

## Scientific Evidence of Health Benefits by Practicing Mantra Meditation: Narrative Review

### Abstract

Mantra meditation (MM) is one of the simplest and most effective meditative practices suitable for both novice and skillful meditators. It has attracted a significant number of practitioners for various health benefits or for spiritual inspiration. The scope of this review article focuses on the examination of the health benefits of practicing MM without considering the motivation by spiritual rewarding or cultivation. Through the examination, we attempt to confirm and to add scientific evidence on the benefits of mental and physical health to the practitioners. We review a large number of the recent studies of MM for understanding the mechanism in yielding medical benefits and for analyzing the quantitative evidence of the trial outcomes. The review covers four important areas: stress, anxiety, hypertension, and immunity, with the hope to evoke more studies to refine the current evidence and to encourage more studies in other promising areas. Furthermore, the review gives more attention or discussion on more recent, original, and stronger studies. The discussion can include the strong or weak points of the reviewed studies. The review discovers evidence that MM can provide various degrees of beneficial effects on the four areas considered. Studies with larger participants, superior quality, and a few others are recommended to draw firm conclusions. Several promising research areas and directions are also suggested.

**Keywords:** *Anxiety, health benefit, hypertension, immunity, mantra meditation, stress*

### Introduction

Meditation encompasses a family of gentle practices that include mantra meditation (MM), mindfulness meditation, spiritual meditation, yoga, tai chi, chi gong, and others. Of these practices, MM is described as one of the simplest and the most effective nonjudgmental attention to present-moment experiences. It has recently received much attention in the Western world.

In 2012, the US National Center for Health Statistics conducted an NHIS Adult Alternative Medicine Supplement Survey with nationwide valid samples from 32,876 households, consisting of 34,525 adults.<sup>[1]</sup> The 2012 Survey data disclosed that 1.6% of the valid respondents had practiced MM in the previous 12 months, which represents 3.6 million adults in the USA.<sup>[2]</sup> This is a significant number of adults practicing MM in the USA. Furthermore, the prevalence of practicing MM in the Eastern world

could be even higher since most meditation techniques, including MM, originate in Eastern spiritual or religious traditions.

The term mantra originates from Sanskrit and means an instrument of mind or thought. It is a sacred utterance consisting of syllables, words, or verses to form a sacred symbol, spiritual figure, or magic incantation.<sup>[3]</sup> A mantra is a central feature in MM, which employs a repeated mantra as the focus of meditation to distinguish itself from other forms of meditation. MM is a range of techniques to achieve a meditative state by repeating a mantra, in which mantra repetition no longer consciously occurs and instead, the mind reaches a near-empty state without thought or bothering by anxiety or attachments.<sup>[4,5]</sup> The mantras adopted in MM are relatively short and can be only one syllable, such as “Om” or “Ham,” known as seed syllables. In general, mantras can be chanted silently, softly, or loudly with active or passive breathing.<sup>[6]</sup>

People have used meditation for various health benefits in the areas, including anxiety, pain, depression, stress, and

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insomnia.<sup>[7]</sup> Many scientific studies have found evidence to suggest that MM should be a nonpharmacological strategy to foster positive mental and physical health among the general population. Consequently, the purpose of the present article is to review more recent studies and to find more medical evidence of the benefits of practicing MM. Moreover, the evidence presented is not meant to be a comprehensive one but rather to focus on providing evidence in four important health areas, including stress, anxiety, hypertension, and immunity, to illustrate the versatility and delicacy of the health benefits obtained from practicing MM.

The review gives more attention and discussions on more original, more recent, and randomized-controlled trials. The discussions given can include the strong or the weak points of the reviewed studies. Special attention was also placed on modern instrument measures, which tend to be more consistent and less biased. On the contrary, without appropriate statistic planning, execution, and analysis, the self-reported measures tend to have certain dependences on the metric or questionnaire used and the culture, faith, or economic background of the participants studied. Finally, closing remarks on the quality of the required studies and the future trend of MM research are given. Note that, the present article does not intend to review the spiritual or religious benefits of practicing MM.<sup>[8]</sup>

## Stress Relieving

Stress is more persistent than ever because of the accelerating pace and rapid change of modern life. Stress can be caused by many reasons, including the inability to cope with work pressure, economic conditions, or family issues, which may lead to adverse conditions such as anxiety, fear, anger, or depression. Eventually, chronic stress may affect the heart and brain functions.<sup>[9]</sup> Thus, many MM studies often deal with the outcome of stress, anxiety, and depression altogether.<sup>[10-12]</sup>

