

# Effect of *Sahaja* Yoga Meditation on Quality of Life, Anxiety, and Blood Pressure Control

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## Abstract

**Objective:** The present study investigates the effect of *Sahaja* yoga meditation on quality of life, anxiety, and blood pressure control.

**Design:** The prospective observational cohort study enrolled two study groups: those receiving treatment from the International Sahaja Yoga Research and Health Center (meditation group) and those receiving treatment from the Mahatma Gandhi Mission Hospital (control group). Researchers measured quality of life, anxiety, and blood pressure before and after treatment.

**Results:** Sixty-seven (67) participants in the meditation group and 62 participants in the control group completed the study. The two groups were comparable in demographic and clinical characteristics. At baseline, the meditation group had higher quality of life ( $p < 0.001$ ) than controls but similar anxiety level ( $p = 0.74$ ) to controls. Within-group pre- versus post-treatment comparisons showed significant improvement in quality of life, anxiety, and blood pressure in the meditation group ( $p < 0.001$ ), while in controls, quality of life deteriorated and there was no improvement in blood pressure. The improvement in quality of life, anxiety reduction, and blood pressure control was greater in the meditation group. The beneficial effect of meditation remained significant after adjusting for confounders.

**Conclusions:** Meditation treatment was associated with significant improvements in quality of life, anxiety reduction, and blood pressure control.

## Introduction

QUALITY OF LIFE INTEGRATES aspects of physical, psychologic, and social health.<sup>1</sup> Patients with chronic diseases often suffer from physical and psychologic distress, lowering their quality of life.<sup>2</sup> As over 100 million people in the United States are living with chronic illness,<sup>3</sup> effective interventions that can alleviate distress and improve quality of life are important.

During the past 50 years, the use of meditation and yoga, commonly applied as an effective adjunct to conventional medical treatment, has increased rapidly in the general population.<sup>4,5</sup> However, research on the effects of meditation and yoga has not focused on quality of life. One (1) study reported improvement in quality of life after a mindfulness meditation program in patients with diverse diseases; however, the absence of a control group in the study made it

difficult to assess the extent of improvement attributed to the meditation.<sup>6</sup> One (1) pilot study reported increased quality of life after yoga/relaxation treatment in elderly patients with heart failure.<sup>7</sup> Another factorial randomized trial reported quality of life improvement in patients with advanced acquired immune deficiency syndrome who received a combination of Metta meditation and massage treatment.<sup>8</sup> Insufficient power was a drawback in both studies. More clinical evidence is required to strengthen current understanding about the effect of yoga and meditation on quality of life.

Meditation is a state of consciousness, characterized by marked cortical changes that are different from those in ordinary wakefulness, relaxation at rest, and sleep.<sup>9</sup> In *Sahaja* yoga meditation, simple applications of silent affirmations and breathing techniques assist an individual to achieve a state of mental silence in which the entire attention is on the

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present moment and one is free from unnecessary mental activity.<sup>10</sup> The experience is often described by its practitioners as soothing, relaxing, and enjoyable. The tranquility experienced during meditation is marked by change in electroencephalography (EEG) patterns in the cortical activity of the brain, where elevated  $\alpha$  and  $\theta$  oscillating frequencies<sup>11,12</sup> and reduced EEG complexity<sup>13</sup> mark a better internal attentional control<sup>14,15</sup> and positive emotional feedback.<sup>16</sup> The unique EEG patterns observed in *Sahaja* yoga meditation distinguishes it from the other two popular meditation practices in the West—the Transcendental meditation (TM), in which practitioners repeat a word or phrase silently to quiet and ultimately transcend the internal mental dialogue, and the Mindfulness meditation, in which practitioners simply observe or attend to thoughts, emotions, sensations, or perceptions without judgments.<sup>17</sup> During TM practice, the inconsistent  $\alpha$  amplitude,<sup>18,19</sup> decreased  $\theta$  activity,<sup>20</sup> and higher EEG complexity<sup>21</sup> suggest a possible adverse effect on consciousness. In Mindfulness meditation, asymmetric  $\alpha$  activation was observed,<sup>22</sup> which was shown to be associated with increased defensiveness<sup>23</sup> and disproportional anger.<sup>24</sup>

