

Effect of Rajayoga Meditation on Blood Pressure, Heart Rate, Cardiac Output, Cardiac Index, Peripheral Blood Flow (Right Upper Limb & Lower Limb)

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ABSTRACT

Background: Rajayoga Meditation is good for maintaining proper health of an individual reduces Blood Pressure and stress, producing consistent physiological changes and have sound scientific basis. It also improves the cardiovascular parameters.

Aims & Objectives: To find the effect of short and long term 'Rajayoga Meditation' practice on different parameters of Blood Pressure(BP),Heart Rate (HR),Cardiac Output(CO),Cardiac Index(CI),Peripheral Blood Flow(PBF) in right upper limbs and right lower limbs.

Material & Method: This is a cross-sectional study conducted, on 54 individual of age group(18-40yrs.) of both sexes. Each individual was informed about the purpose and benefits of the study and written consent was taken before examination.

Procedure: The subjects were divided into three groups on the basis of time period ,they have been practicing 'Rajayoga Meditation'.

- Group-A consists of 14 meditators practicing 'Rajayoga Meditation' for 2-5yrs.
- Group-B consists of 15 meditators practicing 'Rajayoga Meditation' for >10yrs.
- Group-C consists of 25 non-meditators as control.

The various parameters were recorded in a calm and silent environment in each individual. The Heart Rate , Cardiac Output , Cardiac Index , Peripheral Blood Flow(Right Upper & Lower Limbs) were recorded by NICOMON(L&T,Mysore).

Result: This study quantifies the effects of Rajayoga Meditation on the pratitioners of 2-5years and >10years compared to the non-pratitioners and gives the significant changes which are lower in meditators as to the non-meditators.

Conclusion: 'Rajayoga Meditation' shows a significant changes after practiced for a certain time period by an individual.

- A. In comparison of Group-A to Group-C have shown significant changes in BP,HR,CO,CI,PBF.
- B. In comparison of Group-B to Group-C BP, HR and PBF(Right upper and lower limb) was found to be significantly lower in rajayoga meditators than non-meditators, while CO and CI have insignificant changes.
- C. On comparison of meditator practicing 'Rajayoga mediation' for 2-5yrs & >10yrs were found significant changes in Systolic and diastolic blood pressure.

Keywords: 'Rajayoga Meditation' , Blood Pressure , Heart Rate , Cardiac Output , Cardiac Index , PBF(Right upper and Lower Limbs)

INTRODUCTION

Meditation is a complex phenomenon that involves several coordinated, effects on human body. (1) Meditation has entered the main stream of health care as a method of stress and pain reduction. In the recent years there has been a growing interest within the medical community to study the physiological effects of meditation (2-5).

Raja Yoga meditation as taught in the Brahmakumaris World Spiritual University (also known as Prajapita Brahmakumaris Ishwariya Vishwa Vidyalaya) is a behavioral intervention which is simple to practice, as no fixed physical postures are to be adopted. It is an art with scientific, psychological, intellectual and spiritual process, which enables invisible latent powers and capabilities to emerge from the inner recesses of heart and mind. It aims at establishing balance in head, heart and hand.

It is the science and art of harmonizing spiritual, mental and physical energy through the connection with the ultimate source of spiritual energy, the Supreme Soul for enjoying ever healthy, ever-wealthy and ever-happy life.

Regular practice of Raja yoga meditation causes improvement in physiological parameters. The longer the duration of meditation, more are the changes. This study was performed with the objective of assessing the effect of short term and long term Brahmakumaris Raja Yoga meditation on physiological variables.

'Rajayoga Meditation' taught by Brahmakumaris world spiritual university contains ample knowledge helping one to develop this attitude. Listed below are just a few of the benefits people all over the world are endorsing/admiring after practicing meditation in health and fitness programs:-

- 1) Enhances energy, strength, vigor & fitness.
- 2) Helps keeping blood pressure normal.
- 3) Creates a state of deep relaxation and general feeling of well-being.
- 4) Increases concentration and strengthens the mind.
- 5) Amazing ability to fight stress-buster.
- 6) Helps reduce heart diseases, weight loss, building self confidence.

Certain studies and statistics carried out on 'Rajayoga Meditation' have shown positive effects on health. Throughout study we want to quantify the effects of Rajayoga meditation on various parameters.

METHODOLOGY

Study Setup: The present study was carried in the Cardio Respiratory Laboratory of Physiology Department in Saraswathi Institute Of Medical Sciences, Hapur.

Study type: Cross-Sectional Study.