During MM, the body and mind can enter a state of profound rest. Heart and respiration rates typically decrease during meditation. However, the heart rate can also speed up during meditation in response to the introduction of stimuli perceived as stressful.<sup>[13]</sup> Moreover, Credidio found that, by practicing Clinically Standardized Meditation (CSM), meditators showed significantly greater frontalis electromyographic (EMG) decreases and peripheral skin temperature increases than did a group practicing Biofeedback.<sup>[14]</sup> Lehrer, *et al.* showed that participants practicing CSM meditation, compared with those practicing progressive relaxation or with controls, displayed greater cardiac deceleration, more frontal EEG alpha, and fewer symptoms of cognitive anxiety than those in the other groups.<sup>[12]</sup> They concluded that CSM prepares people to cope with stress.<sup>[12]</sup> Here, CSM was developed by Carrington by reciting a mantra loudly, slowly, and rhythmically to make MM flexible enough to

be more suitable for clinical purposes.<sup>[6]</sup> Biofeedback is the process of using electronic instruments to gain awareness of many physiological functions of one's body with the intention to control these functions to improve one's health. Biofeedback has been used for the treatment of headaches and migraines.<sup>[15,16]</sup> PR is based on the premise that muscle tension is the body's psychological response to anxiety-provoking thoughts and can be released by tensing and relaxing specific muscle groups.<sup>[17]</sup>

In the electronic instruments used in the above studies, EMG is a measure of muscle electrical activities in response to a nerve's stimulation and is a diagnostic procedure to assess the health of muscles and the nerve cells that control them. EEG alpha is neural oscillations in the frequency range of 8–12 Hz produced by EEG, which is the abbreviation of electroencephalogram. It is a method to measure voltage fluctuations (brain waves) resulting from ionic current within the neurons of the surface layer of the brain.

In 2009, Travis *et al.* applied EEG to investigate the effects of Transcendental Meditation (TM) on brain functioning.<sup>[18]</sup> They found that TM practice decreased the effects of previous stressful experiences and made an individual function better in stressful situations. Furthermore, their results indicated that lower sleepiness and faster habituation rates were negatively correlated with higher scores on the Brain Integration Scale, which is also negatively correlated with anxiety.<sup>[18]</sup> Here, TM is one of the popular MM techniques developed in modern times. It involves passive breathing with no specific breath patterns. Without any strenuous effort, meditators mentally (silently) repeat the mantra.<sup>[19]</sup>

In 2010, Elder *et al.* evaluated the effects of TM on psychological distress and burnout among 40 school teachers and support staff at a therapeutic school for students with severe behavioral problems in Vermont.<sup>[11]</sup> The 40 participants were randomly assigned to either the wait-list control group or the TM practicing group, in which TM was practiced twice daily for approximately 20 min for 4 months. Outcome measures, including perceived stress, depression, and burnout, were assessed after 4-month TM. Self-assessment based on the 5-point Perceived Stress Scale (PSS) was used to evaluate participants' stress. Without much explanation of their data obtained, Elder *et al.* indicated a significant improvement in the main outcomes, including stress, resulting from practicing TM compared with controls.<sup>[11]</sup> They further concluded that the TM was effective in reducing psychological distress in teachers and support staff working for students with severe behavioral problems.

In 2020, Avvenuti *et al.* combined psychometric questionnaires and functional magnetic resonance imaging (fMRI) to investigate the potential brain modifications underlying the psychological effects of

TM.<sup>[20]</sup> The 19 participants in the testing group were asked to complete two 20-min TM sessions daily, while 15 volunteers were in the control group. Both groups were evaluated before and after the 3-month TM program. The results indicated that only the TM testing group showed a decrease in perceived anxiety and stress, which correlated negatively with the changes in functional connectivity among the posterior cingulate cortex, precuneus, and left superior parietal lobule. The findings also indicated that the beneficial effects of TM may be attributed to functional brain changes that take place after a short practice period of 3 months.<sup>[20]</sup> Here, fMRI uses magnetic resonance imaging to measure brain activity by detecting changes associated with blood flow and provides the static image of the whole target region.

