

Effect of Rajyoga Meditation on the Heart Rate, Blood Pressure and ECG

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ABSTRACT

Introduction: Meditation is a technique of achieving harmony between the physical, mental, intellectual and spiritual personalities of man. Rajyoga is one of the techniques of meditation where a flow of thoughts is encouraged thus using mind in a natural way. Meditation has a number of positive effects on the physiology of human body. It has shown to reduce diastolic blood pressure, systolic blood pressure, heart rate and serum cholesterol levels thus reducing the risk of coronary artery disease.

Aims and Objectives: This study aims to highlight haemodynamic effects of meditation by studying its impact on blood pressure, heart rate and ECG.

Materials and Methods: The study was conducted on 100 healthy subjects (50 meditators and 50 non-meditators) from Brahma Kumari Ashram. They were further subgrouped on the basis of their sex, age and duration for which they had been practicing yoga. A detailed history was taken and detailed

general physical examination was conducted on all of them. Anthropometric measurements were taken. Systolic and diastolic blood pressures, heart rate and ECG was recorded in all of them. Data was collected and statistically analyzed to achieve the results.

Results: The mean heart rate, systolic blood pressure, diastolic blood pressure, heart rate were significantly lower in subjects who practised meditation regularly than in subjects who did not. ECG did not show any significant change except for decreased heart rate in meditators.

Conclusions: Coronary Heart Disease remains one of the most important causes of morbidity and mortality in Indian population. Yoga and Meditation, given its positive effects on physiology of human body, if practised regularly, can emerge as one of the important non-pharmacological method of prevention of heart disease.

Key Words: Coronary artery disease, Yoga, Meditation, Prevention, Regular practise

INTRODUCTION

Meditation is a technique of achieving harmony between the physical, mental, intellectual and spiritual personalities of man. Meditation is the highest spiritual discipline. Through meditation, man comes to experience peace within and without. The internecine wars between desires are ended, the conflicts between duties no longer wreck a meditator's nerves and the mind grows up to view life as a whole. (Meditation and Life, Swami Chinmayananda)

Rajyoga is one of the techniques of meditation. It involves concentration but no physical object is involved. The object of concentration is the inner self. Instead of repeating one word or a phrase as in a mantra, a flow of thoughts is encouraged, thus using the mind in a natural way. The positive flow of thoughts is based on an accurate understanding of the self and so it acts as a key to unlock the treasure trove of the peaceful experiences which are lying within oneself. (Practical Meditation, Brahma Kumaris, Ishwariya Vishwa Vidyalyaya.)

The increasing materialism in society is resulting in widespread tension in all the age groups. Tension is said to have two components: a controllable element arising from the factors in the environment and the in built uncontrollable residue which is a basic part of the human temperament. The effects of excessive stress can be either emotional, such as anxiety, hypochondria, phobia and obsessions or depressions or psychosomatic reactions like nervous asthma, headache, insomnia and even heart attacks. Relaxation is the only way to control undesirable nervous tension and its techniques require to be learnt [1].

A deadly combination of delineating obesity, hypercholesterolaemia, and hypertension has been identified to be strongly related to heart disease. In addition, physical inactivity, stress and behaviour patterns, male sex hormones and an untreated menopausal status are the risk factors for coronary artery disease [2].

A no. of drugs have been discovered, but drugs are accompanied by side effects and so, there is an extensive back to nature movement for the prevention and treatment of coronary artery disease. Meditation has a number of positive effects on the physiology of the human body. It has been shown to reduce the blood pressure, heart rate and the serum cholesterol levels, thus reducing the risk of coronary artery disease [3].

AIMS AND OBJECTIVES

This study was contemplated to highlight the haemodynamic and the biochemical effects of Rajyoga meditation by studying its impact on the blood pressure, heart rate and ECG. By adopting this non-pharmacological and not so difficult technique in their life style, people can lead a healthier life.

