

A Study to Assess the Effect and Experience of Transcendental Meditation on Hypertension Patients Attending Medical OPD at Mangalore, Karnataka

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Abstract

The emotional state of a person affects blood pressure, especially among persons with Hypertension. One method to stabilize the emotional state is through Transcendental Meditation (TM) technique. Objective was to know whether TM reduces subjective complaints, stress and blood pressure of patients with hypertension. A pre-experimental “one group pre test- post test design” was adopted, involving 60 patients through purposive sampling. BP, stress levels, Subjective complaints and experience were recorded before and after meditation. Data analysis include description of subjective complaints, paired t-test was carried out against the null hypothesis that SBP and DBP before and after meditation remained the same. Average systolic blood pressure before and after meditation was 141.66 and 136.30 mmHg respectively. This decrease is statistically significant ($p < 0.0001$). Average diastolic blood pressure before and after meditation was 84.84 and 79.86 mmHg respectively, the difference is statistically significant ($p < 0.0001$)

Keywords: Transcendental meditation, TM, hypertension, Stress, meditation

Introduction

The number of patients suffering from hypertension has been increasing. The data from USA showed that 31% Americans had hypertension, and this figure tends to increase over time¹. Cardiovascular disease (CVD) carries with it the highest mortality rates and healthcare costs. The annual death rate from heart disease and stroke is nearly one million, with an annual cost of \$396 billion. These statistics raise concerns about the performance of conventional health care in preventing and treating chronic disorders².

According to worldwide estimates, hypertension affects approximately 1 billion people, resulting in 7.1 million attributed deaths per year³. As one of the most widespread, least controlled diseases around the world, hypertension poses a threat to adults from all cultures and lifestyles. Factors such as improved treatment, pharmacologic

interventions, preventative measures, and lifestyle changes have contributed to a 60% decrease in age-adjusted death rates from stroke and a 50% decrease in age-adjusted death rates from coronary heart disease⁴.

Pharmacological therapy has been the mainstay of treatment for hypertension. This method of treatment is practical and effective in most cases. Non-pharmacological therapy, such as exercise, weight reduction and salt restriction has been recommended. Behavioural therapy, such as relaxation techniques and biofeedback, was also used in the treatment of hypertension⁶.

The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) recommends lifestyle modification for high BP, from pre hypertension to hypertension. Despite this national guideline, there is a paucity of data

from randomized controlled trials on the long-term effects of non pharmacologic therapies for hypertension.

Transcendental Meditation is one Non pharmacological relaxation therapy and a method to produce relaxation response^{5,7}.

Altered sympathetic nervous function has been implicated in the genesis of hypertension. Increased sympathetic nervous system activity leads to arterial hypertension. Significant reduction of elevated levels of blood pressure can be achieved by practicing Transcendental meditation, breathing exercise, and progressive muscle relaxation, all of which elicit relaxation response⁷. Stress reduction by TM in a period of 4 months significantly reduced blood pressure among African American adolescents with high-normal systolic blood pressure^{9,13,15,16}.

A randomized controlled trial comparing TM, progressive muscle relaxation, and participation in conventional health education classes by African Americans with hypertension showed that the greatest decrease in systolic and diastolic blood pressure was attained by those practicing meditation¹⁰.

Meditation therapy was defined as a technique to attain harmony and to empower the body through concentration⁸. Meditation has been shown to affect decreased sympathetic nervous system arousal, hypothalamic-pituitary-adreno cortical axis dys regulation, cortisol levels, and sympathetic b-adrenergic receptor sensitivity¹⁸. Deep meditation state produces delta waves in the brain like a person who is sleeping soundly. In this state, a person feels a total relaxation with respiration over heart rate ratio 1:3. This means that one full breath takes equivalent time period as three heart beats. This practice harmonizes all organ activities, even at molecular level. The body has the ability to regulate and heal itself. Meditation enhances the harmonization and self treatment^{7, 19}. Effective self-regulation and self-treatment may decrease psychosocial

stress and blood pressure in patients with hypertension.

The experience central to effects of the TM program, the experience of “Transcendental Consciousness” appears to be related to mindfulness as described²¹. The four mindfulness skills identified by —observing, describing, acting-with-awareness, and accepting-without-judgment—can be seen as by products of the experience of transcendental consciousness during TM practice, as hypothesized below¹⁸.

Maharishi posits that observation is heightened through transcendental consciousness. He explains that through the practice of TM, the mind not only “sees all the changing phenomena of the world—movement and play of light and shadow, form and colour, all the drama of life”¹⁸ but is also able to turn inward and see itself. The ability to describe the content of one’s mind also seems likely to be improved by TM practice. Heightened sense of self, TM and Mindfulness proposed by product of transcendental consciousness, would presumably have an impact on the ability to describe subjective experience¹⁹.