Clinical studies have documented beneficial effects of *Sahaja* yoga meditation in disease management for patients with epilepsy,<sup>25</sup> essential hypertension,<sup>26</sup> asthma,<sup>27</sup> menopausal symptoms,<sup>28</sup> and attention deficit-hyperactivity disorder.<sup>29</sup> In the present study, the effect of meditation on quality of life in individuals with heterogeneous health conditions was evaluated. Both quality of life and anxiety level between patients who sought meditation treatment and those who sought conventional therapy were examined. For patients who reported having hypertension at baseline, differences in blood pressure before and after treatment were also compared.

### Study Design and Setting

This prospective observational cohort study was conducted in 2008 as an international public health project through the University of Pittsburgh. The study was approved by the Institutional Review Board in both the University of Pittsburgh and Mahatma Gandhi Mission Medical College and Hospital before implementation.

Two (2) groups of patients were enrolled and followed. The common eligibility criterion in the study for both the meditation and control groups was men and nonpregnant women between 18 and 65 years old who were willing to give a written consent for being enrolled in the study. The meditation group comprised patients seeking care from the inpatient sector of the International Sahaja Yoga Research and Health Center (hereafter referred as the Health Center), located at Navi Mumbai, India. The center was the first institute where treatment based on Sahaja Yoga Meditation was provided. Doctors were formally trained in Western medicine or homeopathy and also meditated. Patients who sought treatments from the Health Center could have either major diseases or be seeking treatment for minor health issues.

The control group was comprised of patients receiving internal medicine care in the Mahatma Gandhi Mission Medical College and Hospital located at Navi Mumbai, India. The Mahatma Gandhi Mission hospital provided primary to tertiary medical care for the community. Doctors were formally trained in Western medicine. Individuals who

sought internal medicine care either had major diseases or were attending regular health checkups. Individuals were eligible for participating in the control group if they had not actively practiced meditation during the past 3 months and were willing to forgo any practice of meditation for the duration of the study. The conventional therapy received by controls during the study was medical care according to the standard Western medicine treatment guidelines.

### Study Intervention

Treatment in the Health Center consisted of daily meditation and application of cleansing practices. The therapeutic effect of meditation was achieved in the state of mental silence, where one could better introspect, address, and resolve the distress caused by negative thoughts, emotions, or behaviors. To facilitate the relaxation and mental silence (meditation), individuals could do simple exercises and cleansing practices, such as deep breathing and foot-soaking with salt water.<sup>30</sup> In the Health Center, patients continued their standard medical treatment during their stay. The daily schedule for the inpatient sector in the Health Center is described in Table 1.

### Measurement

Demographic and clinical characteristics were recorded at baseline, when participants registered to receive treatment. Quality of life and anxiety were measured both at study entry and at 2 weeks after treatment or at the time of discharge, if their stay was shorter than 2 weeks.

Quality of life was measured by two World Health Organization Quality of Life (WHOQOL) instruments: the WHOQOL-BREF<sup>31</sup> and WHOQOL-SRPB.<sup>32</sup> The WHOQOL-BREF is a 26-item questionnaire evaluating quality of life from four domains: physical health, psychologic, social relationships, and environment/surroundings. Sample questions included “How would you rate your quality of life?” and “To what extent do you feel that physical pain prevents you from doing what you need to do?” WHOQOL-SRPB is a 32-item questionnaire measuring the impact of the spirituality, religion, and personal beliefs on quality of life. A sample question was “To what extent do you find meaning in life?” This study selected the WHOQOL instruments for their coverage of important quality of life aspects, their development and validation accounted for different cultural and value systems. The default time frame is 2 weeks, with the flexibility to prolong or shorten for different study settings or patient populations.<sup>31</sup> Both instruments were self-administered. If self-administration was difficult, an interviewer assisted administration by reading items to the

TABLE 1. DAILY SCHEDULE OF ACTIVITIES AT THE SAHAJA YOGA RESEARCH AND HEALTH CENTER FOR INPATIENTS

Time	Activity
05:00	Wake up, individual meditation
8:30–9:30	Collective meditation
10:30–14:00	Doctor consultation
16:30–18:30	Collective workshop (for example, foot-soaking)
19:00–20:30	Collective meditation

participant. WHOQOL-BREF was summarized into four domain scores, and transformed to a 0–100 scale. WHOQOL-SRPB was calculated as a single domain score from 4 to 20. Higher scores indicated better quality of life.

