

RESEARCH ARTICLE

Effects of meditation compared with effects of meditation with autosuggestion on cardiovascular variables and autonomic functions – An analytical study

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ABSTRACT

Background: Primordial prevention of hypertension is a public health concern. Health benefits of meditation in reducing blood pressure (BP) are well documented by various studies. However, effects of autosuggestion a form of self-hypnosis are not much studied. **Aim and Objective:** Our study intends to know the effects of meditation and added autosuggestion on cardiovascular variables and autonomic functions. **Materials and Methods:** About 60 students aged 17–20 years were selected and divided into two groups randomly. Group A was made to practice meditation and Group B meditation with autosuggestion for 3 months. Physiological parameters such as heart rate, BP, postural changes in BP, and R-R interval were recorded before and after 3 months of practice. **Results:** We found a statistically significant change in both groups in all the physiological parameters after the practice of meditation and also with practice of meditation with autosuggestion. The group that practiced meditation with autosuggestion showed a greater effect on postural changes in BP. **Conclusion:** These observations suggest that meditation helps to improve the cardiovascular efficiency and homeostatic control of the body, meditation with autosuggestion has an added benefit.


KEY WORDS: Meditation; Autosuggestion; Blood Pressure; Heart Rate variability

INTRODUCTION

Hypertension represents one of the single greatest preventable cause of death in humans and is one of the most important modifiable risk factors for cardiovascular diseases.^[1] Studies have shown that for a reduction of 10 mmHg in systolic

blood pressure (SBP) or 5 mmHg in diastolic blood pressure (DBP), the relative risk of coronary heart disease was reduced by 22–25%. Risk of stroke was reduced by 36–41%.^[2]

Meditation has a number of positive effects on the physiology of the human body.^[3] Meditative interventions have been found to be beneficial in treating various clinical conditions such as hypertension,^[4] cardiovascular disorders,^[5] pain syndromes, musculoskeletal diseases^[6] and respiratory disorders such as asthma and chronic obstructive pulmonary disease;^[7] dermatological problems such as psoriasis and allergies;^[8] and immunological disorders.^[9] Affirmations or autosuggestions are positive self-talk or talking to yourself in a positive manner. Continually making positive statements

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about how you want your life to be, such as “I am” or “I have.” According to Louise Hay “Affirmations that are used consistently become beliefs and will always produce results, sometimes in ways that we cannot even imagine.^{[10,11]”}

The aim of our study is to find the effects of meditation on cardiovascular health, also to compare the effect of autosuggestion inculcated in meditation practice.

MATERIALS AND METHODS

The study was conducted in Mysore Medical College and Research Institute, Mysore. Permission from ethics committee: Ethical clearance was obtained from “Mysore Medical College and Research Institute Ethical Committee for Research.”

Sixty subjects, including males and females, studying in 1st MBBS were selected randomly. Students who volunteered for the study, in the age group of 17–20 years, were included in the study. Students who had any systemic illness, undergone major surgeries, history of consumption of alcohol or tobacco in any form, and practiced yoga or meditation previously were excluded from the study. An informed consent was obtained from the study participants.

Subjects were divided into two groups of 30 each; Group A practiced 10 min of loosening exercise, 5 min of breathing exercise and 15 min OM meditation. Group B practiced 10 min of loosening exercise, 5 min of breathing exercise and 10 min OM meditation and 5 min of autosuggestion. Training was provided in the evening at 4.15 pm–5.00 pm 6 days a week using a pre-recorded CD. First 3 months, Group A was given meditation training. This was followed by training for Group B for 3 months meditation and autosuggestion. The test parameters were assessed before beginning the training and once again after 3 months of meditation practice.

Heart rate (HR) and BP were recorded using a digital electronic BP monitor (displays both HR and BP) manufactured by Microlife AG, Switzerland. Model no: bp-3 ac1-4m. Postural changes in BP were recorded from supine to standing, immediately within 30 s using the same digital electronic BP monitor. Digital electronic BP apparatus was used so that BP could be taken immediately within 30 s. The digital machine was calibrated and standardized regularly using a mercury sphygmomanometer.

