

Effect of OM meditation on autonomic functions in healthy young individuals

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Abstract

Background: Meditation practices mainly change functions through autonomous nervous systems, which links brain and body. Meditation is a technique of yoga practiced in India over thousands of years. Long term yogic practices have shown improvement in cardiovascular functions. OM chanting meditation is a concentrative type of meditation involving focusing of attention on breath.

Aims and Objectives: to study effect of OM meditation on autonomic functions in healthy young individuals.

Materials and Method: 30 healthy individuals in age group 18-20 years were selected. The group selected is divided in 2 subgroups, Dhayana group performs OM meditation and control group sitting with eyes closed. Autonomic function parameters heart rate, blood pressure, respiratory rate, GSR are recorded in both groups.

Results: Heart rate, respiratory rate, blood pressure are reduced during meditation session and GSR increased suggesting parasympathetic dominance.

Conclusion: Study shows regular practice of OM meditation would be helpful in increasing cardiorespiratory efficiency. There is parasympathetic nervous system dominance during and after OM meditation.

Keywords: Yoga, OM meditation, Galvanic skin resistance, Heart rate, Blood pressure.

Introduction

Meditation practices mainly change body functions through Autonomic nervous system, which links brain and body. It is achieved by excersing the techniques like meditation, yoga, pranayam. Yoga is best lifestyle modification which aims to attain the unity of mind body and spirit.⁽¹⁾ Concentrative meditation focuses the attention on the breath. Breath is a dynamic bridge between the body and mind.⁽²⁾ OM meditation is a concentrative meditation. Studies on OM meditation suggest that mental repetation of OM results in a physiological state at one time characterised by reduced physiological alertness, increased sensitivity, synchronicity as well as changes at specific levels along the auditory pathway suggestive of increased sensitivity to sensory transmission.⁽³⁾ According to Padma purana the syllable AUM is leader of all prayers A stands for awareness, U for understanding and M for meditation. The word meditation is derived from latin word meditari which means to engage in contemplation or reflection. The present study design aims to find the effect of OM meditation on cardiac and respiratory functions as reflected in heart rate, respiratory rate, blood pressure, and GSR.

Materials and Method

30 healthy individuals in age group 18-20 were selected. The study group is selected based on following inclusion and exclusion criteria.

Inclusion criteria: Age 18-20 years

Has given written consent.

Have no acute or chronic illness.

Are not on any medication at time of study

Exclusion criteria: Individuals with

Known cardiorespiratory diseases

Known allergic diathesis

History of alcohol consumption, cigarette smoking.

Known psychological disorders.

The selected group of 30 students were explained regarding the procedure and a written consent is taken. The group thus selected is divided equally into 2 subgroups on random basis (each group consists of 15 students). Each of these sub group are made to get familiarised with procedure of recording of cardiorespiratory autonomic parameters with the polyrite.

“Dhyana” group: performs a targeted thinking task – OM meditation.

“Control” group: performing a non-targeted task – sitting relaxed with eyes closed.

Dhyana group having no earlier experience of meditation is trained in meditation for duration of 3 months. This supervised training is given for a duration of 30 minutes daily in evening hours (4-5pm) of which 20 minutes are spent in meditation and remaining 10 minutes spent in relaxation(5 minutes preceding the meditation and 5 minutes post meditation). Meditation involves mental chanting of OM, while sitting comfortably with eyes closed. The control group subjects are also studied in control sessions which are of same duration as the meditation session and similar in design except that 20 minutes period is spent sitting relaxed with eyes closed and non-targeted thinking instead of meditation.

Three months following the training, the autonomic function parameters (HR, RR, BP, GSR) are recorded in both groups using computerised 8 channel

polyrite(RMS-polyrite, version 1.0) during morning hours (8-9 am).

Recording of physiological parameters.

Heart rate: Before the test was performed subjects were allowed to lie down for 5 minutes in supine position on couch. ECG leads were connected from subjects to the polygraph (8 channel) for recording of lead ECG (using leads provided in the polyrite connected to hardware). The basal lying down heart rate of subjects was noted. This was repeated 3 times at interval of 5 minutes and mean of 3 readings was taken.

Blood pressure: It was recorded using mercuric sphygmomanometer provided along with polyrite connected to hardware, which converts analogue signal to digital and records same in digital form. Pulse pressure = systolic –diastolic blood pressure. Mean arterial pressure=diastolic+1/3pulse pressure were calculated for each reading. 3 blood pressure reading with 1 minute interval were performed and lowest of them was expressed as resting SBP, DBP, MAP, PP(mm of Hg).

GSR: Galvanic skin resistance is recorded using specially designed metal plates placed in contact with volar surface of the distal phalanges of left index and ring fingers provided with polyrite. Prior to reading of the GSR the subjects sat with eyes closed and relaxed for 3-4 minutes. When a normal and relaxed breathing was achieved, GSR recording was taken for period of 3 minutes as this polygraph gives a continuous monitoring of GSR.

Respiratory rate: RR was counted as breaths per minute.

