

Study of effect of meditation on vital parameters like BP, respiratory rate and pulse rate

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Abstract

The aim of this study to study Meditation as a method of cost-effective practice for prevention and treatment of coronary heart diseases and other diseases, which are influenced by Vital parameters. Total 74 subjects in the age group of 45-55 years, of either sex were included in the study. The significant fall in pulse rate after meditation was 7.27, 7.34 and 7.3 min/ in females, in males and as a combined respectively. The significant fall in respiratory rate after meditation was 2.34, 2.24 and 2.3/min in females, in males and as a combined respectively. The significant fall in systolic blood pressure after meditation was 4.93, 5.03, and 4.98 mm of Hg in females, in males and as a combined respectively.

Keywords: BP, respiratory rate and pulse rate.

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INTRODUCTION

India is a rapidly developing country in the world. For centuries, in India, infectious diseases were the main cause of death. These infectious diseases were overcome by – proper immunization and improving health facilities. However, in the recent years, the picture has changed. The non-communicable diseases like obesity, hypertension, diabetes mellitus, cardio-vascular heart diseases, type-A personality disorder and psychoses are spreading like an epidemic in the developing countries like India. The non-communicable diseases are the new pandemic of the 21st century.¹ Meditation practices were widely practiced in ancient India. In this method, breathing exercises and mental concentration help the individual to attain control over the autonomic nervous system, resulting in optimization of homeostatic functions of the body and improving mental health. Meditation is

not restricted to any particular age group. It is therapeutic for patients but it is also practiced in normal individuals to keep them physically fit. The techniques once learned, call for self-training and constant practice and they do not require specific instrument or other equipment. The cost is therefore negligible. Meditation practices are ideal for protecting and promoting health.² The present study was undertaken to find out the effect of meditation in reducing the severity of risk factors in CHD. Effect on vital parameters like Pulse Rate, Blood Pressure, respiratory rate before and after “Meditation” two months programme is evaluated in the above study. A number of modified risk factors have been shown to be associated with these non-communicable diseases namely unhealthy diet, physical inactivity, type-A personality, cigarette smoking, alcohol intake, diabetes mellitus, hypertension, obesity and dyslipidemia. Cardio-vascular diseases (CVD) are being claimed as world’s public health enemy number one. Among the cardio-vascular diseases, a coronary heart disease (CHD) is the most important disease. I Modification of our present way of lifestyle with a low fat vegetarian diet and Meditation practices, dramatically reduce toll by these non-communicable diseases and reduce overall mortality in persons before 65 years of age. Various studies suggested that diet and Meditation breathing exercise as an affordable and cost-effective intervention for CHD prevention and control, instead of drug and other forms of management, which are often unaffordable for the common man³ Meditation

practices were widely practiced in ancient India. In this method, breathing exercises and mental concentration help the individual to attain control over the autonomic nervous system, resulting in optimization of homeostatic functions of the body and improving mental health. Meditation is not restricted to any particular age group. It is therapeutic for patients but it is also practiced in normal individuals to keep them physically fit. The techniques once learned, call for self-training and constant practice and they do not require specific instrument or other equipment. The cost is therefore negligible. Meditation practices are ideal for protecting and promoting health.² The present study was undertaken to find out the effect of Meditation in reducing the severity of risk factors in CHD.

MATERIAL AND METHODS

Meditation is practiced in quite place; eyes closed, observing you breathing. Repeatedly engaging the mind in observing the breathing as breath travels inside your body and comes out, Relaxes the mind.⁴ The present study was designed as a controlled trial. The study subjects were enrolled between 15th April 2008 to 15th June 2008. The active intervention period was one hour per day for two months. Each enrolled subject was followed for a period of 2 month during the intervention

programme. The present study was carried out at Examination Hall, M.G.M. Medical College and Hospital, Navi Mumbai. The training of Meditation was given by a Meditation teacher. This camp was free for all teaching and non-teaching staff of M.G.M. Medical College and Hospital, Navi Mumbai.

MATERIAL AND METHODS

Meditation will be performed in peaceful place, asking the subjects to Sit their silently in a comfortable position with closed eyes and take some deep breath. Ask them to focus their entire attention on the breathing and follow it as it travels inside you body and comes out. Follow the breath in its entire route pf inhalation and exhalation at least for 15-20minutes initially for 10 days and increasing time periods up to 1 hr. daily afterwards till the end of the camp. Method will be taught the participants and evaluated during the camp by an expert teacher of Meditation.⁴

Data analysis

In order to determine effectiveness of Meditation breathing exercises, the data before and after the two months programme were analyzed by Microsoft excel software for significant differences using paired 't' tests. A 'p' value < 0.05 was considered significant and 'p' value < 0.001 was considered highly significant.

