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Original Research Article

Effect of Meditation on Heart Rate and Blood Pressure

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Abstract

Meditation is a technique of achieving harmony between the physical, mental, intellectual and spiritual person alities of man. Meditation has a number of positive effects on the physiology of human body. It has shown to reduce diastolic blood pressure , systolic blood pressure, heart rate. The present study was done to know the effect of meditation on heart rate and blood pressure in healthy volunteers above the age of 30 years. The cardiovascular status of the subjects was assessed clinically in terms of resting heart rate and blood pressure before the start of meditation practice and again after 4 months of practice of meditation. The results were compared and analysed.. From the study it was observed that significant reduction in the heart rate occurs in the subjects practicing meditation ($P < 0.001$). The systolic blood pressure was lowered to a highly significant level ($P < 0.001$). The diastolic blood pressure was reduced significantly ($P < 0.001$). From our study, it can be concluded that regular meditation increases parasympathetic dominance in our body. This result in better cardiac reserve in meditators compared to non-meditators. Meditation provides significant improvements in physiological cardiovascular functions by tilting of autonomic balance from sympathetic in favour of parasympathetic.

Keywords: Meditation, Heart Rate, Blood Pressure.

Introduction

Meditation is a complex phenomenon that involves several coordinated, cognitive processes and autonomic nervous system alterations. Meditation as a form of therapy may facilitate positive effect resulting in a sense of physical and mental well being in patients [1]. Meditation has entered the mainstream of health care as a method of stress and pain reduction. In the recent years there has been a growing interest within the medical community to study the physiological effects of meditation [2-5]. Meditation is recognised as a calm state of mind with parasympathetic dominance in the body Regular meditators may experience a calm & hypo-metabolic state with parasympathetic dominance. Some studies shows beneficial effects in controlling blood pressure in hypertensives. The meditation is the method of extending our ordinary consciousness and thereby discovering more about ourselves. When we gain this insight, we can change our habits and our deeper, inner personality has a better chance to show through. Our whole life changes for the better. Meditation is the technique of turning down the brilliance of the day so that the subtle sources of energy can be perceived within. Meditation has always been a subject of intense exploration amongst scientists. It has been stressed that the physiology of meditation differs from that of ordinary rest with eyes closed and from that of most hypnotic states. Further, during meditation, deep physiological relaxation, somewhat similar to that occurring in the “deepest” non-rapid-eyemovement (NREM) sleep phase occurs in a context of wakefulness [6]. Wallace et al., termed meditation a “wakeful, hypometabolic state of parasympathetic dominance” [7]. Meditation techniques have also been used for counseling and psychotherapy, as it has been proved that it reduces stress and anxiety. Meditation produces mental and physical relaxation. From physiological point of view, meditation can induce an altered state of consciousness, corresponding to altered neuro physiologic states. Meditation has been practiced all over the world, to increase calmness and physical relaxation, to improve psychological balance, to cope with illness, or to enhance overall health and well-being. Concentration is focusing our mind on an object or theme. When the concentration becomes continuous and deep and the goal is higher spiritual idea, it becomes Meditation. Meditation practices are beneficial for the brain’s self-regulation and control by increasing activity in the anterior cingulate cortex. Meditation is associated with bringing relief in depression and anxiety, and guiding us towards happiness, relaxation, and emotional balance [8].

Empathy and compassion are higher in those who practice meditation regularly. These attributes of meditators come from activity in the amygdala— the part of the brain that processes emotional stimuli. Other systematic reviews and meta-analysis [9] show that mindfulness meditation has many mental health benefits such as bringing about reductions in depression symptoms. Long term meditation has been shown to change brain anatomical structure like grey matter concentrations and the precuneus [10]. Several researches have shown that meditation serves as a neuroprotective factor that slows age-related brain atrophy [11]. The autonomic nervous system is a part of nervous system which control subconsciously and regulates bodily functions such as the heart, digestion, blood vessels, respiratory rate, pupillary reflexes, urinary bladder and all internal viscera. The sympathetic nervous system is considered to be 'fight or flight' system, while the parasympathetic nervous system is considered the "rest and digest" system. Disturbances of the autonomic nervous system play an important role in the pathogenesis and clinical course of many diseases. Various procedures have been described to monitor autonomic dysfunction. Present study was aimed to assess the effect of meditation on blood pressure and heart rate.