Anxiety was measured by the Clinical Anxiety Scale (CAS), designed based on the anxiety disorder diagnostic criteria.<sup>33</sup> The instrument is a 25-item self-report scale measuring perceived anxiety level at the time of administration. A sample item was “I use tranquilizers or antidepressants to cope with my anxiety,” and the response of the participant was recorded in a 5-point Likert scale. The CAS score ranged from 0 to 100; a higher score indicated more perceived anxiety. The quality of life and perceived anxiety measures have been validated in populations with different chronic conditions or anxiety level.<sup>31–33</sup> To assess the tendency for a participant to provide answers that were considered to be more socially acceptable than his/her actual perceptions, a five-item assessment for socially desirable response set (SRDS)<sup>34</sup> was incorporated in the study questionnaire.

The blood pressure and pulse for patients with self-reported hypertension were measured at baseline and the end of follow-up. Hypertensive patients rested in a sitting position for 5 minutes before a trained staff measured their blood pressure with a calibrated sphygmomanometer. Pulse was measured at the wrist (radial artery).

### Analysis

Participants with both baseline and follow-up assessments were included in the analysis. The baseline demographic, clinical, and quality-of-life characteristics were compared between the two groups, using Student's *t*-test for continuous variables and  $\chi^2$  statistics for categorical variables.

The quality-of-life instruments and CAS were scored according to the manuals.<sup>32,33,35</sup> In the current study, missing data management rules for WHOQOL-BREF were applied to WHOQOL-SRPB, such that if <30% of items were missing within a domain for a patient, the missing value was imputed by his/her mean domain score. The domain score of an individual was not calculated if more than 30% of items were missing.

For change before and after treatment within each study group, sign-rank tests were used to compare WHOQOL-BREF domain scores and paired *t*-test for other outcomes (WHOQOL-SRPB, CAS, blood pressure, and pulse). To compare the difference between the meditation group and control group, Wilcoxon rank-sum tests and *t*-tests were used for between-group comparisons. Multivariate linear regression models were constructed to assess the effect of meditation, controlling for essential covariates such as baseline quality-of-life values and socially desirable response. In addition, the effect of modification between meditation and patient characteristics on study outcomes was tested. The two-sided  $\alpha$  level for treatment effect and effect modification in hypertensive patients was set to 0.01 to adjust for subgroup comparisons. The analysis was performed using SAS 9.1.

### Results

From July to October 2008, 70 of 112 eligible patients admitted to the inpatient sector of the Health Center consented to participate in the study and 67 completed follow-up. In the control group, 80 of the 120 eligible patients seeking care

in the internal medicine clinic of the Mahatma Gandhi Mission hospital consented to participate in the study and 62 completed follow-up. Forty-four (44; 70.0%) of the control patients received outpatient care. The mean follow-up time was 8.13 ( $\pm 5.2$ ) days for the meditation group and 14.25 ( $\pm 2.6$ ) days for controls. In the meditation group, the averaged years of practicing meditation were 7.4 ( $\pm 4.9$ ) years. Eleven (11; 16%) patients in the meditation group were from countries other than India, while all controls were Indians. The two groups were comparable in age, gender, and marital and working status (Table 2). The percentage of individuals with higher education was greater in the meditation group than in the control group. The control group had a higher physical activity level and lower body-mass index. At study entry, the prevalence of smoking and drinking were 16% and 13%, respectively, in the control group, while none of the individuals in the meditation group smoked or consumed alcohol. The self-reported clinical history was similar in the two groups, but the meditation group had a higher prevalence of prior anxiety, depression, and gastrointestinal distress. One (1) patient in the meditation group had a history of multiple sclerosis, while 2 patients in the control group reported human immunodeficiency virus infection. At baseline, 13 (19.4%) patients in the meditation group and 28 (45.2%) patients in the control group reported a history of hypertension required treatment. For patients with self-reported hypertension, the duration and management of hypertension were comparable.

