

A Comparative Study on Effect of Meditation on Arterial Blood Pressure amongst the Adult Population

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Abstract:

Introduction: As normal blood pressure is one of the most vital elements of health and it may be connected with the turbulence and calmness of mind, proper practice of meditation can control it.

Aim and Objective: To investigate the association between meditation and control of blood pressure.

Method: There was total 200 participant of which 100 were in the control group and rest 100 were in the study group. In each group 50 participants were male and 50 of them were female. We selected participants who were in between 45 to 55 of age who are the most vulnerable group for developing hypertension. We recorded the blood pressure of the participants for four times at every three months interval using the same blood pressure measuring device. All the data were collected by experienced technical person and at the end statistical analysis were done to compare the changes of blood pressure both systolic and diastolic. Students T test and ANNOVA tests were used for statistical analysis of the data for comparison.

Result: After analysis by T test it has been seen that the systolic as well as the diastolic blood pressure was changed towards the lower side significantly in the participants who were meditating regularly for at least one hour each day throughout the year.

Conclusion: With the result of the current study, we can conclude that practice of meditation can be used as a very safe alternative of antihypertensive drugs. However time to time measurement of blood pressure and other primary health check-up are advisable.

Keywords: Systolic Blood Pressure, Diastolic Blood Pressure, Meditation.

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Introduction

Meditation is a practice that trains the mind to achieve a state of inner peace and awareness. It primarily focuses on overall relaxation and mindfulness. Raj yoga is one of the techniques of meditation. It is all about peaceful concentration. The object of concentration is the inner self. Here a flow of positive thought is encouraged and mind is used in a natural way. The peaceful inner personality is discovered after proper practicing and the mental calmness develops and that is reflected in the physical elements of the body. As normal blood pressure is one of the most vital element of health it may be connected with the turbulence and calmness of mind, proper practice of meditation can control it.

Yoga and meditation techniques are practiced together more often in the recent world as people are now aware of different beneficial effect of these practices on health. 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 [1]. Hypertension is one of the most important chronic morbidities as well as risk factor for cerebrovascular and renal diseases. It is also a major cause of premature death worldwide. According to epidemiological studies it is seen that prevalence of hypertension is increasing in India mostly in adult population. Age is one of the non-modifiable risk factors for hypertension. The natural aging process gradually increases the arterial stiffness which leads to hypertension.

Hypertension is diagnosed if, when it is measured on two different days, the systolic blood pressure readings on both days is ≥ 140 mmHg and/or the diastolic blood pressure readings on both days is ≥ 90 mmHg. Meditation may control the blood pressure within normal range by its mind body relaxation effect. In the current study we have tried to find out if meditation has any notable effect on controlling the raising blood pressure without using any antihypertensives medicines. If it is an effective technique of blood pressure control, people

may take it as an alternative to long term use of antihypertensive drugs as well as they may get rid of the high cost of the medicines. Therefore the aim of the current study is to investigate if meditation controls blood pressure. If result is positive it can be a good choice of practice to control blood pressure.

Material and Methods

The study has been conducted in Diphu Medical College though the study population belongs to Kamrup Metropolitan district. This was a comparative study between two groups of hypertensive people who are still not using anti-hypertensive drugs as treatment. But one group enrolled themselves to meditation practice and the other groups choose neither to do meditation nor medicine. The effect of meditation on controlling the blood pressure was tried to evaluate with this study. There was total 200 participant of which 100 were in the control group and rest 100 were in the study group. In each group 50 participants were male and 50 of them were female. We selected participants who were in between 45 to 55 of age who are the most vulnerable group for developing hypertension. The target study group was divided into two groups and subjects of one of the two groups were enrolled in a meditation centre just after selection, while other group's subjects were allowed to continue their normal life style till the end of the study. Proper written consent was taken from each participant after explaining the study procedure verbally.

Exclusion criteria:

Any participant who was on antihypertensive medication prior to or after initiation of data collection was excluded from the study. Also participants who could not continue the proper meditation technique in the meditation centre were excluded from the study.