Statistical Analysis: Clinical parameters were compared in study and control group before meditation and post meditation by performing paired t test. SPSS software is used for data analysis.

The interpretation of P value are as follow

P>0.05-not significant

P <0.05-significant

P <0.01- highly significant.

Results

Heart rate: Table shows heart rate in study and control groups pre and post meditation. HR decreased in both dhyana and control groups post meditation, but it was more decreased in dhyana group than control group.

The difference in HR was statistically significant in between 2 groups(p=0.001).

Respiratory rate: It decreased in both groups post meditation but it was more decreased in dhyana group. This difference between 2 groups is statistically significant(p=0.001).

Systolic and Diastolic blood pressure: There was decrease in SBP and DBP post meditation in both groups. But this was not significant in dhyana group as compared to control group(p=0.1683). Mean arterial pressure decreased in both group post meditation, but it decreased more in dhayna group.

GSR: Galvanic skin resistance increased in both groups post meditation, but increase was more in dhayna group.

This shows HR, RR, BP decreased after OM meditation and GSR increased.

Parameter	Study (Dhyana) Group				Control Group		
	Pre meditation	Post Meditation	P Value	Significance	Pre meditation	Post meditation	P Value
HR (heart rate)	91.46±9.12	76.80±5.89	0.001	Highly significant	89.33±8.87	87.73±9.12	0.6300
SBP (Systolic blood pressure)	123.46±5.57	116.13±5.47	0.0011	Highly significant	121.20±13.45	122.20±11.13	0.9972
DBP (diastolic blood pressure)	75.20±5.28	72.40±5.56	0.1683	Not significant	76.93±5.84	76.67±6.07	0.9057
MAP (mean arterial pressure)	91.28±4.19	86.97±4.06	0.0079	significant	91.86±7.01	91.48±7.25	0.8850
RR (respiratory rate)	19.33±2.02	15.93±1.57	0.0001	significant	20.26±2.52	19.8±1.93	0.579
GSR (galvanic skin resistance)	189.63±86.45	256.51±85.33	0.0419	significant	186.44±63.28	216.95±78.93	0.2526

Table: Various parameters in dhyana and control group (pre and post meditation)

Discussion

The significant decrease in heart rate, blood pressure, respiratory rate, after OM meditation practice in present study is in accordance with findings of other studies on physiological effect of meditation practice in

healthy individuals.⁽⁴⁾ The present study revealed a significant decrease in heart rate during mental chanting of OM compared to control group which is suggestive of psychophysiological relaxation. In present study a highly significant reduction in heart rate, systolic and

diastolic pressure can be attributed to modulation of autonomic activity with parasympathetic predominance and relatively reduced sympathetic tone. This autonomic modulation in yoga is mediated through modification of breathing which triggers central and autonomic mechanism and hemodynamic adjustments.⁽⁵⁾ OM meditation by modifying state of anxiety reduces stress induced sympathetic over activity, thereby decreasing arterial tone and peripheral resistance resulting in lowering of diastolic blood pressure and heart rate.⁽⁶⁾ OM chanting slowed respiration to almost 5 breaths/minute. In present study significant reduction in respiratory rate can be explained on basis of altered mental state, reduction in sympathetic activity or inhibition of neural activity. By practicing OM meditation for few weeks, the bulbopontine complex is adjusted to a new pattern of breathing which is slower than basal rhythm causing decrease in respiratory rate.⁽⁷⁾

GSR is a type of electrodermal response. It is a transient change in certain electrical properties of skin associated with sweat gland activity. GSR is a method of capturing the autonomic nerve response as a parameter of sweat gland function.⁽⁸⁾ Present study showed marked increase in GSR in individual during OM meditation compared to non meditator. It is well established that skin resistance decreases in state of anxiety or stress and increases during relaxation. State of relaxation are accompanied by high skin resistance.⁽⁹⁾

Chanting OM mentally causes increased alertness. Diseases like diabetes mellitus type 2, hypertension, asthma, some psychiatric conditions, epilepsy have been assessed by meditation studies and some researchers found beneficial effects in patients doing regular OM meditation.⁽¹⁰⁾ Decrease in heart rate and diastolic BP was observed which indicates a shift in balancing components of autonomic nervous system towards parasympathetic state, reduced stress induced sympathetic overactivity resulting in a lowering of diastolic blood pressure and heart rate. It makes subject undergo relaxation and thereby decreases arterial tone and peripheral resistance. Some research shows an elevated Beta endorphin level in person doing regular meditation that may be responsible for relaxed and calm state of regular meditation and also boost immunity.⁽¹¹⁾

Conclusion

We concluded that regular practice of OM meditation for 20 minutes would be helpful in increasing cardiorespiratory efficiency. The results of study demonstrates reduction in blood pressure, heart rate and increased GSR indicating parasympathetic nervous system dominance after OM meditation. This would help in preventing or treating various psychosomatic and other respiratory diseases. Study justify that incorporation of OM meditation as part of our lifestyle in promoting health and preventing age related cardiovascular diseases.

Conflict of interest: Nil

Source of funding: Nil

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