

Positive impact of integrated amrita meditation technique on heart rate, respiratory rate and IgA on young healthy adults

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ABSTRACT

The objective of the current study was to find out the effect of Integrated Amrita Meditation Technique (IAM) on blood pressure (BP), heart rate (HR), respiratory rate (RR) and IgA. One hundred and fifty subjects were randomized into three groups IAM, Progressive Muscle Relaxation (PMR) and Control. Baseline values were collected before giving the training for all the subjects and the IAM and PMR groups were given training in the respective techniques. BP, HR, RR and IgA were recorded manually at 0 h, 48 h, 2 months and 8 months after the first visit. HR was found to be reduced in the IAM group 48 h onwards and the fall sustained till 8 months ($p < 0.05$). IAM group showed significant drop when compared to the PMR group and control group in all the subsequent visits ($p < 0.05$). RR decreased significantly in the IAM group in the third and fourth visits ($p < 0.05$). RR of IAM showed significant decrease when compared to PMR and control from the third visit onwards. IgA showed significant increase in comparison with PMR and control in the third and fourth visits. BP did not show any difference in any of the visits. There was subject dropout from randomization to completion of the study, in all the three groups. The significant decrease in HR and RR and increase in IgA in the IAM group when compared to the PMR and control group shows the efficacy of the technique in reducing the physiological stress indicators for up to 8 months.

Keywords Integrated Amrita Meditation Technique, stress, blood pressure, respiratory rate, IgA, meditation

INTRODUCTION

Walter Bradford Cannon and Selye were the pioneers who attempted to understand the impact of stress on the body (Selye, 1936; Cannon, 1935). In 1932 Cannon defined stress as a threat to homeostasis (Lazarus and Folkman, 1984) and in 1936 Selye defined "stress" as the non-specific response of the body to any demand. Stress occurs when expectations do not match the situations in life. Selye considered the hypothalamo pituitary adrenal (HPA) axis and genetic factors as the effectors of stress response (Lazarus and Folkman, 1984). Physical or psychological stress increases sympathetic nerve stimulation as well as release of adrenaline which in turn increases blood pressure (BP), heart rate (HR) and respiratory rate (RR) (Selye, 1976). Plasma adrenaline and HR were found to be increased when subjects were exposed to stress and on termination of exposure to stress the same was found to be decreased (Ganong, 2007). Studies report that increase in adrenaline during stress increases slow inward Calcium/sodium current in the sinus region thereby increasing the HR (Eisenhofer et al., 1985). Increased adrenaline levels are also found to stimulate respiration to a comparable degree (Brown et al., 1979).

Studies also show that stress alters immune functions (Cohen and Rabin, 1998). IgA, IgG, and IgM represent different types of antibody molecules that recognize and bind to a specific antigen, mark it for destruction and prevent it from causing infections. IgA is primarily present in mucous secretions. IgA is a better indicator in stress as it plays an important role in local immunity and activation of the complimentary pathway in the immune response (Henningsen et al., 1992).

Healthy diet, exercise, reducing the negative thoughts through open discussions and relaxation techniques are some of the methods by which stress reduction may be achieved. Among the widely used relaxation techniques, yoga and meditation are now gaining lot of popularity in the West as well as the East as effective tools. By simple definition, Meditation is a complex process involving changes in cognition, sensory perception, release of hormones and autonomic activity (Whelan and Young, 1953).