The facet of acting with awareness may be the by product that develops spontaneously from the experience of transcendental consciousness, as transcendental consciousness is the epitome of awareness. According to Maharishi, “through the process of TM, human awareness is open to its full potential” Finally, acceptance-without-judgment is implied by the TM approach to thoughts that arise during meditation. According to, “thoughts during meditation are never an indication of unsuccessful meditation, but rather the experiential artefact of the beneficial result of deep rest”. Instead of being considered distracting or off-putting, these thoughts are accepted as a normal by product of meditation.²⁰

Hypertension is a major cause of coronary heart disease, stroke and renal failure due to

end-organ damage. Stage 1 and stage 2 hypertension are characterized by systolic blood pressure 140-159 mmHg, 160-179 mmHg, respectively and diastolic blood pressure 90-99 mmHg, 100-109 mmHg respectively. Most people suffer from hypertension with unknown etiology, categorized as essential or primary hypertension. Only 10% of those with hypertension have other diseases which increase the blood pressure, hence the hypertension is classified to secondary. The most frequently reported symptoms are headache, pain or tension on the back of the head, neck and even the shoulders¹¹. People with hypertension often feel tired and malaise, without any known cause. Hypertension is not precisely a disease, but a disorder in the regulation of blood pressure.

Most blood vessels have the intrinsic capacity to compensate changes by affecting the resistance to blood flow so that adequate blood supply relative to need is achieved. Metabolic changes, such as the decrease of O₂ and pH produce vasodilatation¹⁷, relaxation of arterioles and pre capillary sphincter. The increase in CO₂ and osmolality also cause dilatation of blood vessels.

The dilating effect of CO₂ is readily apparent on the skin and the brain. Systemic regulation may also result from hormonal effects, such as kinin, which produces vasodilatation, and several hormones, such as vasopressin, norpeinephrine, epinephrine and angiotensin II, which produce vasoconstriction¹². Meditation practice reduces acute and chronic sympathetic nervous system tone and possibly modification of other neuroendocrine and neurophysiologic mediators of stress. The effects of the meditation practices on hypertension are restoration of adaptive mechanisms²⁰.

The objective of this research is to know short term subjective and objective effects of Transcendental Meditation in persons with hypertension. Subjective effects are

characterized by the decrease of symptoms, and objective effects are shown as the decrease of blood pressure and stress. This study tested the null hypothesis that meditation does not decrease subjective symptoms, level of stress and blood pressure in patients with hypertension.

Methods

The design of this study is pre-experimental “one group pre test-post test design”. The usual notation for this design is: O₁ _ X_ O₂ Where O₁ is the pre test, X is the treatment (in this case Transcendental meditation), and O₂ is the post test.

The subjects of this study were persons with systolic blood pressure 140 mmHg or higher and diastolic blood pressure 90 mmHg or higher, with or without medication with anti hypertensive's. A total sample of 60 persons was obtained from out patients departments of KS Hegde hospital, Deralakatte Mangalore through purposive sampling. Before participating in the study, the subjects signed informed-consent form, after the objectives and procedures of the study were explained and clarified to them.

History taking and interviews were used as a data collection instrument to document the Symptoms felt by the research subjects. Sphygmomanometer and stethoscope were used to Measure blood pressure. Level of stress was measured by valid stress scales. The research activities were carried out according to the following steps:

- Identify research subjects, explain about TM therapy and invite them to participate in this research as study subjects;
- Facilitate the subjects to sign informed-consents;
- History taking and interviews to obtain disease history and family history;

- Provide trainings to practice meditation in a calm and relaxed condition, while saying within themselves a specific mantra
- Obtain information about subjective complaints before meditation;
- Measure blood pressure three times each;
- Measure the level of stress with stress questionnaire.
- Provide guidance in the practice of TM with the help of TM instructor, the subject sits on a chair, spine erect, feet rest on the floor. The subjects focus their attention on the mantra within their heart. The meditation practice takes 20 minutes each;
- Measure blood pressure three times each after the meditation
- Obtain information about subjective complaints after meditation;
- Check that all information's have been recorded.

Descriptive analysis was conducted to interpret changes in subjective complaints. Paired t-test was applied to test the null hypothesis that meditation does not produce decrease in blood Pressure and stress.

Results and Discussion

Among 60 research subjects, 25 persons (41.67%) were male and 35 persons (58.33%) female. The ages of the subjects were between 35-65 years, with an average of 54.5 years. The Average duration of hypertension

according to the knowledge of the subjects was 3.5 years.

Common complaints include stiffness on the back of the neck (53%), dizziness (38%), and stiffness of the shoulders (25%). Tingling sensations were felt by 28% subjects, and 10% of the subjects experienced nauseated. General weakness was expressed by 54% subjects. Back pain was reported by 47%, and some subjects (8%) also mentioned breathlessness. Heaviness of head and body was experienced by 37% of subjects.