MATERIALS AND METHODS

This study was conducted on 100 healthy people who were selected from the Brahma Kumari Ashram, Amritsar. The subjects were categorised into two groups. Group I included 50 subjects (36 males and 14 females) in the age group of 25-50 years, who were performing rajyoga meditation regularly for at least 1 hour a day for the past 2-5 yrs. Group II included 50 subjects in the same

age group, who did not perform any meditation technique. In this group also, there were 36 males and 14 females.

Subjects having a history of hypertension, Diabetes mellitus, ischaemic heart disease, jaundice, alcoholism and smoking were not included in the study.

Each subject was subjected to a detailed physical examination, including pulse, its rate and rhythm volume, etc. A detailed cardiovascular examination was done in all the subjects.

The heart rate was counted with the stethoscope being kept over the apex for one full minute.

The blood pressure was checked by using a standard mercury sphygmomanometer and three consecutive readings were taken. The mean of the three readings was calculated. The readings were taken at an interval of 8 minutes.

A standard 12 lead ECG was recorded in all the subjects and all the necessary precautions were taken. The ECG was studied for the rate, rhythm, P wave, axis, ST segment and T wave.

The urine sugar and the blood sugar levels were calculated in each case.

Descriptive statistics of the mean, standard deviation and the percentages were used to display the continuous and the categorical variables of both the groups. One way analysis of variance (ANOVA) was applied to find the significance.

OBSERVATIONS

The mean values of age, height and weight in the meditators (group I) and in the non-meditators (group II) were 36.38+/- 7.92 years, 160.15 +/-6.22, 60.30+/-8.73 and 36.98+/-7.71, 159.74+/-5.98,63.10+/-9.11 respectively..

The mean age for the meditator males was 36.11+/-7.63 years and for the meditator females, it was 37.07+/-8.90. The mean value of height (in cms) in the meditator males and females was 162.22+/-5.98 and 154.82+/-2.69 respectively and the mean value for weight in the meditator males and females was 59.53+/-8.66 and 62.69+/-8.93. In the non-meditator group, the mean values for age, height and weight in the males and females was 37.44+/-7.93, 161.18+/-5.64,64.25+/-8.43and 35.79+/-7.23,154.43+/-2.68, 60.14+/-10.39 respectively [Table/Fig-1].

The meditator subjects were divided into three groups depending upon the no. of years of meditation which they had undergone. Group I included 16 subjects who were regularly doing meditation for the past 2-3 years. . Group II with 3-4 yrs of meditation had 18 subjects and Group III with 4-5 yrs of meditation had 16 subjects. The anthropometric measurements are shown in the Table [Table/Fig-2].

The heart rate, systolic and diastolic blood pressure and ECG were recorded in each subject.

The data which was obtained from these observations was statistically analyzed to elicit the results.

RESULTS

The mean heart rate in the meditators was 69.39+/-5.26 and in the non meditators, it was 81.96+/-3.53. The mean value for heart rate in the meditators was lower than the value in the non-meditators and it was statistically highly significant [Table/Fig-4].

The mean value of systolic blood pressure in the meditators was

118.37+/-7.25 and in the non-meditators, it was 128.15+/-10.05. This difference was also statistically highly significant.

Similarly, the diastolic blood pressure in the meditators was 78.62+/-4.71 and it was lower than the values in the non meditators, ie 84.50+/-4.83. This difference was also statistically highly significant.

In the standard 12 lead ECG which was recorded in case of the meditators and the non meditators , except for the heart rate as was stated earlier, it did not show any significant difference.

The heart rate and systolic and diastolic blood pressures in the meditator males and the non-meditator males were compared. The t values and the p values were calculated and the difference was found to be highly significant [Table/Fig-3].

Similarly, all the three parameters were compared in the non-meditator and the meditator females, the results were analyzed and the differences were found out to be highly significant [Table/Fig-4].

