

## Can A Single 10 Minutes' Session Of Meditation Be Useful For Reducing Blood Pressure?

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**Abstract:** Introduction: There is substantial evidence on the usefulness of meditation for the reduction of blood pressure and stress. Regular practice of meditation improves cardiovascular and mental health. There are lots of documented evidences that meditation is effective in coronary artery diseases. Aims: The study was done to ascertain immediate effect of meditation on blood pressure profile in young healthy students. Methodology: Our study was done in 84 healthy students of 17-20 years of age group of Pramukhswami Medical College, Karamsad. In study group (n=42), students were asked to sit in quiet room and meditation was done for 10 minutes. In this group, blood pressure and heart rate were taken before the meditation and after the meditation. In control group (n=42), blood pressure and heart rate were taken initially then they were allowed to sit comfortably in quiet room for 10 minutes, after that again blood pressure and heart rate were taken. Results: In comparison to control group, in study group SBP, PP and MAP were significantly reduced after meditation from  $116.38 \pm 14.10$  to  $109.88 \pm 10.55$  ( $P < 0.05$ ),  $43.2 \pm 4.8$  to  $37.04 \pm 3.56$  ( $P < 0.05$ ) and  $67.6 \pm 7.96$  to  $61.32 \pm 5.88$  ( $P < 0.05$ ) respectively. But there is no significant reduction in DBP and HR in study group. In control group, there was no significant change in cardiovascular parameters. Conclusion: Meditation is useful for reduction of blood pressure and best way of life for healthy heart. [Hasmukh SNJIRM 2016; 7(4):73-76]

**Key words:** Meditation, blood pressure, Indian students.

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**Introduction:** Globally cardiovascular disease accounts approximately 17.5 million deaths per annum<sup>1</sup>. High blood pressure and hypercholesteremia are common risk factors for cardiovascular diseases. Mortality due to raised blood pressure is preventable by life style modification. Unhealthy life style is associated with prevalence of non-communicable diseases<sup>1</sup>. Life style modification is the best option for prevention of high blood pressure. Yoga and meditation are the best life style modification tools for prevention of cardiovascular diseases<sup>2</sup>. Meditation and yoga are used as effective adjunct therapy for prevention of hypertension and many researchers have documented it as a therapy and as a positive life style changing step<sup>2,3,4</sup>.

Meditation is a simple non-invasive method and one can perform at home without any cost and at own's convenient time. Meditation is helpful to solve basis of disease rather than only symptomatic relief. Meditation is one limb of yoga and it is effective for cardiovascular diseases by reducing blood pressure. Reduced sympathetic activity is seen in meditators<sup>5</sup>. Meditation is useful tool for reducing myocardial oxygen demand and overall metabolism of body<sup>5, 6</sup>. Keeping the same concept in mind, present study was undertaken to determine immediate effect of meditation on cardiovascular profile in healthy students.

**Methodology:** A cross-sectional study was conducted on 84 students of 17-20 years' age group after taking the approval of Human Research Ethics Committee. All participants were informed about the study protocol and their future usefulness to the society and informed consent was taken from each participants. Physically healthy and disease free participants were enrolled for the study. Participants doing regular exercise, yoga and meditation were excluded from the study. The recruited participants (study group, n= 42) were assessed for the effect of meditation in the evening at 5:00 pm in the Department of Physiology, Pramukhswami Medical College. Anthropometry, resting pulse rate and blood pressure were recorded prior to the meditation session.

**Body Composition:** The body composition was assessed in a standardized state of clothing. The body weight (Wt) was recorded bare footed to the nearest 0.5 kg. The height was measured using meter scale without footwear to the nearest 5 cm. BMI was calculated as the weight (kg) divided by the square of height ( $m^2$ )<sup>7</sup>.

**Recording of Resting Pulse Rate and Arterial Blood Pressure:** The participants were instructed to avoid the intake of tea, coffee, tobacco or any other stimulants for a period of at least 1 hour before the intervention. The participants were asked to empty

the bladder before the measurement and relax quietly in sitting position for a period of at least 5 minutes<sup>8</sup>. The heart rate (HR), Systolic blood pressure (SBP) and Diastolic blood pressure (DBP) were measured at the brachial artery from the left arm using the Omron T8 (HEM757A4-C1) Automatic Blood Pressure instrument by following all standard precautions. Resting pulse rate and blood pressure were recorded for three times at interval of 1 minutes till the difference between two consecutive reading is less than 5 mm Hg. The average of the three consecutive readings was used for data analysis. Pulse pressure (PP) was calculated using average SBP & DBP by standard formula (PP=SBP-DBP) and mean arterial blood pressure (MAP) was calculated from the formula (MAP= DBP + PP/3)<sup>8</sup>.