In the meditation group, after a week of meditation treatment, all quality-of-life domains and clinical anxiety level improved significantly ( $p < 0.001$ , Figs. 1 and 2). Hypertensive participants in the meditation group experienced significant improvements in systolic and diastolic blood pressure. Conversely, after an average 2 weeks of conventional treatment, the control group reported a significant decline in quality of life and greater anxiety ( $p \leq 0.011$ ). Hypertensive participants in the control group had no improvement in blood pressure after treatment was received (Figs. 1 and 2).

Between-group analyses showed that at study entry, average quality-of-life scores were significantly higher in the meditation group than in the controls. After treatment, the meditation group experienced a greater improvement in all domains of quality of life (meditation group versus controls: physical: +7 versus 0; psychologic: +13 versus 0; social: +6 versus 0; environmental: +7 versus 0; spiritual [0–20 scale]: +1.2 versus -0.5,  $p < 0.001$ ). Baseline clinical anxiety scores were similar in the two groups ( $p = 0.74$ ). After treatment, the improvement in anxiety was only observed in the meditation group (between-group difference  $p < 0.001$ ).

For self-reported hypertensive patients, mean blood pressure and pulse were lower in the meditation group than controls at baseline. After treatment, there was a trend for greater reduction in mean systolic blood pressure in the meditation group than controls ( $p = 0.061$ ). The reduction in diastolic blood pressure was significantly greater for hypertensive patients in the meditation group than controls (-3.3 mm Hg versus 1 mm Hg,  $p = 0.0043$ ). The mean pulse in the meditation group was significantly lower than that of controls at baseline and at the end of follow-up ( $p < 0.001$ ). The change in pulse before and after treatment was similar in both groups ( $p = 0.87$ ).

TABLE 2. DEMOGRAPHIC AND CLINICAL PROFILE OF STUDY GROUPS AT STUDY ENTRY

	Meditation (N=67)	Controls (n=62)	p-Value
Age, mean (SD)	40.53 (11.9)	42.01 (15.5)	0.6
Female, n (%)	35 (52.2)	29 (46.8)	0.49
Marital status, n (%)			0.2
Never married	17 (25.4)	10 (16.1)	
Married	46 (68.7)	50 (80.6)	
Widowed	1 (1.5)	2 (3.2)	
Divorced/separated	3 (4.5)	0 (0)	
Education level, n (%)			<0.001
<High school	0 (0)	16 (25.8)	
High school graduate or some college	19 (28.4)	17 (27.4)	
Bachelor degree	30 (44.8)	22 (35.5)	
Graduate degree	18 (26.9)	7 (11.3)	
Work status, n (%)			0.47
Working full time	36 (53.7)	35 (56.5)	
Working part-time/homemaker	21 (31.3)	22 (35.5)	
Other	10 (14.9)	5 (8.1)	
Activity level, n (%)			<0.001
Sedentary	8 (12.1)	1 (1.6)	
Mild	21 (31.8)	5 (8.1)	
Moderate	31 (47.0)	32 (51.6)	
Strenuous	6 (9.1)	24 (38.7)	
BMI, mean (SD)	23.82 (3.5)	21.86 (4.5)	0.0069
Ever smoking, n (%)	17 (25.4)	17 (27.4)	0.79
Current smoke, n (%)	0 (0)	10 (16.1)	<0.001
Alcohol consumption during the past year, n (%)	0 (0)	8 (12.9)	0.0024
History of heart disease (including angina), n (%)	4 (6.0)	7 (11.3)	0.28
History of type 2 diabetes, n (%)	10 (14.9)	9 (14.5)	0.95
History of asthma, n (%)	2 (3.0)	3 (4.8)	0.59
History of anxiety or depression, n (%)	10 (14.9)	2 (3.2)	0.022
History of gastrointestinal distress, n (%)	18 (26.9)	6 (9.7)	0.012
History of hypertension, n (%)	13 (19.4)	28 (45.2)	0.0017
Self-reported hypertension patients (n=41)			
No. of hypertension drugs taken, median (Q1,Q3)	1 (1,2)	2 (1,2)	0.26
Hypertensive years (n=41), mean, SD	5.62 (3.4)	3.93 (5.0)	0.28

SD, standard deviation; BMI, body-mass index.