The mean values of heart rate, systolic blood pressure and diastolic blood pressure were compared between group I and group II, group II and group III and group I and group III. It was seen that the difference was not statistically significant in any of the comparisons. [Table/Fig-5] and [Table/Fig-6].

DISCUSSION

Coronary heart disease remains one of the major causes of mortality and morbidity in India. A number of risk factors have been identified to be strongly associated with coronary heart disease. Delineating obesity, hypercholesterolaemia, hypertension along with physical inactivity, stress and behaviour patterns, male sex hormones and an untreated menopausal status are the risk factors for coronary heart disease [2].

Meditation has a number of positive effects on the physiology of the human body. It has been shown to reduce the blood pressure, heart rate and the serum cholesterol levels and thus, the practice of meditation significantly helps in the management and the prevention of coronary artery disease by reducing the risk factors which are associated with the same.

The present study was contemplated to put forward some of the effects of meditation, especially the cardiovascular status of the individuals who practised the same in this part of the country.

The mean value for heart rate in the meditator subjects was 69.39+/-5.26 and in the non-meditator subjects, it was 81.66+/-3.66. The statistical analysis showed that the differences were highly significant ($p < 0.001$). In a study which was conducted in 1984 on 25 rajyogis, both males and females, by The Medical Wing of Rajyoga Education and Research Foundation, an overall decrease in the mean values of the heart rate, systolic and diastolic blood pressure and the respiratory rate was observed.

Meditation is associated with a blunted sympathetic activity as is shown by a reduction in the heart rate after regular meditation. Similar trends in the heart rate were noted in other studies [4,5].

The mean value for systolic blood pressure in the meditators was 118.87+/-7.25 and in the non-meditators, it was 128.15+/-10.05. Similarly, the mean value for diastolic blood pressure in the meditator subjects was 78.62+/-4.71 and in the non-meditator subjects, it was 84.50+/-4.83. Statistically, these results were found to be significant. ($p < 0.001$).

Group	Sex	Age (Yrs)		Height (Cms)		Weight (Kg)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Meditators	Male	36.11	7.63	162.22	5.98	59.53	8.66
	Female	37.07	8.90	154.82	2.69	62.29	8.93
Non meditators	Male	37.44	7.93	161.81	5.64	64.25	8.43
	Female	35.79	7.23	154.43	2.68	60.14	10.39

[Table/Fig-1]: Table showing anthropometric data of Males and Females of two groups

Groups	Age		Height		Weight	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
GroupI(16)	34.92	+/-8.53	159.65	±5.66	59.69	±7.41
GroupII(18)	33.13	+/-5.46	157.13	±4.76	62.13	±9.09
GroupIII(16)	40.38	+/-6.58	162.47	±7.18	60.38	±10.81

[Table/Fig-2]: Table showing anthropometric measurements of meditators divided into three groups

Parameters	Meditators n=36		Non Meditators n=36		t-value	p-value	Significance
	Mean	S.D.	Mean	S.D.			
Heart Rate Per min	67.72	3.95	82.17	3.29	16.99	<0.001	H.S.
SBP	114.78	4.95	126.67	6.20	9.06	<0.001	H.S.
DBP	77.67	3.72	84.22	3.34	7.92	<0.001	H.S.

[Table/Fig-3]: Table showing comparison of Heart Rate, Systolic Blood pressure (SBP), Diastolic Blood Pressure(DBP) in meditator and non-meditator males. H.S.= highly significant

Parameters	Meditators n=14		Non meditators n=14		t-value	p-value	Significance
	Mean	S.D.	Mean	S.D.			
Heart Rate	67.36	3.32	81.43	4.18	10.05	<0.001	H.S.
SBP	113.29	3.73	127.71	6.41	7.41	<0.001	H.S.
DBP	76.71	3.73	84.43	3.78	5.54	<0.001	H.S.