Meditation has its roots in the Tantric yoga of ancient Indian scriptures known as the Vedas. But it is clearly recommended as a solution to relieve stress in the Dhyana yoga chapter of Srimad Bhagawat Gita - a chapter included in the sixth century BC epic Mahabharata written by Vyasa. In this text Lord Krishna recommends meditation as one of the techniques to soothen the mind and also the methods to practice the technique. After that, Patanjali produced the classical yoga text- The Yoga sutras. The address of Swami Vivekanada in 1893 at the Parliament of Religions in Chicago and "The

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Autobiography of a Yogi” by Paramahansa Yogananda in 1920 introduced the concepts of yoga and meditation to the West. Maharishi Mahesh Yogi developed the Transcendental Meditation technique which gained popularity in the West in 1960s and the first papers of Meditation Research on the physiological benefits of meditation were published in early 1970s (Newberg, 2003). The practice of meditation is expected to improve both physical and mental health and also contribute to psychological well-being. But there is very little scientific data to support this expectation, and only a few studies have conducted a comprehensive assessment to correlate all the possible beneficial effects of meditation.

Stress is assessed in research using questionnaires, electromyography, autonomic nervous system tests and hormonal analyses. The autonomic stability was compared between meditators and non-meditators in 1973 through simple galvanic skin response and meditators were found to have a better response (Wallace, 1970). The value of Alternative Medicine (meditation, meditative prayer, yoga and relaxation response) in reducing stress-related symptoms has been reported to be effective and the authors had recommended meditation over prescription of drugs as the preferred treatment for mild hypertension in 1984 (Orme-Johnson, 1973). The practice of Transcendental Meditation has been reported to reduce blood pressure in patients with Hypertension (Arias et al., 2006; Schneider et al., 1995) and also improve other risk factors like Dyslipidemia and Insulin Resistance, thus having an overall impact of reducing cardiovascular risk in patients with Metabolic Syndrome who are at high risk for developing coronary artery disease (Rainforth et al., 2007; Schneider et al., 1998).

Both exercise and meditation can lead to better psychological health, but when these modalities were compared, meditation was found to be superior not only in improving psychological health but also reducing endocrine stress markers like catecholamines (Labrador et al., 2006). It is recognized that many different meditation techniques have widely differing methodologies (Harte, 1992). A meta-analysis of over 600 studies indicates that, not all techniques have the same effects. The analysis of the studies on the psycho-physiological benefits of meditation shows that clear and reproducible evidence is lacking (Alexander et al., 1991; Taylor, 1998). Small sample size, suboptimal control groups, lack of long-term follow up, and problems of adherence among participants are all factors which have been criticized in these studies (Alexander et al., 1994). The aim of our study was to analyze the effect of Integrated Amrita Meditation Technique on the RR, HR, BP and IgA in normal adults, with a view to understand its potential benefit on stress coping.

As any other form of meditation, IAM also has its roots in the Indian Tantric practices. It consists of energizing exercises (yogic postures) for up to 8 min, a brief period of relaxation for 2 min and 13 min of meditation. At the end of the technique the subjects are asked to remain in silence for 5 min.

The components of the technique are:

Relaxation exercises/yogic postures: These exercises progressively relax the muscles and joints and so the mind too. It also has an energizing, holistic effect.

Breathing exercises (focused breathing): These breathing exercises draw attention to the way one breathes, prompts a more complete breathing.

Awareness: Throughout the process awareness is the main component. One is encouraged to be aware of all the subtleties of each of the steps. One part in particular focuses on the flow of breath.

Visualization: This is a key component of this technique as mind is focused on an internal point, rather than on a physical

object outside.

Only the first class is guided. The later practice is without the help of any external means. Criteria for successful practice: Belief in a spiritual master and chanting the mantra given by the master is recommended.

The relaxation of the mind by this technique is expected to reduce stress and expand thinking in general, making the subject more creative on his work or studies. The relaxation of the mind by this technique removes stress and expands thinking in general, making the subject more creative.

MATERIALS AND METHODS

Subjects

One hundred and fifty college students from two different colleges under Amrita University (age 18 - 21 years) were recruited for the study. Any student between the ages of 18- 21 who had not undergone any specialized relaxation training and had volunteered to participate was included. Chronic smokers, alcoholics and psychiatric patients were excluded through a screening questionnaire.