After excluding these participants applying the above criterion only 200 of them existed till the end

of the study which was included. The study was commenced in March 2023 and completed in March 2024.

The group which joined the meditation centre were practicing meditation (Raja yoga) regularly throughout the year for at least one hour every day. They were practicing the raja yoga under the guidance of experienced yogi of a brahma Kumari centre in Guwahati. We recorded the blood pressure of the participants for four times at every three months interval using the same blood pressure measuring device to exclude instrumental error. Moreover timing of measuring the blood pressure was preferably the morning hours of the day in order to avoid the diurnal variation of blood pressure.

All the data were collected by experienced technical person and at the end statistical analysis were done to compare the changes of blood pressure both systolic and diastolic. Students T test and ANNOVA tests were used for statistical analysis of the data for comparison.

Result

After collection of data from participants of both the group we performed the statistical analysis by using students T test to compare the first and last readings of systolic and diastolic blood pressure separately.

Also ANNOVA test was applied to compare changes of data collected at three months interval throughout the course of the study. After analysis by T test it has been seen that the systolic as well as the diastolic blood pressure was changed towards the lower side significantly in the participants who were meditating regularly for at least one hour each day throughout the year(table 1). On the other hand the systolic blood pressure was, increased in a significant manner in the male controls(table; 6) towards the end of the year while female controls have shown no significant changes in systolic as well as diastolic.

Table 1: Comparison of SBP and DBP before and at the end of one year of meditation practice in male and female participants

Gender	Mean systolic BP (1 st reading)	Mean Systolic (BP last reading)	T value	P value	At p<.05
Male	157.36	140.24	7.795	<.00001	Significant
	Mean diastolic BP (1 st reading)	Mean diastolic (BP last reading)			
Female	91.12	83.88	7.604	<.00001	significant
	Mean systolic BP (1 st reading)	Mean Systolic (BP last reading)	7.244	<.00001	significant
	146.78	134.76			
	Mean diastolic BP (1 st reading)	Mean diastolic (BP last reading)	7.033	<.00001	significant
	88.44	83.04			

Table 2: Comparison of SBP and DBP before and at the end of one year without meditation practice in male and female participants(control)

Gender/N	Mean systolic BP (1 st reading)	Mean Systolic (BP last reading)	T value	P value	At p<.05
Male 50	146.54	146.34	0.1331	0.447	Not Significant
	Mean diastolic BP (1 st reading)	Mean diastolic (BP last reading)	0.387	0.349	Not significant
	88.44	88.64			
Female - 50	Mean systolic BP (1 st reading)	Mean Systolic (BP last reading)	0.1818	0.428	Not significant
	146.26	146.58			
	Mean diastolic BP (1 st reading)	Mean diastolic (BP last reading)	0.387	0.349	Not significant
88.44	83.64				

Table 3: Comparing 4 readings systolic blood pressure changes at three months interval by One way ANNOVA test in male participants who did meditation practice

Sl no of readings	Mean SBP mmHg	SD	F ratio	P value	Significance at P<.05
1	157.36	10.50	25.106	<.00001	Yes
2	140.24	11.44			
3	146.58	8.94			
4	146.34	9.04			

Table 4: Comparing 4 readings of Diastolic blood pressure changes at three months interval by One way ANNOVA test in male participants who did meditation practice

Sl no of readings	Mean DBP mmHg	SD	F ratio	P value	Significance at P<.05
1	92.12	4.83	31.037	<.00001	Yes
2	83.88	2.84			
3	88.44	2.23			
4	88.64	2.22			

Table 5: Comparing 4 readings of systolic blood pressure changes at three months interval by one way ANNOVA test in male participants who did not practice meditation practice

Sl no of readings	Mean SBP mmHg	SD	F ratio	P value	Significance at P<.05
1	146.58	8.99	14.114	<.00001	Yes
2	157.36	10.50			
3	156.36	10.50			
4	156.36	10.50			