R-R interval was measured using HR variability (HRV) analyzer. A biopotential two electrode system was used. The data acquisition system had a project rate of 8000 hz. Electrodes were placed on the right arm and left foot and lead II electrocardiogram was recorded. It was processed by HRV analysis software. Recordings were standardized and

instructions followed as per the guidelines of Task Force of the European Society of Cardiology.^[12]

Statistical Analysis

Descriptive statistics was calculated for individual statements as well as the total scores for each component. A paired sample *t*-test was applied for analyzing differences within the groups. ANOVA was applied to compare the results between the two groups. Statistical calculations were done using SPSS software version 16.0.

RESULTS

Physical characteristics of the 30 subjects are – in Group A, 14 (46.7%) males and 16 (53.3%) females and in the Group B, 14 (46.7%) males and 16 (53.3%) females are tabulated in Table 1. The two groups had similar physical characteristics.

Test parameters HR, BP, postural changes in BP, and HRV were measured before and after 3 months of meditation practice. The results were compared and statistically analyzed within each group and between the two groups. The mean, standard deviation, *t* and *P* values of HR, SBP, DBP, postural changes in BP, and R-R interval were tabulated in Tables 2 and 3.

There was a significant decrease in HR by ~ six beats/min in Group A and seven beats/min in Group B. When the two groups were compared, Group B had a greater decrease in HR but it was not statistically significant [Table 4].

In Group A, SBP decreased by ~ 4 mm of Hg and DBP decreased by ~ 3 mm of Hg after meditation practice for 3 months, In Group B, SBP decreased by ~ 6 mm of Hg and DBP decreased by ~ 4 mm of Hg after meditation with autosuggestion practice for 3 months, both the groups had a statistically significant ($P = 0.001$) reduction in BP. However, repeated measure ANOVA did not show significant difference between the two groups [Table 4]. With change in posture from supine to standing, there was statistically significant reduction in SBP and DBP. In Group A, the difference in SBP on standing before and after intervention was ~3 mm of Hg and DBP was ~ 5 mm of Hg. In Group B, it was ~11 mm of Hg and ~9 mm of Hg, respectively, both were statistically highly significant ($P = 0.001$). Repeated measure ANOVA

Table 1: Physical characteristics of the subjects

Variables	Group A		Group B	
Gender				
Male	14	-	14	-
Female	16	-	16	-
Age in (years)	18.4	-	18.13	
Height (cm)	158.83	±10.37	161.57	±11.65
Weight (kg)	52.8	±8.2	57.57	±14.23

Table 2: Physiological variables before and after meditation Group A

Variables	Pre-meditation Mean±SD	Post-meditation Mean±SD	t-test	Significance
HR (b/m)	79.77±9.15	73.93±11.24	4.046	0.0001**
SBP (mm of Hg)	118.53±6.36	114.56±5.06	4.765	0.0001**
DBP (mm of Hg)	73.73±5.03	70.23±4.70	7.460	0.0001**
STSBP (mm of Hg)	116.20±8.89	113.67±6.78	1.384	0.001*
STDBP (mm of Hg)	72.80±5.29	67.90±4.61	4.732	0.0001**
RRINT	0.76±0.09	0.81±0.12	-3.773	0.001*

* $P < 0.05$: Significant difference; ** $P < 0.01$: Highly significant difference. HR: Heart rate, SBP: Systolic blood pressure, DBP: Diastolic blood pressure

Table 3: Physiological variables before and after meditation with autosuggestion Group B

Variables	Pre-meditation with autosuggestion Mean±SD	Post-meditation with autosuggestion Mean±SD	t-test	Significance
HR (b/m)	77.43±6.83	70.57±5.11	5.739	0.0001**
SBP (mm of Hg)	118.87±7.03	112.53±6.49	6.393	0.0001**
DBP (mm of Hg)	74.27±7.59	70.16±3.98	4.684	0.0001**
STSBP (mm of Hg)	120.4±6.23	109.53±6.53	8.513	0.177
STDBP (mm of Hg)	78.73±5.44	69.16±4.33	11.431	0.0001**
RRINT	0.78±0.07	0.85±0.06	-0.725	0.001*