The subjects were randomly assigned by the lottery method to any of the three different groups. The first group was trained to practice a meditation technique called Integrated Amrita Meditation (IAM) Technique. Integrated Amrita Meditation Technique is a simple combination of yoga, pranayama and meditation. The technique was designed and presented to the world by Her Holiness Mata Amritanandamayi Devi. It is a synthesis of traditional, time-tested methods suited for an ordinary urban person. All subjects who were randomized to this group were trained to practice this technique for twenty min every day. IAM Technique was taught by teachers who were well versed with the technique and approved as teachers by the Mata Amritanandamayi Math. A self-maintained diary assessed compliance.

The subjects randomized to the second group were given training on Progressive Muscle Relaxation (PMR) technique. It is a technique of stress management developed by American physician Edmund Jacobson in the early 1920s. Progressive muscle relaxation is based upon the practice of tensing or tightening one muscle group at a time followed by a relaxation phase with release of the tension. PMR involves a physical and mental component. With the eyes closed and in a sequential pattern, a tension is given to a muscle group purposefully for approximately 10 seconds and then released for 20 seconds before continuing with the next muscle group. The whole PMR session takes approximately 30 min (Ospina et al., 2007). A trained Physiotherapist taught the PMR Technique.

Subjects in this group were to practice this technique once daily and compliance was assessed by self-maintained diary. The subjects randomized to the third group served as controls and did not practice any meditation technique or do any relaxation exercises.

The sample size was calculated from the available information in published papers on meditation (Jacobson, 1924). The minimum Sample size was estimated as 14 in each of the three groups (95% confidence and 80% power). Since we anticipated a dropout rate above 50% on the basis of previous studies we decided to recruit 150 subjects. All subjects were followed up for a total duration of eight months. Institutional Ethics Committee clearance was obtained and subjects signed informed consent forms prior to participation in the study. The values were recorded at baseline (before any intervention), and again 48 h later, after 2 months and eight months after randomization. All readings were taken at 8 am.

Table 1. Comparison of Heart Rate from baseline visit to 8 months visit within each of the three groups (Integrated Amrita Meditation)

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	Sample	Mean \pm SD	<i>p</i> value in comparison with visit 1
Baseline visit	35	79.29 \pm 14.0	0.011*
48 h	35	72.62 \pm 6.0	
Baseline visit	29	80.10 \pm 15.0	0.021*
2 months	29	73.20 \pm 18.0	
Baseline visit	29	81.33 \pm 16.0	0.001*
8 months	29	68.97 \pm 8.8	
<i>Progressive Muscle Relaxation</i>			
Baseline visit	36	75.78 \pm 8.64	0.702
48 h	36	76.22 \pm 8.27	
Baseline visit	29	76.07 \pm 6.31	0.024*
2 months	29	80.75 \pm 6.90	
Baseline visit	31	74.45 \pm 6.91	0.840
8 months	31	74.90 \pm 8.10	
<i>Control</i>			
Baseline visit	34	84.06 \pm 12.90	0.163
48 h	34	81.88 \pm 12.80	
Baseline visit	29	84.76 \pm 13.40	0.961
2 months	29	84.48 \pm 8.56	
Baseline visit	30	84.73 \pm 13.46	0.102
8 months	30	80.06 \pm 7.12	

Recording of blood pressure, heart rate and respiratory rate

BP- The mercury sphygmomanometer method which is considered generally as the gold standard for recording BP (Dougherty and Lister, 2008) was used in the study to record BP. The subject was allowed to relax and BP was recorded in the sitting posture. For the same subject BP was recorded twice each time and the average of the two recordings was taken as the reading. The measurements were taken by the same qualified nurses during all visits to minimize inter observer variability.

HR- HR was recorded with the elbow and forearm resting comfortably on a table and the palm of the hand turned upward and the radial pulse was felt and counted for 1 min exactly.

RR - Examiner's fingers were placed on the subject's abdomen and the number of breaths or respirations in one min was recorded. Effort was taken to prevent people from becoming aware that their breathing is being checked.