The majority (73%) of respondents took anti hypertensives, 22% of them also use alternative treatment, such as music therapy, herbal medicine, juice and massage, yoga. Only 30% of the respondents had salt restricted diet, and 26% of the subjects practiced exercises, including breathing exercises. Family history revealed that most of the subjects had relatives with hypertension (39%). (26%) of the subjects had relatives with diabetes.

The results of the descriptive data analyses indicated that among 23 patients with dizziness, 16 persons reported that the complaint disappeared and in 6 persons the complaint was reduced after meditation. Tension on the back of the head and shoulders was reported by 47 persons, 28 felt more relaxed and reduced pain. Heaviness in the head or body expressed by 22 persons 15 subjects got relief after meditation. The practice of meditation also removed anxiety and produced calming effects in 38 persons Among 6 persons without symptoms, all were still free from any symptom after meditation, 49 of them even felt more relaxed.

The effect of meditation on dizziness could be explained by 20% reduction of oxygen consumption and increased CO₂ production during meditation¹⁸ resulting in better supply of oxygen to the brain. The disappearance of tension on the back of the head and shoulders was due to the relaxation effect of meditation.

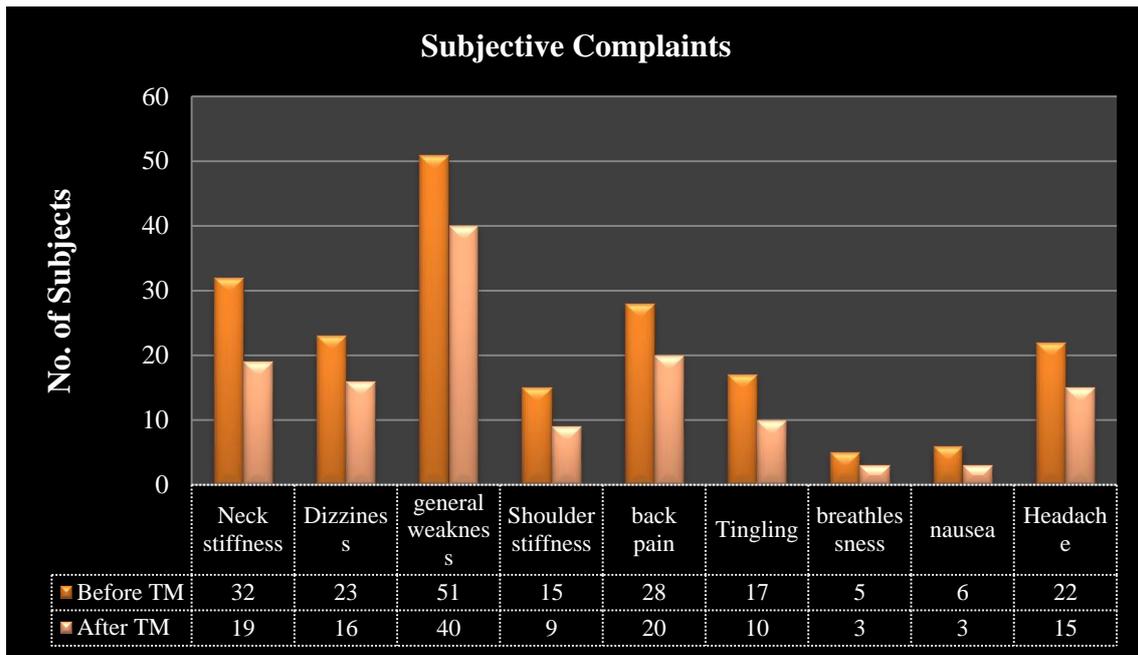


Fig. 1: Comparison chart of Subjective Complaints in Hypertensive Subjects

Meditation stimulates alpha waves which present in a relaxed and full awareness state²³. At the same time, the delta waves commonly present during a deep sleep also present during meditation suggesting that during meditation full consciousness and relaxation coexist. Alertness is enhanced by the release of epinephrine, while relaxation is the result of endorphin hormone. The sympathetic nervous system arousal also reduced by meditation, so that the heart rate and breathing rate slowdown¹⁹. Anxiety was reduced after meditation due to the opposite effect of “fight or flight” in a person under stress. Meditation was recommended for persons with hypertension to manage stress in their daily lives. Better blood flow and decrease in metabolic rate improve peripheral blood circulation so that tissue perfusion will be better²².

