



YOGA AND ITS IMPACT ON CARDIAC AUTONOMIC FUNCTIONS AMONG A GROUP OF YOGA PRACTITIONERS IN IMPHAL WEST, MANIPUR

Physiology

Dr. A. Dinesh Sharma

PG Trainee, Regional Institute of Medical Sciences, Imphal, Manipur

Prof. Sarada N

Professor and head, Regional Institute of Medical Sciences, Imphal, Manipur

Dr. Kh. Ranendra

Assistant Professor, Regional Institute of Medical Sciences, Imphal, Manipur

ABSTRACT

Background: Yoga is an ancient Indian holistic practice towards health. It is seen that yoga maintains the homeostatic balance of cardiac autonomic functions of the body. The present study is aimed to determine the impact of yoga on cardiac autonomic functions by comparing pre and post test results of 3 months yoga training among a group of yoga practitioners in Imphal West, Manipur. **Material and methods:** This is a randomized interventional study conducted on 30 newly admitted healthy yoga practitioners of both genders in the Department of Physiology, RIMS, Imphal. The parameters studied were resting heart rate, heart rate response to Valsalva maneuver and blood pressure response to handgrip test. The parameters were taken before and after 3 months of yoga training. **Results:** The results showed that there is significant decrease in resting heart rate. There is significant increase in mean value of heart rate response (HRR) to Valsalva ratio and the significant decrease in mean value of blood pressure response to handgrip test in post yoga training. **Conclusion:** From these above findings, it is clear that Yoga maintains the homeostatic balance of cardiac autonomic functions.

KEYWORDS

Yoga in autonomic functions, effect of Yoga in health, Yoga in cardiac autonomic functions

INTRODUCTION

Yoga is an ancient practice, the mother of all physical exercises. It consists of body flexibility, muscular toning, co-ordination, balance, improvement in autonomic and cardiovascular activity. Since known period of time, yoga has been practiced by Sadhus. These practices include yoga asanas (physical postures), yoga pranayama (breathing practices) and dhyana (meditation). It controls the nervous, cardiovascular, respiratory, digestive and other systems to function harmoniously, thereby balancing as one system.

Stress in the form of anxiety, tension, strain, nervousness, pressures and constant worry and depression, affects the autonomic nervous system by activating the limbic system and hypothalamus. It stimulates the secretion of neuroendocrine hormone i.e. adrenaline and nor adrenaline that increases the function of sympathetic nerve fiber and adrenal gland. It influences consciously and subconsciously the mental processes that increase the heart rate and hypertension and follows the sequelae of serious cardiovascular disorders.

Researchers found out that regular practice of yoga has significant positive effect on cardiovascular system and health. Yoga practices has shown improvement on cardiac autonomic function. It has been claimed that yoga plays a positive role in promotion of the physiological state, prevention and maintenance and rehabilitation of psychosomatic and life style related disorders. Yoga practice helps in restoring the imbalance of sympathovagal activity of autonomic nervous system. Therefore, this study is planned to evaluate the role of Yoga and its impact on cardiac autonomic function among the yoga practitioners in Imphal West, Manipur.

MATERIALS AND METHODS

This is a randomized interventional study, conducted in the Department of Physiology, Regional Institute of Medical sciences, Imphal in collaboration with Yoga Training and Research Centre (YTRC) Kwaikethel, Imphal West, Manipur. Newly joined Thirty (30) healthy subjects from YTRC of age group 18 – 60 years (including both males and females) were selected in the study.

Inclusion criteria:

1. Newly joined individuals who are willing to participate
2. Age group of 18-60 years
3. Those individuals who are willing to practice yoga for at least 3 months.

Exclusion criteria:

1. Subjects who has been already practicing yoga
2. Subjects undergoing any other form of physical exercise
3. Any illness like hypertension (Bp > 140/90 mm Hg)

4. Subjects on medication that are known to interfere on the cardiac and autonomic functions.

A routine health examination was performed before study was started.

Autonomic function test parameters were:

1. Resting heart rate response to supine
2. Heart rate response to Valsalva maneuver / Valsalva ratio (VR)
3. Blood pressure response to sustained hand grip

The study parameters were recorded before the start of Yoga training and after 3 months of yoga training. The yoga practices were given by an expert for a period of 3 months, 1 hour in the morning every day for 6 days a week. All the subjects were called to the Department of physiology. A routine health examination was done. Particulars of the subject like Name, age, biodata was recorded and generated ID number and maintained by limiting the identifying variables.