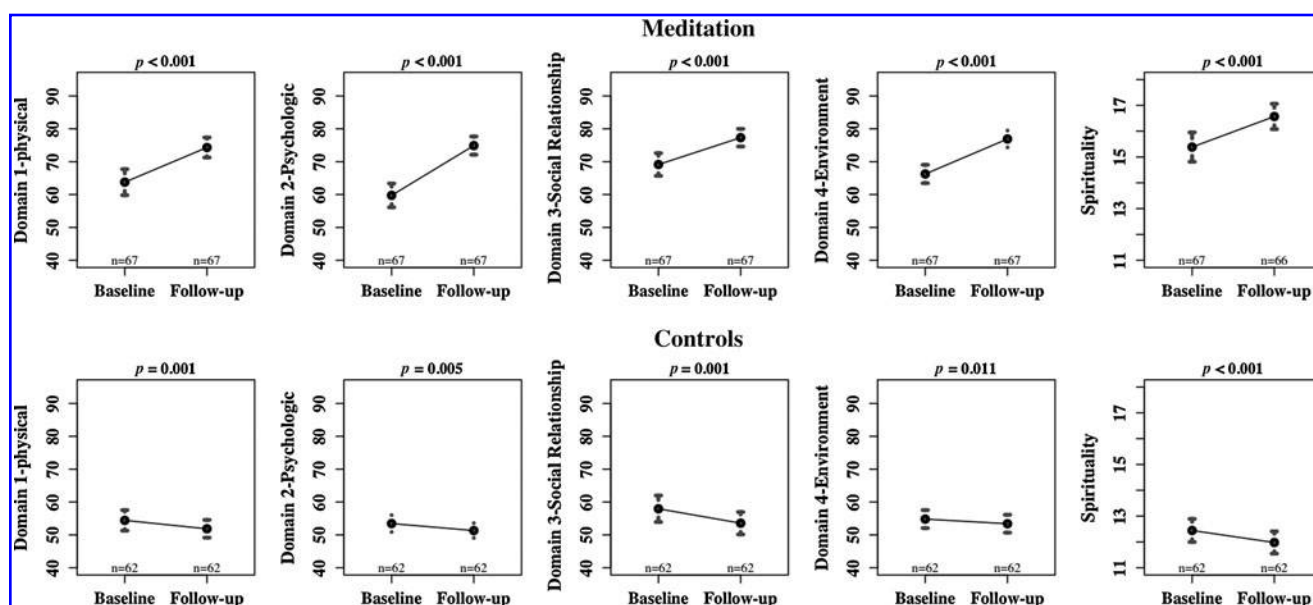


FIG. 1. Baseline versus follow-up for quality-of-life measures within meditation and control groups (mean  $\pm$  1.96 standard error).