IgA - IgA was analysed by turbidimetry method. IgA represents about 10 to 15% of the serum immunoglobulins. The most important form of IgA is the secretory IgA, found in tears,

Table 2. Comparison of Respiratory Rate from baseline visit to 8 months visit within each group (Integrated Amrita Meditation)

	Sample	Mean \pm SD	<i>p</i> value in comparison with visit1
Baseline visit	35	18.97 \pm 3.10	0.606
48 h	35	18.74 \pm 3.40	
Baseline visit	29	18.62 \pm 2.90	0.005*
2 months	29	16.72 \pm 2.20	
Baseline visit	29	18.62 \pm 2.90	0.051*
8 months	29	17.66 \pm 3.70	
<i>Progressive Muscle Relaxation</i>			
Baseline visit	36	20.78 \pm 3.40	0.873
48 h	36	20.83 \pm 3.50	
Baseline visit	29	21.38 \pm 3.42	0.015*
2 months	29	19.44 \pm 2.72	
Baseline visit	30	21.00 \pm 3.47	0.951
8 months	30	20.73 \pm 2.49	
<i>Control</i>			
Baseline visit	34	20.24 \pm 3.10	0.415
48 h	34	20.82 \pm 3.37	
Baseline visit	29	20.00 \pm 3.07	0.188
2 months	29	21.51 \pm 4.67	
Baseline visit	30	20.40 \pm 3.26	0.705
8 months	30	20.73 \pm 3.88	

sweat, saliva, milk, colostrums and gastrointestinal and bronchial secretions.

We analyzed the plasma IgA levels. Anti-human IgA antibodies form insoluble complexes when mixed with samples. As the scattering light of the immunocomplexes depends of the IgA concentration in the subject's sample, the values were quantified by comparison from a calibrator of known IgA concentration.

Statistical analysis

The data was analyzed using SPSS - Version 11 (SPSS Inc, Rostock, IL) statistical package. Since the data did not follow normal distribution and were heterogeneous between the groups and also because of the smaller sample size within the group parametric tests could not be applied. The within group comparison was done by Wilcoxon Signed Ranks test. The between group analysis was done using independent t test and if test of homogeneity of variances was not followed logarithm was taken and analyzed. As significant difference was seen in the baseline visit between groups the difference between groups in the subsequent visits was analyzed by analysis of co variance taking care of the initial difference.

RESULTS

The one hundred and fifty volunteers were randomized into the three groups namely IAM, PMR and Control. However some of the subjects dropped out of the study after signing the Informed Consent Document, and 39 and 41 subjects each attended the initial training at baseline visit in the IAM and PMR group and 35 subjects in the Control group came for the baseline visit (visit1). The groups were found to be comparable on basis of age, sex and education (On an analysis between groups the *p* value was for Sex-0.908, Age-0.837 and Education-0.823).

Analysis of the mean HR values within the IAM group showed a statistically significant decrease from visit 1 to visit 2 (48 h). The HR levels at visit 3 (two months) and visit 4 (8 months) also showed a statistically significant decrease compared to the baseline visit (Table 1). In the PMR group there was an increase in the third visit alone.

The control group did not show any statistically significant difference until visit 4. The analysis of HR between the groups IAM showed a statistically significant difference from visit 2 to visit 4 when compared to PMR. The significance in the drop was seen in HR levels in IAM group even compared to the control in the second, third and fourth visits. HR of PMR group showed no significant difference on comparison of Control

Table 3. Comparison of Heart Rate, Respiratory Rate, Diastolic Blood Pressure, Systolic Blood Poressure from 48 h to 8 months between the groups