OBSERVATIONS AND RESULTS

Table 1: Comparison of pulse rates/min before and after meditation

Parameter	Before meditation mean \pm SD	After meditation mean \pm SD	't'	'p'	Significance
Pulse rate (beats/min) In females (n=41)	80 + 5.67	72.73+5.01	18.17	<0.001	Highly Significant
Pulse rate (beats/min) in males (n=33)	79.76 \pm 4.43	72.42 \pm 4.14	20.95	<0.001	Highly significant
Pulse rate (beats/min) Combined (n=74)	79.89 \pm 5.24	72.59 \pm 4.61	26.61	<0.001	Highly Significant

Table 2: Comparison of average systolic blood pressure before and after meditation

Parameter	Before Meditation mean \pm SD	After Meditation mean \pm SD	't'	'p'	Significance
Systolic blood pressure (mm of Hg) in female (n=41)	122.+4.27	117.46 \pm 21	10.08	<0.001	Highly significant
Systolic blood pressure (mm of Hg.) in male (n=33)	122.6 \pm 4.37	117.57 \pm 4.57	8.73	<0.001	Highly significant
Systolic blood pressure (mm of Hg.) of combined (n=74)	122.49 \pm 4.29	117.51 \pm 4.35	13.33	<0.001	Highly significant

Table 3: Comparison of average diastolic blood pressure before and after meditation

Parameter	Before Meditation mean \pm SD	After Meditation mean \pm SD	't'	'p'	Significance
Diastolic blood pressure (mm of Hg) in female (n=41)	81.41 \pm 2.94	76.44 \pm 3.53	5.56	<0.001	Highly significant
Diastolic blood pressure (mm of Hg.) in male (n=33)	81.15 \pm 2.83	76.18 \pm 3.67	4.85	<0.001	Highly significant
Diastolic blood pressure (mm of Hg.) of combined (n=74)	81.30 \pm 2.87	76.32 \pm 3.57	7.38	<0.001	Highly significant

Table 4: Comparison of average respiratory rate before and after meditation

Parameter	Before Meditation mean \pm SD	After Meditation mean \pm SD	't'	'p'	Significance
Respiratory Rate/min. in female (n=41)	19.61 \pm 1.5	17.27 \pm 1.47	12.91	<0.001	Highly significant
Respiratory Rate/min.in male (n=33)	19.45 \pm 1.34	17.21 \pm 1.32	10.9	<0.001	Highly significant
Respiratory Rate/min.of combined (n=74)	19.54 \pm 1.43	17.24 \pm 1.39	16.87	<0.001	Highly significant

DISCUSSION

In developing countries like India, the rates of mortality from chronic and non-communicable diseases are moderately high compared with those in countries with well-developed market economics. The only rational way to tackle the problem is through the preventive activities, which should be aimed at promoting healthy life through Meditation breathing exercises.⁸ The present controlled trial shows the effect of Meditation breathing exercises in reducing the severity of risk factors in non-communicable diseases like cardiovascular diseases. Pulse rate (TABLE-II) It is observed from table -1, that the mean pulse rate in females, before meditation breathing practices was 80+5.68/min and after meditation breathing practices the mean pulse rate was 72.73+5.01 / min. In males, before meditation breathing exercises, it was 79.76+4.73/min and after it was 72.42+4.14/min. In combined, before meditation it was 79.89 + 5.24 / min and after meditation it was 72.59 + 4.61/min. The average fall in pulse rate was 7.27, 7.34 and 7.3 min/ in females, in males and as a combined respectively. This indicates decrease in pulse rate after meditation and it was found to be statistically significant ($p<0.001$). Yogic postures (asanas) and yogic breathing (meditation), meditation contribute for physical, emotional and mental relaxation which is responsible for decrease in pulse rate by possibly changing the reaction of individual to stress.⁹ Hence it can be said that meditation practice may be responsible for decrease in pulse rate of study subjects.