The participants underwent a 10-minute single meditation session after which pulse rate and blood pressure were recorded immediately.

**Meditation (Concentration Technique or Concentration-type Meditation):** Participants were guided for a concentrative-type meditation technique that uses the breath as an object of focus and does not require changes in personal or spiritual beliefs. The meditation technique involves having the participants sit upright in a comfortable position with eyes closed. Participants were instructed to focus on the movements of diaphragm while breathing -in slowly, deeply and in relaxed manner. Participants were instructed that if they found their attention shifting toward unrelated thoughts, ideas or images to simply acknowledge and accept them without making judgment about them and to shift their attention back to breathing<sup>9</sup>.

**Recording of pulse rate and blood pressure post-meditation:** Heart rate and blood pressure were

recorded immediately after meditation following all precautions.

**Rate Pressure Product (RPP)** is product of heart rate and systolic blood pressure. RPP is calculated by using formula:

$$\text{Heart rate} \times \text{Systolic blood pressure} / 100$$

**Control group:** These group of participants (n=42) didn't perform meditation and were made to sit in a silent room for the 10 minutes. Resting pulse rate and blood pressure were recorded in this group following all standard precautions. After 10 minutes of sitting in a silent room again pulse rate and blood pressure were recorded.

**Statistical Analysis:** The data was analyzed using Microsoft excel windows 8. The quantitative data was expressed as mean  $\pm$  SD. As the data was following Gaussian distribution paired t-test was used to analyze the difference between the variables before and after the meditation. The level of significance was accepted at  $p < 0.05$ .

**Results:** In our study, mean age of the participants in study group was  $18.09 \pm 0.43$  years and in control group was  $18.23 \pm 0.53$  years. Average body mass index of the participants in study group was  $20.37 \pm 1.28$  and control group was  $20.79 \pm 1.89$ . The participants in two groups did not show statistically significant difference in age and body mass index (BMI). Cardiovascular parameters between two groups are shown in Table I. In study group average SBP, PP and MAP were found to be lower after 10 minutes of meditation as compared to control group and they were statistically significant also. There was no reduction in HR & DBP after 10 minutes of meditation. In control group, there was no significant change in any parameters.

**Table 1: Cardiovascular parameters in both groups:**

	Study Group (n=42)		Control Group (n=42)	
	Pre-meditation	Post-meditation	Pre-meditation	No-meditation
HR	83.54 $\pm$ 16.01	85.4 $\pm$ 11	82.38 $\pm$ 10.86	83.78 $\pm$ 10.1
SBP	116.38 $\pm$ 14.10	109.88 $\pm$ 10.52**	115.5 $\pm$ 11.91	115.78 $\pm$ 12.38
DBP	73.14 $\pm$ 9.22	72.83 $\pm$ 6.95	72.83 $\pm$ 8.54	73.26 $\pm$ 8.07
PP	43.23 $\pm$ 4.88	37.04 $\pm$ 3.56**	42.66 $\pm$ 3.37	42.47 $\pm$ 4.3
MAP	67.61 $\pm$ 7.95	61.32 $\pm$ 5.88**	66.94 $\pm$ 6.22	66.89 $\pm$ 7.0
RPP	98.02 $\pm$ 26.49	94.02 $\pm$ 16.99	95.57 $\pm$ 18.86	97.41 $\pm$ 18.76

HR = Heart rate, SBP = Systolic blood pressure, DBP = Diastolic blood pressure,  
PP= Pulse pressure, MAP = Mean arterial blood pressure,

RPP = Rate pressure product

As per table II and table III, mean SBP, PP, MAP were significantly reduced in males and females of study group while RPP was reduced and statistically significant in males but not in females. In control

group, there was no change in cardiovascular parameters after sitting peacefully in silent room for 10 minutes.