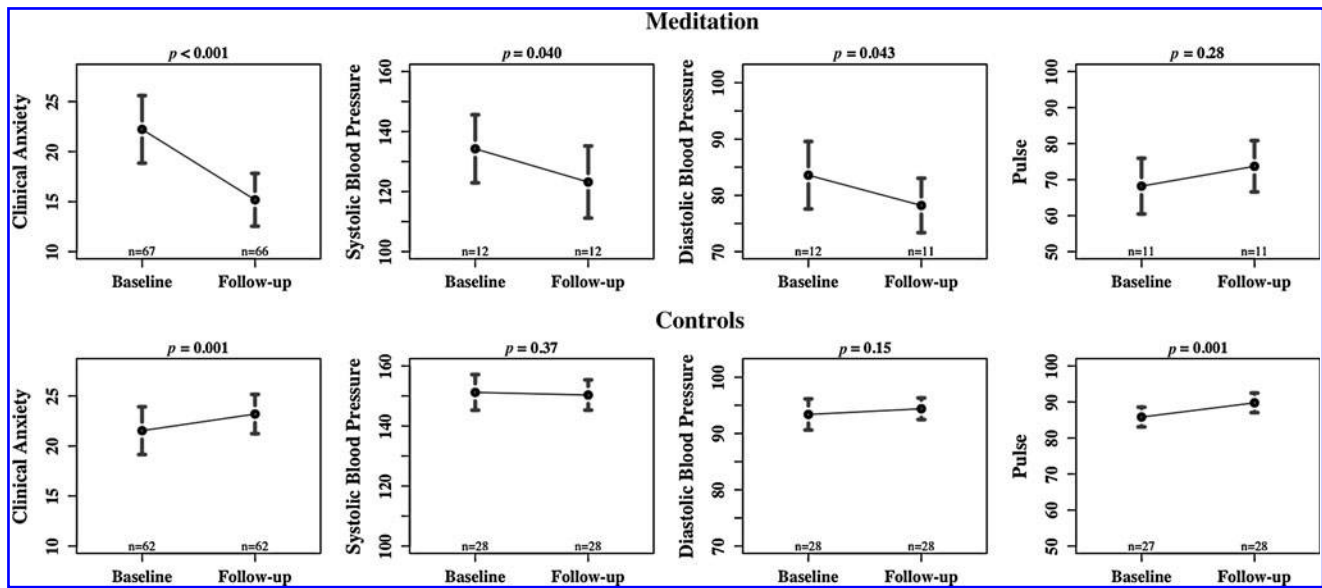


FIG. 2. Baseline versus follow-up for clinical anxiety, blood pressure, and pulse within meditation and control groups (mean  $\pm$  1.96 standard error).

In multiple linear regression models, after adjustment for baseline value and potential confounders including age, socially desirable answering pattern, and self-report illness, meditation remained the strongest independent covariate for improvement in quality of life and decrease in anxiety and blood pressure. Compared to controls, meditation was associated with a mean improvement of 15.7 units in physical, 21.7 units in psychologic, 16.7 units in social, 13.2 units in environmental, and 2.3 units (by a 0–20 scale) in spiritual quality of life ( $p < 0.001$ ) (Table 3). Meditation resulted in a

significant reduction in clinical anxiety (-8.5 units,  $p < 0.001$ ) (Table 4).

In hypertensive patients, controlling only for baseline measure in the model, meditation treatment was associated with a mean 12 mm Hg reduction in systolic blood pressure ( $p < 0.001$ , significant at an  $\alpha$ level of 0.01). The quantitative effect of meditation on diastolic blood pressure differed by diabetes status ( $p$  for effect modification = 0.0053). In patients with both hypertension and type 2 diabetes, meditation treatment decreased diastolic blood pressure by 12.32 mm

TABLE 3. EFFECT OF MEDITATION ON QUALITY OF LIFE, ADJUSTED FOR DEMOGRAPHIC AND CLINICAL VARIABLES (N = 129)

	WHOQOL-BREF									
	Physical domain (0-100)		Psychologic domain (0-100)		Social domain (0-100)		Environmental domain (0-100)		WHOQOL SRPB (0-20)	
R <sup>2</sup>	0.7339		0.7232		0.7358		0.8076		0.8741	
Parameters	Est.	P	Est.	P	Est.	P	Est.	P	Est.	P
Meditation (reference: controls)	15.7	<0.001	21.66	<0.001	16.66	<0.001	13.22	<0.001	2.29	<0.001
Baseline value	0.51	<0.001	0.45	<0.001	0.48	<0.001	0.71	<0.001	0.71	<0.001
SDRS	2.60	0.004			2.11	0.03	2.96	<0.001	0.29	0.013
Age	-0.17	0.003					-0.10	0.032	-0.02	0.007
Indian race			5.77	0.038						
Education level (reference: high school or less)							0.023			
High school graduate or some college					-0.28					
Bachelor degree					2.04					
Graduate degree					6.97					
Self report history of gastrointestinal disease					-5.78	0.007				
Ever smoking									-0.47	0.034

WHOQOL-BREF, short version of the World Health Organization Quality of Life Assessment; WHOQOL-SRPB, 32-item questionnaire of the World Health Organization Quality of Life Assessment measuring the impact of the spirituality, religion, and personal beliefs on quality of life; SDRS, socially desirable response set; Est., estimated.

