolic blood pressure. Similar trend is observed in case of diastolic blood pressure. It can be stated from such observations that yoga not only reduces blood pressure in hypertensive individuals but also modulates blood pressure in healthy adults [8,9].

Practice of Yoga brings harmony among all the systems of body especially nervous system and hormonal system. In nervous system - Yogic practice creates a good balance between two divisions of ANS and brings good control over blood pressure [10,11,12]. Relaxation in yoga and Pranayama decrease sympathetic nervous system activity [13,14] and creates parasympathetic dominance there by reducing blood pressure by reducing vagal tone [15,16].

In hormonal system, it brings down the level of stress hormone, cortisol, in the body hence controlling blood pressure [17]. Pranayama increases frequency and duration of inhibitory neural impulses by activating pulmonary stretch receptors during above tidal volume inhalation as in Hering Bruer reflex, which bring about withdrawal of sympathetic tone in the skeletal muscle blood vessels, leading to widespread vasodilatation, thus causing decrease in peripheral resistance and thus decreasing the diastolic blood pressure. Baroreceptor sensitivity can be enhanced significantly by slow breathing (supported by a small reduction in the heart rate observed during slow breathing and by reduction in both systolic and diastolic pressure). Slow pace bhastrika and bhramari pranayama (respiratory rate 6/min) exercise thus shows a strong tendency to improving the autonomic nervous system through enhanced activation of the parasympathetic system [18,19]. This may be due to a normalization of autonomic cardiovascular rhythms with increased vagal modulation and/or decreased sympathetic activity along with improvement in baroreflex sensitivity [20]. Further studies are required to enable a deeper understanding of the mechanisms involved as well as determine how long such a BP lowering effect persists.

Conclusion

From the present study we can conclude that short term (4 weeks) regular yogic practices produce relaxed state where parasympathetic

activity overrides the sympathetic activity thus lowering blood pressure in normal young healthy adults.

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Declaration of Interest

The authors report no conflict of interest

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