The procedure of the parameters to take is explained fully to the subjects. The subject was made to relax and calm physically and mentally for 30 minutes. The resting heart rate and the blood pressure were recorded first, followed by the other tests. The tests were performed in an ambient environment with room temperature ranging from 18-28°C The subjects were advised to wear simple and light clothes. The resting time duration after each test was 5-10 minutes.

Statistical Analysis:

The quantitative data collected were analyzed using SPSS 21.0 version for windows (IBM Inc. Armonk, NY, USA). The descriptive statistics included the comparison of mean, and standard deviation were used. Paired t test was used for continuous variables to test for association at different point of time of the group under study. A p value of <0.05 was taken as statistically significant.

RESULTS AND OBSERVATION

The present study was studied based on the collected data of thirty (30) healthy subjects of both genders with the age group of 18- 60 years. The mean age of the thirty (30) subjects is 35.60 ± 9.53 years.

Autonomic function test Parameters

Table 1: Comparison of Resting heart rate for pre and post- test yoga training

Test	No. of cases	Pre-test (mean $\pm$ SD)	Post-test (mean $\pm$ SD)	t-value	P-value	REMARK
Resting HR (Beats/min)	30	74.62 $\pm$ 10.98	67.01 $\pm$ 08.94	4.446	0.001	SIGNIFICANT

Table 1: shows the comparison of resting heart rate pre and post test of Yoga training. The mean resting heart rate in pre yoga training is 74.62 ± 10.98 beats / min and is significant decreases to 67.01 ± 08.94 beats/min in post test of yoga training

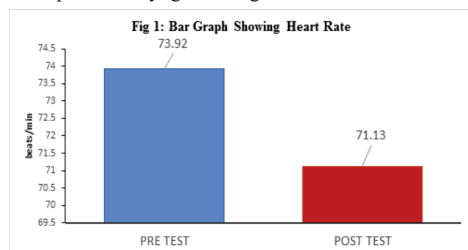


Table 2: HRR to Valsalva maneuver or Valsalva ratio (VR) for pre and post test after yoga training

Test	No. of cases	Pre-test (mean $\pm$ SD)	Post-test (mean $\pm$ SD)	t-value	P-value	REMARK
VR	30	1.31 ± 0.27	1.53 ± 0.27	4.481	0.001	SIGNIFICANT

Table 2 shows HRR to Valsalva maneuver or Valsalva ratio (VR) of pre and post test of yoga training. The mean VR in pre test is 1.31 ± 0.27 and is significant increases to 1.53

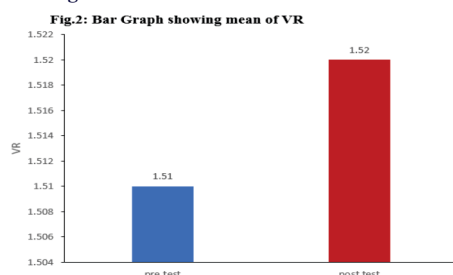


Table 3: Systolic BP response to sustained handgrip for Pre and Post test of yoga training

Test	No. of cases	Pre-test (mean $\pm$ SD)	Post-test (mean $\pm$ SD)	t-value	P-value	REMARK
Resting	30	119.33 ± 10.08	113.67 ± 8.26	3.693	0.001	SIGNIFICANT
2 min.	30	129.17 ± 10.81	121.00 ± 10.70	4.739	0.001	SIGNIFICANT
4 min.	30	133.33 ± 15.02	122.57 ± 10.39	4.239	0.001	SIGNIFICANT
6 min.	30	136.00 ± 17.20	124.00 ± 12.25	5.585	0.001	SIGNIFICANT
Standing Mean		132.83 ± 14.34	122.52 ± 11.11			Rise in BP
Difference		13.50 ± 4.26	8.85 ± 2.85			

Table 3 shows systolic BP response to sustained handgrip for pre and post test of yoga training. The mean resting systolic BP significantly decreases from 119.33 ± 10.08 mm Hg to 113.67 ± 8.26 mm Hg in post test of yoga training. The mean rise in systolic blood pressure of 2 minutes, 4 minute and 6 minutes in pre test was found significantly

decreases from 132.83 ± 14.34 to 122.52 ± 11.11 in post test yoga training. The mean rise difference of resting systolic BP response to sustained handgrip decreases from pre test (13.50 ± 4.26) to post test (8.85 ± 2.85) of yoga training