TABLE 4. EFFECT OF MEDITATION ON ANXIETY LEVEL AND BLOOD PRESSURE<sup>a</sup>

	Clinical anxiety (n = 129)		Systolic blood pressure (n = 41)		Diastolic blood pressure <sup>b</sup> (n = 41)		Pulse (n = 41)	
	Est.	<i>p</i>	Est.	<i>p</i>	Est.	<i>p</i>	Est.	<i>p</i>
R <sup>2</sup>	0.5539		0.8494		0.9326		0.7454	
Parameters	Est.	<i>p</i>	Est.	<i>p</i>	Est.	<i>p</i>	Est.	<i>p</i>
Meditation (reference: controls)	-8.46	<0.001	-12.01	<0.001			-5.42	0.081
Meditation versus controls in hypertensive patients with diabetes					-12.32	<0.001		
Meditation versus controls in hypertensive patients without diabetes					-6.12	<0.001		
Baseline value	0.48	<0.001	0.80	<0.001	0.59	<0.001	0.70	<0.001
Self-reported history of type 2 diabetes					-0.32	0.77		

<sup>a</sup>Covariates in models for (1) systolic blood pressure and pulse: meditation and baseline value; (2) diastolic blood pressure: meditation (stratified by type 2 diabetes), baseline value, history of type 2 diabetes; (3) clinical anxiety: meditation, baseline value, physical activity and marital status.

<sup>b</sup>*p*-Value for interaction between meditation and self-reported history of type 2 diabetes on diastolic blood pressure: 0.0053; Est., estimated.

Hg ( $p < 0.001$ ); the effect for hypertensive patients without diabetes was smaller but still significant (6.12 mm Hg decrease,  $p < 0.001$ ). Change in pulse was similar in the meditation or control groups in the multivariate model (Table 4).

## Discussion

In the current study, an averaged 1-week meditation treatment is associated with significant improvement in quality of life, anxiety reduction, and blood pressure control. The improvements are significantly greater among patients who received meditation treatment than that among controls who received conventional therapy.

Individuals who sought meditation treatment had an average of 7 years practice of meditation, which may contribute to a higher quality of life at baseline. When the change from baseline was evaluated, the meditation group experienced significant improvement. In the control group, conventional therapy resulted in a small but significant worsening in quality of life. The observation indicates that treatment in *Sahaja* yoga meditation is associated with betterment over an extensive spectrum of quality of life. This association is supported by comparing the perceived anxiety in the meditation groups and controls. While a similar anxiety level was observed in both groups at baseline, individuals who received *Sahaja* yoga meditation treatment had a significant anxiety reduction, contrary to a small but significant rise in anxiety among those receiving conventional therapy.

The prolonged treatment and low chances of cure in chronic conditions lead to decreased quality of life in patients,<sup>36</sup> which was observed in the present study as the control group reported worsening quality of life and anxiety. Prior clinical studies have reported that meditation was associated with better moods states, quality of life, and reduction in tension and fatigue than control exercise for patients with asthma.<sup>27</sup> Children with attention deficit-hyperactivity disorder who participated in a meditation program reported improvements in self-esteem, anxiety reduction, and anger control.<sup>29</sup> Meditation was associated with better quality of life among premenopausal women.<sup>28</sup> The present study showed a better quality of life associated with meditation than with

conventional therapy for patients with heterogeneous health conditions. The results were consistent with previous clinical findings.