	IAM-Control (<i>p</i> value)	IAM-PMR (<i>p</i> value)	PMR-Control (<i>p</i> value)
HR48 h	0.002*	0.042*	0.300
HR 2 months	0.001*	0.001*	0.377
HR 8 months	0.001*	0.022*	0.158
RR 48 h	0.062	0.208	0.651
RR 2 months	0.001*	0.002*	0.016*
RR 8 months	0.031*	0.005*	0.852
BPD 48 h	0.011*	0.050	0.509
BPD 2 months	0.089	0.811	0.069
BPD 8 months	0.546	0.380	0.868
BPS 48 h	0.880	0.194	0.276
BPS 2 months	0.990	0.700	0.735
BPS 8 months	0.649	0.690	0.606
IgA 48 h	0.081	0.176	0.683
IgA 2 months	0.003	0.017	0.815
IgA 8 months	0.001	0.007	0.245

Table 4. Comparison of differences among the groups at different visits

	IAM – PMR				IAM- CONTROL				PMR- CONTROL			
	BPD	BPS	HR	RR	BPD	BPS	HR	RR	BPD	BPS	HR	RR
Baseline visit	0.837	0.722	0.012	0.731	0.570	0.688	0.750	0.634	0.720	0.999	0.006	0.906
48 h	0.393	0.638	0.041	0.784	0.001	0.224	0.000	0.414	0.037	0.444	0.028	0.566
2 months	0.459	0.143	0.164	0.262	0.800	0.227	0.618	0.012	0.325	0.788	0.509	0.074
8 months	0.999	0.573	0.344	0.041	0.135	0.002	0.056	0.950	0.165	0.037	0.356	0.050

(Table 3).

IgA values increased significantly in the IAM group in the fourth visit. In the control group the value decreased significantly in the third visit but increased significantly in the fourth (Table 5). When compared with the Control and PMR groups, IgA showed significant increase in comparison with PMR and control group right from the third visit which was maintained even in the fourth visit. No significant difference was seen in PMR group in comparison with the control in any of the visits. The Diastolic Blood Pressure (DBP) of the IAM group did not show any significant change from visit 1 in any of the three subsequent visits. The PMR group showed a significant rise in the DBP in the eight months visit. The Control group showed a significant decrease in the first visit which was not seen to be maintained in the following visits (Fig 1). There was statistically significant change when the IAM group was compared to the PMR in the second visit. But no difference was seen in subsequent visits or in comparison with the Control. Similarly the PMR group too did not show any significant change when compared to the control (Table 3). The Systolic Blood Pressure (SBP) of the IAM did not show any significant change from the first visit in any of the following visits. The PMR showed a significant drop in the second visit which was not maintained in the subsequent visits. The control group showed a significant drop in the second and third visits when compared to the first visit (Fig 2). When the groups were compared between each other, IAM did not show any significant difference when compared to PMR or Control in any of the visits (Table 3).

In the IAM group RR did not show any significant change in visit 2 but there was a significant drop in the visit 3 which

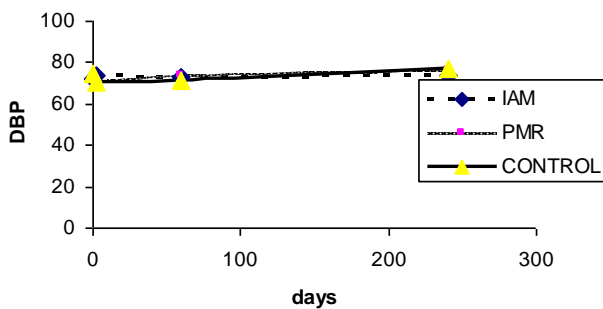


Fig. 1. Comparison of changes of Diastolic Blood Pressure in each of the three groups.