Blood Pressure (TABLE-III, IV)

It is observed from table – II that before meditation practices the mean systolic blood pressure in the female subjects was 122.39 + 4.27 mm of Hg and 117.46 + 4.21 mm of Hg respectively. In male subjects, the mean systolic blood pressure before meditation was 122.6 + 4.37 mm of Hg and after meditation it was 117.57 + 4.57 mm of Hg respectively. In combined effect, before meditation it was 122.49 + 4.29 mm of Hg and after meditation it was 117.51 + 4.35 mm of Hg respectively. The average fall in systolic blood pressure was 4.93, 5.03, and 4.98 mm of Hg in females, in males and as a combined respectively. This indicates decrease in systolic blood pressure after meditation and it was found to be statistically significant ($p<0.001$). It is observed from table No.III that, before meditation mean diastolic blood pressure in female subjects was 81.41+2.94 mm of Hg and after meditation it was 76.44+3.53 mm of Hg respectively. In males, before meditation it was 81.15 + 2.83 mm of Hg and after meditation it was 76.18 + 3.67 mm of Hg respectively. The average fall in diastolic blood pressure was 4.97. 4.97 and 4.98 mm of Hg in females, in males and as a combined respectively. This indicates decrease in diastolic blood pressure after

meditation and it was found to be statistically significant ($p<0.001$). The decrease in systolic and diastolic blood pressure was significant ($p<0.001$). It has been recognized that cardiovascular responses both normal abnormal can be influenced by different conditions of environment and wide variety of behavioral factors such as stress, anxiety and numerous effective and attitudinal disposition of the individual. Thus, chronic arousal of the hypothalamic emergency reaction with associated increased sympathetic nervous system activity is believed to lead to elevated systemic arterial blood pressure.¹⁰ Asanas, meditation may be responsible for alteration of behaviour which is associated with decreased sympathetic over activity that ultimately results in depression in blood pressure.¹¹ The sympathetic nervous system is one of the controlling factors of the rennin-angiotensin-aldosterone system. So meditation may be responsible for alteration of behaviour which was associated with decrease in plasma rennin activity and plasma aldosterone concentration leading to reduction in blood pressure.¹² Hence it can be inferred that meditation play important role in reduction of blood pressure.

Respiratory rate :(TABLE-V)

It is observed from table I V that, in the female subjects mean respiratory rate before meditation practices was 19.61+-1.5/min and after meditation practices was 17.27+-1.47/min. In male subjects, before meditation it was 19.45+-1.34/min and after meditation it was 17.24+-1.39/min respectively. The average fall in respiratory rate was 2.34, 2.24 and 2.3/min in females, in males and as a combined respectively. This indicates decrease in respiratory rate after meditation and it would found to be statistically significant. ($p<0.001$) Usually breathing is not a conscious event and is regulated automatically by bulbopontine respiratory control mechanisms, which are further modified by suprapontine mechanism in the conscious being. The pneumotaxic centre is supposed to relay suprapontine messages which promote voluntary inspiration and expiration. During daily practice of pranayamic breathing the basic activity of bulbopontine complex is modified in such a way as to slow down its rhythm, by voluntarily prolonging the phase of inspiration and expiration by stretching to their fullest extent, thus making respiratory apparatus to work to maximal extent.¹⁵ The sympathetic system is especially strongly activated in many emotional states. For instance, in state of rage, which is elicited mainly by stimulating the hypothalamus, signals are transmitted downwards through the reticular formation of brain stem and into the spinal cord to cause massive sympathetic discharge and all the sympathetic events occur immediately, increased arterial pressure, increased cellular metabolism, increased blood glucose concentration, increased muscle strength,

increased glycolysis in liver and in muscle, increased blood coagulation, increased respiration and increased heart rate. This is called as alarm reaction or flight or fight reaction. Many areas in the reticular substance and tractus solitarius of the medulla, pons and many nuclei control autonomic functions – most important functions are heart rate, arterial pressure and respiratory rate. Signals from hypothalamus and even from the cerebrum can affect the activities of almost all the brain stem autonomic control centers.¹³ It was observed that practice of yogic exercise causes considerable increase in alpha waves which indicate relaxation which cause decrease in pulse rate, respiratory rate and blood pressure. Also plasma cortisol levels are decreased and the plasma prolactin levels are increased after meditation. Studies indicate lessened adrenocortical activity and meditation thus reduces stress. There is also inhibitory effect on neuroendocrine axis.¹⁴ Thus it may be hypothesized that pranayamic breathing is responsible for decreased in respiratory rate by alteration in bulbopontine complex to a new pattern of breathing which is slower than the basal rhythm. It was observed that practice of yogic exercise causes considerable increase in alpha waves which indicate relaxation which cause decrease in pulse rate, respiratory rate and blood pressure. Also plasma cortisol levels are decreased and the plasma prolactin levels are increased after meditation. Studies indicate lessened adrenocortical activity and meditation thus reduces stress. There is also inhibitory effect on neuroendocrine axis.¹⁴

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