The positive perception in quality of life may be due to the fortified tranquil concentration in meditation. EEG studies showed increasing  $\theta$  oscillating networks during meditation.<sup>11,12</sup> Theta band power is related to orienting, attention, memory, and affective processing.<sup>11,12,37</sup> The increasing  $\theta$  band power was observed to be correlated with experience of happiness during meditation.<sup>11</sup> Previous study also showed lower perceived anxiety reported by individuals with higher  $\theta$  power.<sup>38</sup> When facing negative emotional stimuli (such as viewing an adverse movie clip), non-meditating controls experienced a heavier emotional workload, indicating by a greater  $\gamma$  synchronization in EEG than individuals who practice meditation.<sup>39</sup> The better coping of negative stimuli may contribute to a better-perceived quality of life and greater reduction in anxiety in the meditation than controls. Among self-reported hypertensive patients, at baseline, patients who practiced meditation had better blood pressure control than patients who received conventional treatment. After treatment, systolic blood pressure decreased by 9.4 mm Hg in the meditation group. The finding is of clinical and public health significance. High blood pressure was the primary or contributing cause of 11.31% deaths in United States in 2003, and the estimated direct and indirect cost of high blood pressure was \$63.5 billion in 2006.<sup>40</sup> If further validation of the effectiveness of meditation on hypertension control is obtained, cost-effective intervention programs could result in significant lives saved and savings to individuals. Hypertension is also a major risk factor for cardiovascular disease and stroke, and it is estimated that a population-wide 2-mm Hg reduction in diastolic blood pressure could prevent 6% risk of coronary heart disease and 15% risk of stroke or transient ischemic attack.<sup>41</sup> Previous study showed that a 12 mm Hg decrease in systolic blood pressure for 10 years was thought to prevent 1 death for every 11 patients treated.<sup>42</sup> The decrease in blood pressure associated with meditation treatment could potentially lead to decrease in cardiovascular mortality and morbidity.

The present study also showed that meditation was associated with greater decline in diastolic blood pressure compared to conventional treatment. The rate of decline was greater for patients with both hypertension and type 2 diabetes, with an estimated 12 mm Hg reduction in diastolic blood pressure. Hypertensive diabetic patients are at a greater risk of developing complications such as retinopathy<sup>43</sup> and nephropathy.<sup>44</sup> For patients with type 2 diabetes, tight blood pressure control reduced by 32% the risk of diabetes-associated death, by 44% the risk of stroke, and by 37% the risk of microvascular disease than less tight control.<sup>45</sup> While it requires three or more drugs for patients with type 2 diabetes to control blood pressure, meditation may be an effective lifestyle intervention for hypertension management.

The study was subject to several limitations. Because this was an observational cohort study, participants were self-selecting into the study groups. It was possible that individuals who practice meditation regularly could respond better to treatment than controls. The distribution of confounders between two study groups could not be balanced by randomization. Although results were adjusted for covariates such as baseline quality-of-life values, duration of meditation, and other confounders, between-group differences could still exist. The small percentage of foreign patients recruited in the study might influence the generalizability of the results. In multivariate analysis, Indian nationality was associated with higher psychologic quality of life than non-Indians. However, the effect of meditation treatment versus controls was significant after controlling for country difference. The study evaluated the effect of meditation within the specific setting of the Health Center, and the effect could be partly attributable to the rigorous life in the Health Center. Doctors in the Health Center also meditated, which could contribute to better health care delivery and less perceived anxiety in patients. Quality of life is best measured by self-report. The concern regarding responses that were positive but not truthful was controlled in the study by adjusting the tendency to provide socially desirable answers. The sample size of the hypertensive subgroup was small; nevertheless, within-group or between-group differences in blood pressure were sufficient to result in reasonable power. The estimated post-hoc statistical power of observing the 9.41 mm Hg decline in systolic blood pressure was 62% in the study.

A common challenge in behavioral studies is the recruitment and retention of the participants. This challenge did not hamper the current study, and the retention rate was very high. Since the study period was brief (2-week commitment from each subject), the burden of participation was minimized.

Based on the finding of the study, we suggest future investigations on the effect of *Sahaja* yoga meditation on hypertension or hyperglycemia control. Another area for investigation is derived from the observation that participants in the meditation group did not smoke or consume alcohol; how meditation influences health behavior and interferes with disease progression is to be elucidated.

## Conclusions

The current study reports that patients who receive *Sahaja* yoga meditation treatment in conjunction with conventional treatment benefit in perceived quality of life, anxiety, and

hypertension control. Further investigation on the effectiveness of *Sahaja* yoga meditation for managing chronic conditions, such as prehypertension, hypertension, and type 2 diabetes is recommended.

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## Disclosure Statement

Dr. Sandeep Rai and Dr. Madhur Rai were both affiliated with International Sahaja Yoga Research and Health Center.

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