[Table/Fig-4]: Table showing comparison of Heart Rate, Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) In meditator and nonmeditator females. H.S. =Highly Significant

Parameters	Group I n=16		Group II n=18		Group III n=16	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Heart rate	67.19	±4.17	68.25	±2.49	68.00	±3.65
SBP	114.69	±4.16	112.75	±3.69	114.63	±4.66
DBP	76.92	±4.08	77.75	±3.45	78.00	±3.27

[Table/Fig-5]: Table showing mean values of Heart Rate, Systolic Blood Pressure (SBP) and diastolic Blood Pressure(DBP) in three groups of meditators

Parameters	Group I and Group II			Group II and Group III			Group I and Group III		
	t-value	p-value	Sig.	t-value	p-value	Sig.	t-value	p-value	Sig.
Heart rate	0.69	>0.05	N.S.	0.18	>0.05	N.S.	0.65	>0.05	N.S.
SBP	1.21	>0.05	N.S.	1.01	>0.05	N.S.	0.04	>0.05	N.S.
DBP	0.53	>0.05	N.S.	0.18	>0.05	N.S.	0.91	>0.05	N.S.

[Table/Fig-6]: Table showing results of comparison of Heart Rate, Systolic Blood Pressure (SBP), Diastolic Blood Pressure(DBP) in the three groups. N.S.= Not Significant

In similar studies, there was a significant reduction in the systolic and diastolic blood pressure, serum cholesterol and the incidence of ischaemic heart disease in the meditators [6,7].

It was reported that not only in hypertensive individuals, but in normotensive individuals also, the regular practice of meditation could reduce the ambulatory blood pressure levels and hence, it could give significant protection from cardiovascular diseases [8].

Improvements in the cardiovascular parameters in the present study were similar to those which were found in other studies on yoga [9-12]. The decrease in the diastolic and systolic blood

pressure and the heart rate may be because of the activation of the parasympathetic state [1]. Meditation, by modifying the state of anxiety, reduces the stress induced sympathetic overactivity, resulting in lowering of the diastolic blood pressure and the heart rate. It makes the person relaxed and thus decreases the arterial tone and the peripheral resistance [13,14]. This could be another reason for the fall in the diastolic blood pressure. Environmental conditions and a variety of behavioural factors such as stress, anxiety and the affective and attitudinal disposition of the individual influences the cardiovascular responses. The yogic exercises involve physical, mental and spiritual tasks which are performed in a comprehensive manner. Yoga, after a long duration, affects the

hypothalamus and brings about a decrease in the diastolic and systolic blood pressures through its influence on the vasomotor centre, which reduces the sympathetic tone and the peripheral resistance [13]. Yoga involves pranayama i.e. a voluntary alteration of the breathing pattern and scientists who were working on yoga found an increased parasympathetic tone in the yoga practitioners [15,16].

An attempt was made to study the effect of the duration of meditation on all the three parameters. On comparison of the intragroup values, no significant difference was found. Different studies stated that the benefits of meditation and relaxation could only be maintained by the regular practice and integration of these techniques in the day to day life [17]. Also, the amount of the practice of meditation does not correlate with the amount of blood pressure reduction after the training. Regular yoga and meditation is required to maintain positive effects on the blood pressure and the heart rate [18].

SUMMARY AND CONCLUSIONS

The present study was contemplated to put forth the effect of Rajayoga meditation on the heart rate, blood pressure and the ECG of persons who were practising the same and to compare them with those of non-meditators in the same age groups. The lower values for the mean heart rate and the systolic and diastolic blood pressure in the meditators indicated that the persons who practised Rajayoga regularly were at a lower risk of developing cardiovascular diseases as compared to those who did not perform any kind of meditation. Thus, Rajayoga meditation has positive effects on the cardiovascular system and this can be encouraged to be used as a non pharmacological method to prevent heart diseases.

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DECLARATION ON COMPETING INTERESTS:

No competing Interests.

Date of Submission: **Jul 25, 2011**
Date of peer review: **Sep 23, 2011**
Date of acceptance: **Nov 15, 2011**
Date of Publishing: **Dec 25, 2011**