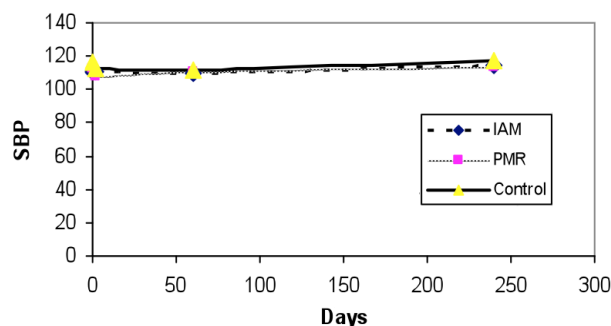


Fig. 2. Comparison of changes of Systolic Blood Pressure in each of the three groups.

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was sustained till the visit 4. The PMR group showed significant drop RR in the third visit. This drop was not maintained in the fourth visit (Table 2). When RR was compared between groups IAM showed significant decrease when compared to the control in the third visit which was seen in the eight months visit too. RR of IAM was significantly lower in than the PMR in the third and fourth visits. There difference between the PMR and the Control group was significant in the third visit alone (Table 3).

DISCUSSION

The Integrated Amrita Meditation Technique involves simple breathing exercises and muscle relaxation exercises along with deep meditation. Along with the control group who did not have any special intervention, we included a third group who were trained to practice a simple muscle relaxation technique. Our objective was to see whether the benefits if any, were due to simple exercises or whether the meditation along with the exercises provided additional benefit to the subjects on regular practice. So we included along with a control group (with no intervention) the muscle relaxation group or the PMR group. Our study is unique in this aspect as no previous study on meditation has compared the potential benefit of meditation over simple muscular relaxing exercises on a long term basis. We had planned the follow up visits at 48 h, 2 months and 8 months with a view to assessing the immediate impact, and also the intermediate and long term sustained effects of meditation.

Our results show that there was a significant drop in HR in the second visit when compared to the baseline and this fall sustained in all the following visits. The superiority of IAM over the other two groups is clear when IAM is compared to the PMR and Control group, as IAM showed a significant decrease in all the visits after the commencement of the training when compared to the other two groups (Table 3). The PMR group or Control group did not show any significant fall

Table 5. Comparison of IgA (in mg/dl) from visit 1 to visit 4 within each group (Integrated Amrita Meditation)

	Sample	Mean \pm SD	p value in comparison with visit1
Baseline visit	28	211.50 \pm 100.37	
48 h	28	280.35 \pm 183.33	0.072
Baseline visit	24	236.25 \pm 125.51	
2 months	24	256.54 \pm 115.28	0.290
Baseline visit	22	216.73 \pm 108.85	
8 months	22	295.63 \pm 44.07	0.002
<i>Progressive Muscle relaxation</i>			
Baseline visit	26	236.65 \pm 120.29	
48 h	26	203.30 \pm 92.75	0.056
Baseline visit	26	212.50 \pm 109.08	
2 months	26	185.53 \pm 84.71	0.454
Baseline visit	18	229.72 \pm 141.71	
8 months	18	239.27 \pm 69.82	0.472
<i>Control</i>			
Baseline visit	29	201.55 \pm 67.25	
48 h	29	201.34 \pm 97.47	0.854
Baseline visit	26	205.38 \pm 66.31	
2 months	26	170.35 \pm 60.04	0.022
Baseline visit	24	192.13 \pm 74.20	
8 months	24	220.58 \pm 76.02	0.034

2013 / Volume 3 / Issue 2 / e13

in any of the visits.

When we look at the previous studies on Transcendental Meditation, in a comparison of HR before, during and after the practice, it was found to be decreased from the control period (Newberg, 2003). Sudsang R et al. when conducted a cross sectional study comparing a 52 males of age 20 - 25 practicing Buddhist Dhammakaya meditation with a control group who did not practice any meditation, HR was significantly lower in the group practicing Dhammakaya meditation technique (Jacobson, 1924). A popular Chinese fitness exercise –Tai chi when studied comparing the beginners and practitioners and before and after the practice, HR was found to be increased after the practice (Sudsang et al., 1991). HR and BP were studied comparatively in a group practicing Hatha Yoga a relaxation technique which has become increasingly popular as a method for coping for stress and another group of young females reading in a comfortable position. HR was found to be lesser in practitioners of Hatha Yoga but no substantial difference was seen between the groups in BP (Jin, 1989). HR, RR and SBP decreased in normal healthy Qi trainees during the practice of the Korean Qi Training (Schell et al., 1994).