Sample Size: 54

Duration Of Study: One year.

Study Population:

Inclusion Criteria: Normal healthy young individual practicing Rajayoga meditation for two different time period and one control group are selected for the present study of 54 individual divided into group A,B&C of age group(18-40Yrs).

Exclusion Criteria: The subjects who were suffering from Diabetes Melitus, Hypertension, Alcohol intake and Cigarette Smoking were excluded from the present study.

STUDY PROCEDURE

Each subjects was informed about the purpose of the study and a written consent was taken.

The BP was measured in sitting position by Mercurical Sphygomanometer taking two reading before and after meditation in each meditators(2-5yrs) &(>10yrs) practice.

The HR, CO, CI, PBF(right upper &lower limbs) were estimated in supine position by NICOMON(L&T, Mysore) which work on the principle of the mean, standard deviation, standard error and P-value were calculated and comparison were made.

TABLE:1

Comparison of Mean and Standard Deviation of all the parameters:-

RAJYOGA STUDIES				
MEDITATORS(2-5 Yrs.)		NON-MEDITATORS	MEDITATORS(>10 Yrs.)	
BEFORE	DURING	Mean±SD	BEFORE	DURING
118.71±10.83	115±7.84	111.52±10.47	118.40±5.66	116±11.02
81.64±9.96	84.80±11.32	81.84±17.35	83.06±10.05	85.33±20.73
75.57±14.32	75±14.40	72±7.31	80.77±7.84	80.38±8.91
4.52±1.21	4.34±1.20	4.23±1.40	4.41±0.82	4.29±0.83
2.77±0.66	2.67±0.63	2.57±0.67	2.68±0.44	2.66±0.38
1.27±0.33	1.33±0.39	1.42±0.19	1.08±0.27	1.13±0.23
0.97±0.45	0.86±0.37	1.28±0.05	0.73±0.17	0.81±0.17

TABLE:2

S.No.	PARAMETERS		2-5Yrs.	Non-Meditators	P-VALUE	
1	BLOOD PRESSURE	BEFORE	SYS.	118.71±10.83	111.52±10.47	.049
			DIA.	81.64±9.96	81.84±17.35	.055
2	HEART RATE	BEFORE		75.57±14.32	72±7.31	0.307
3	CARDIAC OUTPUT	BEFORE		4.52±1.21	4.23±1.40	0.553
4	CARDIAC INDEX	BEFORE		2.77±0.66	2.57±0.67	0.406
5	PBF(FORE LIMBS)	BEFORE		1.27±0.33	1.42±0.19	0.482
6	PBF(LEGS)	BEFORE		0.97±0.45	1.28±0.05	0.269

Comparison of P-values(significant) between group-A to group-C shown in table 2.

TABLE: 3

S. No.	PARAMETERS		>10Yrs.	NON-MEDITATORS	P-VALUE
	1	BLOOD PRESSURE	BEFORE	118.40±5.66	
SYS.					
		DIA.	83.06±10.05	81.84±17.35	0.011
2	HEART RATE	BEFORE	80.77±7.84	72±7.31	0.002
3	CARDIAC OUTPUT	BEFORE	4.41±0.82	4.23±1.40	0.68
4	CARDIAC INDEX	BEFORE	2.68±0.44	2.57±0.67	0.593
5	PBF(FORE LIMBS)	BEFORE	1.08±0.27	1.42±0.19	0.085
6	PBF(LEGS)	BEFORE	0.73±0.17	1.28±0.05	0

Comparison of P-values(significant) between group-B to group-C shown in table 3:-

TABLE: 4

S.No.	PARAMETERS		2-5Yrs.	>10Yrs.
	1	BLOOD PRESSURE	BEFORE	118.71±10.83
SYS.				
		DIA.	81.64±9.96	83.06±10.05
2	HEART RATE	BEFORE	75.57±14.32	80.77±7.84
3	CARDIAC OUTPUT	BEFORE	4.52±1.21	4.41±0.82
4	CARDIAC INDEX	BEFORE	2.77±0.66	2.68±0.44
5	PBF(FORE LIMBS)	BEFORE	1.27±0.33	1.08±0.27
6	PBF(LEGS)	BEFORE	0.97±0.45	0.73±0.17

Comparison of P-values(significant) between group-A to group-B shown in table 4

RESULTS

The different parameters as systolic and diastolic Blood Pressure, Heart Rate, Cardiac Output, Cardiac Index ,Peripheral Blood Flow in right upper and lower limbs were measured in two groups A and B mediatators and the non-meditators (group-C).Comparison between three groups were made as shown in Table 1.