* $P < 0.05$: Significant difference; ** $P < 0.01$: Highly significant difference. HR: Heart rate, SBP: Systolic blood pressure, DBP: Diastolic blood pressure

Table 4: Comparison of physiological variables after intervention in Group A and Group B

Variables	Group A	Group B	Significance
HR (b/m)	73.93±11.24	70.57±5.11	$P=0.583$
SBP (mm of Hg)	114.56±5.06	112.53±6.49	$P=0.106$
DBP (mm of Hg)	70.23±4.70	70.16±3.98	$P=0.548$
STSBP (mm of Hg)	113.67±6.78	109.53±6.53	$P=0.0001$
STDBP (mm of Hg)	67.90±4.61	69.16±4.33	$P=0.001$
RRINT	0.81±0.12	0.85±0.06	$P=0.413$

HR: Heart rate, SBP: Systolic blood pressure, DBP: Diastolic blood pressure

was applied to find the effects between the two groups which showed a statistically significant difference in the reduction in DBP [Table 4].

There was increase in HRV and R-R interval increased from 0.76 ± 0.09 to 0.81 ± 0.12 (statistically significant $P = 0.001$) in Group A and from 0.78 ± 0.07 to 0.85 ± 0.06 (statistically significant $P = 0.001$) in Group B, which indicates an improved autonomic tone. Repeated measure ANOVA did not show a significant difference ($P = 0.413$) when compared between the two groups [Table 4].

On analysis of the above results decrease in HR and BP, increased HRV indicates an increased parasympathetic tone, and reduced SBP and DBP with a change in posture indicates a reduced sympathetic activity.^[13]

DISCUSSION

The major findings in our study were after meditation and also after meditation with autosuggestion there was a

statistically significant reduction in HR, SBP, and DBP. There was decrease in systolic and diastolic pressure with change in posture from supine to standing and there was statistically significant increase in R-R interval depicting HRV.

When both the groups were compared with each other, the group that practiced meditation with autosuggestion showed a statistically significant difference on effect on postural changes in BP. There was a greater decrease in the other study parameters in Group B compared to Group A, but they were not statistically significant.

Studies have shown for a reduction of 10 mmHg in systolic or 5 mmHg of DBP, the relative risk of coronary heart disease was reduced by 22%, and risk of incidence of stroke was reduced by 41%.^[14] The results of our study are consistent with several other studies done on hypertensive and normotensive individuals by Maini *et al.* (2011),^[15] Dillbeck and Orme-Johnson,^[16] Barnes *et al.*,^[17] and others who have shown reduction in the mean HR, SBP, and DBP, in subjects who practiced meditation regularly than in subjects who did not.^[18]

Our study is consistent with the other studies done on meditation. Meditation with autosuggestion also showed significance. The limitation of our study is that we did not find if autosuggestion alone had any health benefits. Moreover, the effect of autosuggestion on regular yoga and meditation practitioners is not studied, which remains as a scope for further study.

CONCLUSION

Meditation, by modifying the state of anxiety, reduces stress-induced sympathetic overactivity, resulting in the lowering

of the DBP and the HR. It makes the person relaxed and thus decreases the arterial tone and the peripheral resistance.^[19,20]

During meditation, meditator brings the mind to a pointed focus which could be the person's breath or a single object, which in turn reduces the thoughts in mind and hence reduces sympathetic activity. This results in the reduction in HR and vasodilatation which in turn reduces total peripheral resistance. Hence, meditation helps to improve cardiovascular efficiency and homeostatic control of the body. Regular practice of meditation provides a significant beneficial role in the primordial prevention of heart disease and stroke which indeed improves human health and quality of life. Meditation with autosuggestion has an added benefit. Autosuggestion which is known to improve cognition may be more effective in psychotherapy as a tool for gaining personal insight.

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