By measuring the galvanic skin response (GSR) of twenty healthy female college students in 2012, Das and Anand studied the effect of 3-day Om MM on the stress level change.<sup>[21]</sup> Each day, the participants perform 15-min loud Om meditation and 15-min prayer. The pretest GSR reading was 388.82 + 353.64 kilo-Ohms (Mean + Standard Deviation), while the posttest reading was 817.53 + 449.83 kilo-Ohms. Johnson and Lubin indicated that stress relaxation is accompanied by high skin resistance, which reaches its maximum during sleep.<sup>[22]</sup> Thus, Das and Anand's GSR results suggest that practicing loud Om MM and praying increases the GSR value and hence decreases the stress level of the meditation participants.<sup>[21]</sup> Here, GSR is a transient response or change in certain electrical properties of the skin associated with the sweat gland activity and elicited by any stimulus.<sup>[23]</sup> As stress levels change, variations in the electrical resistance of the skin are detected by GSR sensors. The activity of the sweat glands in response to sympathetic nervous stimulation results in an increase in the level of conductance.

In 2021, Gupta *et al.* studied the effectiveness of MM to combat stress and its effects with 30 healthy participants recruited from local undergraduate medical students in Jaipur, India.<sup>[24]</sup> Participants were subjected to a computer game stressor. In addition to the self-reporting measure based on PSS, the measures of the heart rate variability (HRV) and GSR were also taken before and after the 6-week 20-min daily MM. An interim-testing measure was also performed after the 3<sup>rd</sup> week of the 6-week study. The results indicated that a 3-week MM was long enough to have beneficial effects for participants under moderate or high stressed mind. Gupta *et al.* believed that the positive or favorable effects were attributed to a shift of sympathovagal balance to parasympathetic dominance.<sup>[24]</sup>

However, an MM study reported by Schoormans and Nyklíček in 2011 revealed no significant difference between the MM group and the mindfulness group on self-reported stress.<sup>[25]</sup> Furthermore, in 2021, Matko *et al.* studied the effects of four meditation conditions on the

changes of stress in 42 healthy participants, where these four conditions were (1) MM alone, (2) MM plus physical yoga, (3) MM plus ethical education, and (4) MM plus yoga and ethical education.<sup>[26]</sup> Results indicated that the participants in the MM-alone condition showed no sizable decrease in self-reported stress measures, while there was a tendency for the combined conditions, i.e., combining MM with other practices, to decrease stress.

Based on the above reviews, in addition to using self-reported measures, many MM studies adopted electronic measurements, including those from the EMG, EEG, fMRI, GSR Sensor, and HRV Monitor, to quantify the stress state. Using electronic measures can be more objective to minimize the subjective responses from participants and should be encouraged. At least, electronic instruments should be considered useful tools to obtain repeatable or reliable data to complement the self-reported data. In self-reported measures, the PSS was the most frequently used metric. The other metrics or questionnaires include the Index of Clinical Stress.

Overall, the vast majority of the MM studies reported significant stress relief by practicing MM, which should be a good candidate for combating stress and its effects for a wide range of people.

### Effects on Anxiety

In 1979, Boswell and Murray studied the effects of TM by quietly chanting the mantra “shantih” on physiological measures of trait anxiety.<sup>[27]</sup> After practicing at home for 15 min twice a day for 2 weeks, a final outcome session consisting of a self-report measure of Spielberger's State-Trait Anxiety Inventory was conducted. The GSR and HRV were also measured at rest, after practicing TM, and after a stress manipulation. Three control groups include an anti-meditation control, a progressive-relaxation control, and no-treatment control. There was no evidence from any of the measures that TM reduced anxiety beyond that shown in the three control groups. In 1989, Alexander *et al.* reported a randomized controlled trial on anxiety outcomes in the general population.<sup>[28]</sup> By comparing the results of the TM group with their control group, Alexander *et al.* concluded that TM had no impact on the measure of anxiety, which is consistent with the finding by Boswell and Murray.<sup>[27]</sup>

In 2014, Goyal *et al.* performed a meta-analysis of the efficacy of meditation for psychological well-being based on screened, well-qualified studies.<sup>[29]</sup> With insufficient consistent data available, MM was ranked by Goyal *et al.* as no effect on anxiety with low-strength evidence, which is also consistent with the earlier findings by Smith and Holmes indicating that MM is not an effective method for reducing anxiety.<sup>[29-31]</sup>