The paired t-test using SPSS-2000 showed that the average decrease of blood pressure from the average systolic blood pressure 141.66 to 136.30 mmHg was statistically significant ($p < 0.0001$). At the same time, the diastolic blood pressure also significantly ($p < 0.0001$) reduced from the average 84.84 to 79.86 mmHg. The results of this statistical test

suggest that the null hypothesis that meditation does not reduce blood pressure is rejected. Studies on the effect of meditation on blood pressure and other cardiovascular phenomena indicated that meditation restore adaptive mechanisms (Schneider et al., 2005). This study showed immediate effect of TM on subjective symptoms, blood pressure and stress among persons with hypertension. Meditation also improved their general health and well being.

With regard to Meditation experience 80% of patients reported inner calmness and peace. 72% of patients reported comfortable sleep for 7-8 hours. 92% of patients reported major drop in anxiety level. 41% of patients felt physically and emotionally good. 56% of patients reported positive hope and energy that they will perform their role effectively in the family. 98% of patients assured to continue meditation regularly. 2% of patients reported mind wavering and too many thoughts in the beginning. 90% of patients reported TM a simple and easy way of meditation. 95% of patients reported to suggest to their friends. 88% reported that they developed self confidence and fearlessness.

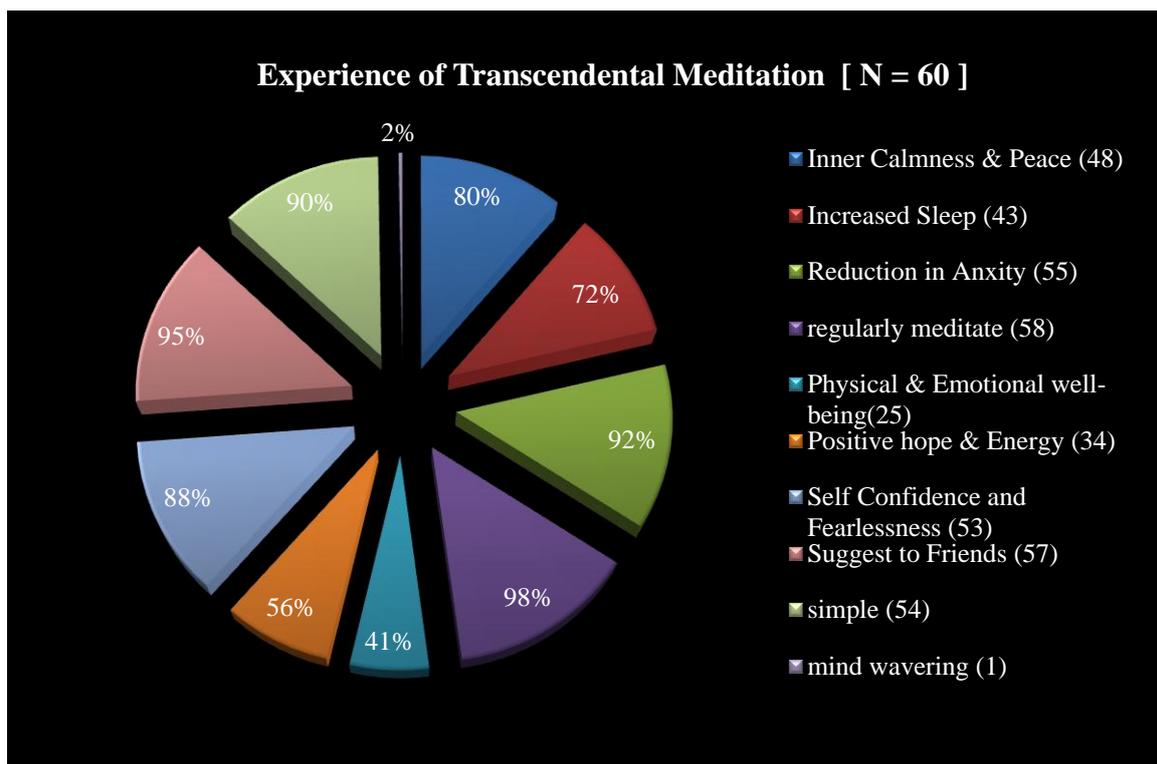


Fig. 2: Experience of Transcendental Meditation of Subjects (Frequency, N=60)

Studies carried out in longer period of times and using a variety of surrogate end-points, mortality and morbidity showed that meditation produced regression of carotid atherosclerosis, reduced myocardial ischemia and lowered mortality rates.

Conclusion and Suggestion

It is concluded from this study that meditation ameliorated or mitigated subjective symptoms and reduced blood pressure and stress among persons with hypertension. Therefore, meditation should be widely practiced as non pharmacological complementary treatment for hypertension. Meditation with its restorative and stress-reduction roles can be applied in

normotensive individuals to improve general health and well-being^{24,25}. Further studies should be carried out to investigate the long term effects of meditation on cardiovascular and other responses to promote health.

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