Materials and Methods

30 healthy volunteers above the age of 30 years and below 60 years performing meditation regularly were included in the study. All the volunteers were clinically examined to rule out any systemic diseases. The study protocol was explained to the subjects and written consent was obtained. The same subjects were chosen as both study and control group in order to minimize the confounding factors. Before recording the parameters, the subject was asked to relax physically and mentally for 30 minutes. The blood pressure was recorded with the sphygmomanometer in supine position in the right upper limb by auscultatory method. Similarly, three readings were taken at an interval of 15 minutes each and average of the three values calculated. Heart rate was counted for one minute. The subjects were trained under the guidance of a certified yoga teacher. They carried out meditation for 3 months for 1 hour daily between 6 am and 7 am. The cardiovascular status of each subject, after 3 months of meditation practice was assessed clinically in terms of blood pressure and heart rate recordings. Statistical analysis was done by t test. P value was calculated.

Results

30 subjects who practiced meditation for 3 months regularly were analysed for the results. The results obtained are expressed as Mean ± SD. Table below shows changes in Blood Pressure, Heart rate before starting of meditation practice and after 4 months of daily meditation for one hour.

Table 1 : Heart Rate and Blood Pressure in Meditators and Non meditators

Variables	Non meditators n=30 Mean ± SD	Meditators n=30 Mean ± SD	P value
HeartRate(beats/minute)	76.80±4.98	70.42±4.80	<0.001
SBP (mmHg)	132.6±8.42	118.46±4.6	<0.001
DBP(mmHg)	82.4±5.98	74.6±6.28	<0.001

<0.001 highly significant

Discussion

It has been established that physiological effects of meditation are mediated through autonomic nervous system. Our results show that the mean values of resting cardiovascular parameters like heart rate, systolic blood pressure, diastolic blood pressure were statistically significantly less in meditators than non-meditators. Our results are similar to results by Desh Deepak et al [12]. Regular long term meditation increases parasympathetic dominance resulting in increased vagal tone in meditators resulting in physiological bradycardia. Several studies by Cauthen and Pyrmk [13], Cuthburt, Kristeller, Simons [14] concluded that heart rate decreases by meditation. All these changes in meditators increases meditators cardiac reserve in compared to non-meditators. Jyotsana. R. Bharshankar [15], in their study also concluded that values for resting HR, SBP and DBP were significantly lower in Raja-yoga meditators.

Our study shows that Mean resting heart rate before meditation practice was76.80±4.98. It reduced to 70.42±4.80 after 3 months of practice of meditation and it was statistically significant P <0.001. The mean systolic blood pressure [SBP] before meditation practice was132.6±8.42. After 3 months, of meditation practice, systolic blood pressure reduced to 118.46±4.6 and it was statistically significant P<0.001. The mean diastolic blood pressure [DBP] before meditation practice was 82.4±5.98. After 3 months, of meditation practice, diastolic blood pressure reduced to 74.6±6.28 and it was statistically significant P<0.001.

The mean values of heart rate, systolic blood pressure and diastolic blood pressure are highly significant reduction after 3 months of meditation practice. Reduction in heart rate and blood pressure indicate a shift in the balancing components of autonomic nervous system towards the parasympathetic activity which was reported by Santha Joseph et al., [16] and Anand BK et al., [17].

This modulation of autonomic nervous system activity might have been brought about through the conditioning effect of meditation on autonomic functions and mediated through the limbic system and higher areas of central nervous system was reported by Selvamurthy et al., [18]. Regular practice of meditation increases the baroreflex sensitivity and decreases the sympathetic tone, thereby restoring blood pressure to normal level in patients of essential hypertension was reported by Vijaya Lakshmi et al., [19]. Meditation by modifying the sympathetic over activity thereby decreasing arterial tone and peripheral resistance, and resulting in decreased diastolic blood pressure and heart rate. This ensures better peripheral circulation was reported by Bhargava et al., [20] and blood flow to the tissues reported by Gopal et al., [21]. Some research shows an elevated beta-endorphin levels in persons doing regular meditation that may be responsible for relaxed & calm state of regular meditators & it also boost immunity [22]. Further researches are undergoing in meditation physiology to unearth rest of the benefits.

Conclusion

From our study, it can be concluded that regular meditation increases parasympathetic dominance in our body. This result in better cardiac reserve in meditators compared to non-meditators. Hence, regular meditation helps meditators to combat anxiety and stress effectively. Meditation helps to maintain normal homeostasis in our body. Hence, meditation should be practiced daily for overall well-being of the body.

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