On the other hand, in 2014, Orme-Johnson and Barnes also conducted a meta-analysis of the effects of TM on



trait anxiety and reported that TM practice was more effective than treatment as usual and was more effective with individuals having high anxiety.<sup>[32]</sup> Although Orme-Johnson's conclusion is opposite to the findings by Goyal *et al.*, his conclusion agrees very well with the MM studies by Pearl and Carlozzi and by Carrington, which consistently showed that anxiety can be sharply reduced by practicing MM.<sup>[33,34]</sup>

Furthermore, according to Hjelle, Walton, *et al.*, and Alexander and Walton, their studies found that the anxiety scores of the regular mantra meditators were significantly lower on the state and trait anxiety scales than either controls or novice meditators.<sup>[35-37]</sup> Furthermore, Domar *et al.* in 1987 and Leserman *et al.* in 1989 reported that the Relaxation Response (RR) has successfully been used to lower the anxiety experienced by patients preparing for cardiac surgery and for ambulatory surgery, respectively.<sup>[38,39]</sup> Here, RR is an MM technique by silently chanting the one-syllable mantra "One."

In 2020, Rankhambe and Pande studied the influence of Om MM on the anxiety levels of a total of 100 bus drivers who were randomly divided into two groups; the testing group and the control group. The testing group practiced Om MM for 20 min daily for 6 days/week for 4 weeks, while the control group did not involve in any meditation practice. The Hamilton anxiety rating scale was used to evaluate anxiety levels before and after the 4-week duration. The self-reported outcome of the testing group showed that the anxiety levels were significantly reduced after practicing 4-week Om MM, while the changes of the anxiety scores of controls were insignificant.<sup>[40]</sup>

By applying EEG, TM has been found to be inversely correlated with anxiety: The higher the coherence, the lower the anxiety.<sup>[41]</sup> Practicing TM increases EEG coherence longitudinally over a year, providing further evidence for TM's physiological effects on lowering trait anxiety.<sup>[41]</sup> Furthermore, by applying fMRI, the brain blood flow patterns of 16 long-term practitioners of TM were evaluated. During TM, the blood flow was found significantly higher in attention areas (anterior cingulate and dorsolateral prefrontal cortices) and significantly lower in arousal areas (pons and cerebellum).<sup>[42]</sup> This pattern supports the understanding that in TM practice, the attentional on the mantra silently chanted was active (heightened blood flow) in an automatic manner with no effort on arousal (decreased blood flow).

It is noteworthy that, as presented in the preceding section, Lehrer *et al.* and Avvenuti *et al.*, respectively, reported that the CSM and TM had beneficial effects on both perceived anxiety and stress.<sup>[12,20]</sup>

Based on the above discussions and evidence, some recent studies still fail to support the contention that MM is an effective method of reducing anxiety. It is suspected that the

opposite conclusion or evidence may be because different anxiety levels were studied. As indicated by Orme-Johnson and Barnes, MM is more effective with meditators having high anxiety.<sup>[32]</sup> Those studies with no noticeable effects on trait anxiety may be due to the fact that the participants had the anxiety level not high enough to be detected or perceived. Nevertheless, the author concludes that the overall evidence is inconclusive and MM is a potential candidate for sizable decreasing anxiety. Future research needs to be more rigorous before firm conclusions can be drawn.

## Reduction of Hypertension

Research has shown MM to be correlated with decreased blood pressure (BP) in both pharmacologically treated and untreated hypertensive meditators.<sup>[43-45]</sup> In 2013, as reported by Brook *et al.*, TM has been recommended to the American Heart Association in its Scientific Statement as Class IIb (Benefit > Risk, additional studies and data would be helpful or needed) and Level of Evidence B (Recommendation that procedure or treatment is useful/effective and evidence from single randomized trial or nonrandomized studies).<sup>[46]</sup>

Brook *et al.* especially indicated that two trials cited in a 2007 NCCAM-funded research report were considered high methodological quality and provided strong evidence for the Heart Association to make its recommendation.<sup>[5,7]</sup> The two trials had sample sizes ranging from 37 to 106 with medium-to-long-term interventions ( $\geq 3$  months).<sup>[46]</sup> TM was found to be superior to progressive muscle relaxation and the systolic BP (SBP) reduced 4.30 mmHg (with 95% confidence interval [CI], from  $-6.02$  to  $-0.57$ ) while the diastolic BP (DBP) decreased 3.11 mmHg (with 95% CI, from  $-5.00$  to  $-1.22$ ).<sup>[46]</sup> On the other hand, the effects of health education on BP were much smaller. The corresponding SBP reduction was 1.10 mmHg (95% CI,  $-5.24$ – $3.04$ ) and the decrease of DBP was 0.58 mmHg (95% CI,  $-4.22$ – $3.06$ ).<sup>[46]</sup> The effect of TM is about four times better than that of health education. Here, CI is the abbreviation of CI.