In our study RR decreased significantly in the IAM group in the third visit and the drop sustained for 8 months. When compared to the PMR group RR was significantly lower in all the visits. RR was lower in the IAM group even in comparison with the control group in the 48 h visit and the drop was sustained in the 2 months and 8 months visit. RR was significantly reduced in the PMR group in the third visit but the drop was not sustained in the 8 months visit. When compared to the Control group PMR group did not show any significant difference in the third visit which was not seen in the next visit.

Many other studies have been conducted on RR on similar techniques. In a study conducted on Raja Yoga Meditation technique by Vyas R et al. the vital capacity, tidal volume and breath holding were found to be higher in short term and long term meditators than the non-meditators (Lee et al., 2008). Relaxation Response which is a combination of Zen, Yoga Meditation and Western prayer methods when introduced to a group of 17 healthy subjects RR decreased significantly during the relaxation response period. Each subject while not practicing the technique served as the control and the values were taken in five consecutive periods of twelve min each involving session of practicing the technique and sessions of remaining in silence or reading (Vyas and Dikshit, 2002).

In our study there was significant increase in the IgA levels in the IAM group right from the 48 h visit but significant difference in comparison with control and PMR was seen from the 2 months. Previous studies on effects of meditation have shown to improve IgA levels in Chinese students (Taniguchi et al., 2007). But in a cross section study on marathon runners no significant changes was noticed before and after 2 h of meditation practice (Solberg et al., 2000). The immediate effects of 10 min relaxation training on salivary immunoglobulin A and mood state for Japanese female medical co-workers showed that s-IgA levels significantly increased after relaxation training in the relaxation group compared with the control group (Cohen and Rabin, 1998). But no study was conducted analyzing the long term effect of IgA after meditation practice. So our results highlight the potential role of IAM in improving immunity.

On analysis of SBP and DBP no significant difference was seen in the IAM group from baseline to the subsequent visits. In comparison with the PMR group and Control there was no significant difference in any of the visits. Within the PMR group DBP increased from baseline to the 8 months and SBP decreased in the 48 h visit from the baseline value. This difference was not sustained in the following visits. The control

group showed an immediate fall in the DBP but this difference was not seen in the 2 months visit and 8 months visit. SBP decreased significantly in the control group from the baseline after 48 h and this drop sustained for 2 months. The difference was not seen in the 8 months visit.

A randomized controlled trial on Hypertensive Older African Americans found that Transcendental meditation was twice as effective as PMR for reduction SBP as well as DBP (Schneider et al., 1995). In a cross sectional study on Transcendental meditation when SBP was compared between short term, long term practitioners of TM and non-practitioners a significant decrease was seen in the practitioners (Wallace, 1970). In our study the subjects were young healthy adults.

Most of the studies were either cross sectional studies or looked at the immediate changes after the practice of various relaxation techniques. Our study has attempted to understand the impact of the technique on a broader way with two control groups and we also looked at the effect on immediate, short term and long term effects of the technique. Further study is required in hypertensive subjects to conclude on the effect of IAM in reducing BP.

HR and RR are indicators of stress and the significant fall in HR and RR shows the immediate and long-term efficacy of the technique in the stress coping mechanism and the potential role of IAM in healing stress related diseases. In conclusion even though other studies have proved the efficacy of various forms of meditation in lowering HR& RR we have for the first time shown that these benefits are sustained for up to 8 months. A study on the effect on BP of IAM should be carried out in hypertensive subjects to assess its benefit in that situation.

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CONFLIT OF INTEREST

NONE

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