Table 6: Comparing 4 readings of Diastolic blood pressure changes at three months interval by One way ANNOVA test in male participants who did not meditation practice

Sl no of readings	Mean DBP mmHg	SD	F ratio	P value	Significance at P<.05
1	91.12	4.83	0.388	0.724	no
2	90.32	5.27			
3	91.12	4.83			
4	90.5	23.8			

Table 7: Comparing 4 readings of systolic blood pressure changes at three months interval by One way ANNOVA test in female participants who did not do meditation practice

Sl no of readings	Mean SBP mmHg	SD	F ratio	P value	Significance at P<.05
1	157.03	10.60	0.10607	0.9226	No
2	158.50	9.95			
3	158	10.42			
4	157.36	10.50			

Table 8: Comparing 4 readings of Diastolic blood pressure changes at three months interval by One way ANNOVA test in female participants who did not do meditation practice

Sl no of readings	Mean DBP mmHg	SD	F ratio	P value	Significance at P<.05
1	91.12	4.83	0.348	0.7899	no
2	90.97	5.27			
3	91.28	4.83			
4	90.9	4.07			

Table 9: Statistical comparison of P value and T value of both SBP and DPB between cases and control group

	Case TOTAL (100)				remark	Control total (100)				remarks
	Male(50)		Female(50)			Male(50)		Female(50)		
	SBP	DBP	SBP	DBP		SBP	DBP	SBP	DBP	
P value	<.0000	<.0000	<.0000	<.0000	Decrease significantly	0.447	0.349	0.42	0.34	No significant change
	1	1	1	1				8	9	
T value	7.795	7.604	7.244	7.033		0.133	0.008	0.42	0.34	
						1	7	8	9	

Discussion

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

In the current study we are trying to put forward the link between one of these modifiable risk factor hypertension and meditation as a controlling measure of blood pressure. It seen that all over the world studies are going on about this association and current study tries to examine if this fact in the local population of Kamrup district. Different studies stated that the benefits of meditation and relaxation could only be maintained by the regular practice and integration of these techniques of meditation in the day to day life [3].

Regular yoga and meditation is required to maintain positive effects on the blood pressure and the heart rate [4]. 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 [5].

The decrease in the diastolic and systolic blood pressure and the heart rate may be because of the activation of the parasympathetic state [6]. Meditation, by modifying the state of anxiety, reduces the stress induced sympathetic over activity, 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 [7,8]. 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 [9,10].

Improvements in the blood pressure in the present study were similar to those which were found in other studies on yoga [11-14]. 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 [3].

A similar study was carried out in Jalandhar Punjab by Seema M. where they concluded that Raja yoga regularly were at a lower risk of developing cardiovascular diseases as compared to those who did not perform any kind of meditation. Thus, Raja yoga 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.[15] . Also another study was carried out on Effect of Meditation on Heart Rate, Blood Pressure and Exercise Performance in Coronary Artery Disease Patients, in Maulana Azad Medical College and Associated GB Pant Hospital, New Delhi, India and their finding was similar to the current study which was concluded as meditation helps in improving health status of an individual including heart rate and blood pressure [16].

Limitations

The study has limitation in terms of investigation regarding cardiovascular health of the participants simultaneously. We may carry this type of study in a large community to make it more authenticate. However there is scope for further similar work to be done in a broader perspective.

Conclusion

Meditation reduces overall stress, promote relaxation and most importantly it activate the parasymp-

pathetics which are the background facts of controlling blood pressure by practicing proper method of meditation.

This link between meditation and blood pressure control may be beneficial for those mild to moderately hypertensive people who do not want to consume antihypertensive drugs because of side effects of them. If people practice meditation when they are normotensive than also it will remain in normal range unless other morbidity is added.

With the result of the current study we can conclude that practice of meditation can be used as a very safe alternative of antihypertensive drugs. However time to time measurement of blood pressure and other primary health check-up are advisable.

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