Also a comparison was done between the meditators of group A&B. The duration of group A meditators doing meditation is 2-5years whereas the duration of group B is >10years. As shown in Table 4.

There was significant difference in the systolic and diastolic blood pressure between the 2-5years meditators and non-meditators. A significant change in the systolic and diastolic blood pressure, Heart Rate and Peripheral Blood Flow (Right upper and lower limbs) were also be seen in comparison of group C(non-meditators) which shows that the practice of meditators helps an individual to lower down the physiological parameters.

There was also significant change observed between the systolic and diastolic blood pressure between group A and group B meditators.

DISCUSSION

Yoga is the ancient India method to attain perfect health. Now yoga is being practice in various forms as rajayoga meditation is widely practiced worldwide. We had tried to find out the effects of rajayoga meditation on Heart Rate, Systolic Blood Pressure, Diastolic blood pressure, Cardiac Output, Cardiac Index and peripheral Blood Flow of right upper and lower limbs on practice Rajayoga Meditation from 2-5years and >10years. We observed that Heart Rate, Systolic and diastolic Blood Pressure are significantly lower in meditators than non-meditators. Moreover the decrease in above parameters was more in subjects practicing Rajayoga for >10years, we also measured the Peripheral Blood Flow of right upper and lower limbs and found that it also decreases in meditators than non-meditators. The decrease in it was more pronounced in meditators of more than 10 years than that of 2-5 years.

Vyas R et al¹² observed that diastolic blood pressure was significantly lower in both short and long term meditators of Raja Yoga meditation as compared to non-meditators. Lipid profile showed a significant lowering of serum cholesterol in short and long-term meditators as compared to non-meditators. However contradictory results have been observed by Telles S et al¹³, who conducted study in 18 males with 5-25 years of meditation (mean 10.1±6.2) showing that heart rate during the meditation period was increased when compared to the baseline period, as well as compared to the value during the non-meditation period of control sessions. No significant change was observed during meditation.

Further scientific research on effects of Raja Yoga meditation on other physiological variables like lipid profile, palmar GSR, finger plethysmogram amplitude, skin resistance is needed to assess its beneficial effects. Hence we recommend that Raja Yoga meditation should be incorporated as the basis for an effective behavioral program in the management of diseases associated with lifestyle modification like hypertension, diabetes, coronary heart disease and cancers. For this, awareness needs to be created among masses regarding the positive health benefits of meditation.

Neelam et. Al & Vyas et. Al^{12,13} had also found the same types of changes in heart rate, systolic blood pressure and diastolic blood pressure

in meditators and attributed these changes to quieting of symphathetic system and activation of para-symphathetic system. We have not observed significant changes in cardiac output and cardiac index in meditators of both groups as compared to non-meditators. Moreover we had been able to demonstrate the peripheral blood flow of right upper and lower limbs are significantly lowered in meditators. The effects are more pronounced in long term meditators.

Sympathetic arousal is expected to be reduced during Raja Yoga practice. Hence the load on heart due to sympathetic arousal is also minimized resulting in an improvement in cardiovascular parameters. Similar findings as in our study were observed in 23 subjects by Gupta S et al¹⁰, attributing decline in HR, RR and BP to the reduction in the level of sympathetic arousal. Meditation is believed to gradually reduce the sympathetic dominance resulting in better balance between sympathetic and parasympathetic. This should bring about a hypometabolic state resulting in decreased heart rate and blood pressure¹¹. The reduction of lactic acid brought about by meditation as observed by Patel G¹¹ is supposed to be a sign of tension free and peaceful state of mind.

It seems that as Cardiac output and cardiac index is unaltered while peripheral blood flow is decreased, perhaps the blood is directed to vital organs the brain, heart etc to achieve better perfusion of vital organs leading to long term beneficial effects on body.

Various study on practitioners of rajayoga meditation had shown that Vital capacity, Tidal volume, Body metabolic rate found that are significantly high in meditators than non-meditators¹² even serum cholestrol was also shown to be lower.

Yoga has defiantly beneficial effects on physical, mental, emotional effects. These effects seems to be mediated by multiple mechanisms, one is being the balance of sympathetic and parasympathetic. Sympathetic often it seems to have selective effects on various organs.

Acknowledgement: Authors thank all the volunteers who have participated in the study for the co-operation and valuable time.

Conflict of Interest : None

Sources of Funding: Institutional

Ethical Clearance: Institutional Ethical Committee

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