**Table 2: Cardiovascular parameter in both groups of males**

	Study Group (n=21)		Control Group (n=21)	
	Pre-meditation	Post-meditation	Pre-meditation	No-meditation
HR	84.95 ± 16.26	85 ± 9.39	83.9 ± 6.85	85 ± 7.66
SBP	120.3 ± 8.35	111.52 ± 10.87*	119.42 ± 6.12	120.47 ± 6.89
DBP	74.09 ± 6.26	73.14 ± 5.43	74.09 ± 6.26	74.76 ± 5.80
PP	46.28 ± 9.22	38.38 ± 8.95*	45.33 ± 7.9	45.71 ± 8.03
MAP	70.98 ± 8.43	62.76 ± 9.29*	70.03 ± 6.76	70.63 ± 7.16
RPP	102.60 ± 21.89	94.34 ± 10.70*	100.28 ± 10.45	102.46 ± 11.59

**Table 3: Cardiovascular parameters in both groups of females**

	Study Group (n=21)		Control Group (n=21)	
	Pre-meditation	Post-meditation	Pre-meditation	No-meditation
HR	82.14 ± 16.02	85.80 ± 12.63	80.85 ± 13.76	82.57 ± 12.13
SBP	112.38 ± 17.45	108.23 ± 10.14*	111.57 ± 14.87	111 ± 14.81
DBP	72.19 ± 11.54	72.52 ± 8.34	71.57 ± 10.34	71.76 ± 9.75
PP	40.19 ± 8.30	35.71 ± 5.65*	40 ± 6.78	39.23 ± 6.41
MAP	64.25 ± 10.85	59.88 ± 6.33*	63.85 ± 8.98	63.15 ± 8.91
RPP	93.45 ± 30.26	93.71 ± 21.84	90.86 ± 23.94	92.37 ± 23.10

Values indicate mean ± SD. \* indicates P value < 0.05 and \*\* indicates P value < 0.01

**Discussion:** The study shows immediate effect of Concentration-type meditation on cardiovascular profile in Indian students of 17-20 years of age group. In our study, systolic blood pressure, pulse pressure and mean arterial blood pressure reduced significantly in study group immediately after 10 minutes of meditation. The findings of this study indicate that the meditation technique used probably affects the sympathetic activity to the heart and thereby lowers cardiac output and tends to decrease systolic blood pressure, pulse pressure and mean arterial pressure<sup>5, 6</sup>. This can be explained by the fact that as systolic blood pressure is decreasing without change in heart rate and diastolic blood pressure which indicates that probably the parasympathetic activity has not been influenced nor is the sympathetic activity to the blood vessels<sup>11, 12</sup>. But in our study there is significant reduction of SBP, MAP, and PP suggesting reduced sympathetic tone. Another reason for reduction in sympathetic tone and peripheral resistance is that meditation relieves stress and thereby relaxes individual which balances autonomic nervous

system<sup>5,6,11,12</sup>. Meditation detaches subject from the environment and level of anxiety comes to zero.

Blood pressure variables are reduced mainly because of reduced sympathetic activity to the cardiac musculature. There may be probability of reduced Sympathetic excitement during concentration-type meditation technique. Hence the load on heart due to sympathetic excitement is reduced resulting in reduced blood pressure variables. In our study, RPP decreased in study group as compared to control group. Rate pressure product (RPP) is a product of systolic blood pressure and heart rate. It is a better index of MVO<sub>2</sub> and this is an indirect indicator of myocardial oxygen consumption and load to the heart<sup>5</sup>. In study group, after 10 minutes of meditation RPP is decreased significantly in males and it proves that meditation is useful tool for reduction of myocardial oxygen consumption and thereby load to the heart also<sup>5,13,14</sup>. The reduction in RPP after meditation shows better autonomic regulation of

heart in meditators. This can also prove that reduce sympathetic drive to the heart.

In our study diastolic blood pressure was also reduced but it was not significant. But we assume that if we meditate for long time there may be significant reduction in DBP also. Vyas R et al observed that diastolic blood pressure was significantly lower in both short and long term meditators of Raja Yoga meditation as compared to non-meditators<sup>15</sup>. Though reduction of diastolic blood pressure is not so significant but it is useful to make preventive strategy. In our study, heart rate is increased after the meditation which is statically not significant and this is supported by Telles S et all, who have shown increased heart rate during meditation as compared to non-meditation period.

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