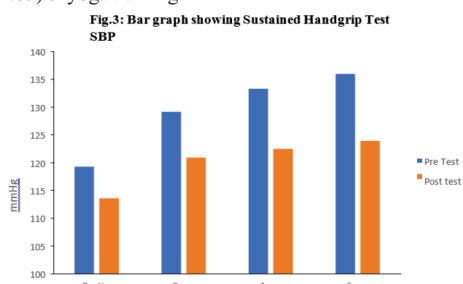
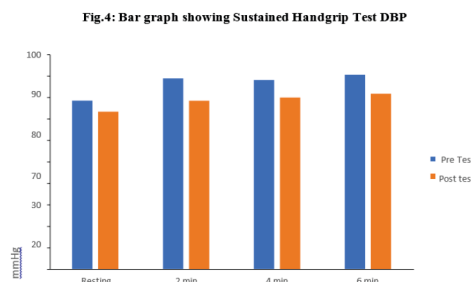


Table 4: Diastolic BP response to sustained handgrip for Pre-test and Post-test

Test	No. of cases	Pre-test (mean $\pm$ SD)	Post-test (mean $\pm$ SD)	t-value	P-value	REMARK
Resting	30	78.27 ± 08.96	73.00 ± 06.96	3.889	0.001	SIGNIFICANT
2 min.	30	88.60 ± 21.08	78.13 ± 08.35	2.733	0.011	SIGNIFICANT
4 min.	30	87.87 ± 12.91	79.60 ± 09.82	3.385	0.002	SIGNIFICANT
6 min.	30	90.33 ± 13.29	81.40 ± 11.06	4.345	0.001	SIGNIFICANT
Standing Mean		88.93 ± 15.76	79.71 ± 9.74			Rise in BP
Difference		10.66 ± 6.88	6.71 ± 2.78			

Table 4 shows diastolic BP response to sustained handgrip for pre and post test of yoga training. The mean resting systolic BP significantly decreases from 78.27 ± 08.96 mm Hg to 73.00 ± 06.96 mm Hg in post test of yoga training. The mean rise value of diastolic BP response to sustained handgrip decreases from pre test (88.93 ± 15.76) to post test (79.71 ± 9.74) of yoga training

The mean rise difference in resting diastolic blood pressure to sustained handgrip in pre test is significantly decreases from 10.66 ± 6.88 to 6.71 ± 2.78 in post test yoga training.



DISCUSSION

The present study was conducted in thirty (30) healthy subjects of both sexes in the age within range of 18-60 years. The parameters of cardiac autonomic function test were carried out in the Department of Physiology, RIMS, Imphal, before the start of yoga training and after 3 months of yoga training.

Resting heart rate and blood pressure:

The resting heart rate and blood pressure of the healthy subjects were found within normal range before the start of yoga training and after yoga training. This finding is similar to the results of researchers Kasturi¹, Ankad et al³

These findings show that there is parasympathetic dominance after yoga training.

Heart rate response to Valsalva maneuver/ Valsalva ratio (VR):

Result show significant increase of heart rate response to Valsalva maneuver after yoga training which is in accordance with researcher like. Veerabhadrapa, S. G et al⁴.

It indicates that yoga increases the vagal modulation of R-R interval showing increase in parasympathetic activity.

Blood pressure response to sustained handgrip:

Result show significant decrease in systolic blood pressure in response to handgrip after yoga and also shows significantly decrease in diastolic blood pressure to handgrip test after yoga training which is consistent with the finding of Pushpanathan P. et al⁵.

A significant decrease in diastolic blood pressure due to handgrip indicate a lower sympathetic drive after yoga training.

From the above finding, it suggests that the practice of yoga definitely improves the cardiovascular system and balances the homeostatic control of the body.

Limitation

1. Sample size is small.
2. Study on effect of long-term yoga training on cardiac autonomic function is required.
3. To study whether yoga actually works on autonomic function or on the cardiovascular system is required.

CONCLUSION

The finding of the present study attributes that practicing yoga causes significantly reduction in mean resting heart rate and blood pressure. It shows parasympathetic dominance in post yoga training.

There is significant increase in heart rate response to Valsalva maneuver indicating more parasympathetic activity in post yoga training.

The systolic and diastolic blood pressure response to standing show significant decrease in post yoga training which is indicative of reduced sympathetic response. The significant decrease in diastolic blood pressure rise to hand grip test indicate a lower sympathetic drive in post yoga training.

Thus, it can be concluded that 3 months of yoga training brings about significant changes in cardiac autonomic responses in normal subjects. Overall, yoga practice thus can be used as promotive, therapeutic and rehabilitative measures to maintain a healthy cardiovascular and autonomic nervous system and thus improve longevity of life.

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