In 1996, Alexander *et al.* studied the efficacy of TM for the treatment of hypertension in 127 African-American men and women (aged 55–85 years) with DBP from 90 to 104 mmHg and SBP  $\leq 179$  mmHg.<sup>[44]</sup> Significant declines were observed after 3-month TM for both genders. For men, SBP decreased by 12.7 mmHg and DBP dropped 8.1 mmHg, while the corresponding decreases for women were 10.4 mmHg and 5.9 mmHg, which were much bigger improvements as compared with the results reported by Brook *et al.*<sup>[46]</sup>

In 2009, Nidich *et al.* reported a randomized controlled trial in 298 healthy college students from Washington, DC to study the efficacy of TM on their BP.<sup>[47]</sup> The 298 filtered participants were divided into two groups:

The TM testing and the control group. The BPs of the TM group had an average of SBP/DBP were 118.7/75.9 mmHg from pretest readings and 116.7/74.7 mmHg from posttest readings. Changes in SBP/DBP for the TM-group were  $-2.0/-1.2$  mmHg, while the changes were  $+0.4/+0.5$  mmHg for the controls.<sup>[47]</sup> The reduction of 2.0/1.2 mmHg in BP is a relatively small improvement as compared with all others.

In 2015, Steinhubl *et al.* used an electrocardiogram (ECG) to examine the neurological and cardiovascular responses of 40 normotensive participants recruited in the USA through a week-long silent MM.<sup>[48]</sup> All participants wore a noninvasive continuous BP monitor. The monitoring records indicated that the mean arterial BP fell 2%–3% (2–3 mmHg) persistently during meditation, which was slightly larger than that of Nidich *et al.*<sup>[47]</sup>

Based on the above studies cited, the effects of TM on hypertension were all positive. Thus, the Heart Association's recommendation should be endorsed. However, the magnitudes of BP reductions were various for different groups of participants. To make MM a reliable and effective therapy for hypertension, better-quality systematic research with larger sample sizes in this area should be encouraged.

### Increasing Immunity

In 2014, Infante *et al.* studied the effect of TM on immunity by comparing the immune cells of the 19 participants in the TM group with the 16 participants in the control group.<sup>[49]</sup> The TM group regularly practiced either TM technique, while the control group had no meditation experience. The immune cells measured included the total leukocytes, granulocytes, lymphocytes, and monocytes, which were counted by an automated quantitative hematology analyzer. The lymphocytes subsets were also measured by flow cytometry. All measurements were taken from each participant after an overnight fast.<sup>[49]</sup> The TM group had higher values than the control group in B-lymphocytes (52% higher), natural killer cells (68% higher), and CD3+CD4-CD8+lymphocytes (20% higher), whereas CD3+CD4+CD8-lymphocytes showed low levels (20% lower) in the TM group. No significant differences were observed in total leukocytes, granulocytes, monocytes, and total lymphocytes.<sup>[49]</sup> Here, CD3+CD4+CD8 denote the lymphocyte surface antigens, where CD3 was used to identify T-cells, CD4 for helper T-cells, and CD8 for cytotoxic T-cells.

TM seems to have a significant effect on immune cells. Although the B-cells and natural killer cells were higher in the TM group, the data of T-cells were inconsistent. Thus, the effect of TM on the immune cells reported by Infante *et al.* became somewhat inconclusive. More research is recommended, especially to have a better way to distinguish the testing group from the control group with a controlled TM period.

In 2016, Torkamani *et al.* conducted a 10-month study with 30 healthy participants to evaluate the effect of loud MM on the change of Salivary immunoglobulin A (s-IgA).<sup>[50]</sup> The participants were all women and recruited from yoga clubs in Shiraz, Iran. Here, s-IgA is an antibody found in body fluids that prevent microorganisms' adhesion to the epithelial cells in gastrointestinal and respiratory tracts, thus helping the body to counteract the pathogens ingested, inhaled, or adhered to the body surface. The 30 participants were randomly and evenly divided into the testing and the control group. The testing group did group MM by repeating the mantra "Hoo" with a loud voice for about 20 min, while the control group participants were left passive. The mantra "Hoo," is one of God's names in Iranian theosophy.

Saliva samples were collected from both groups at four interventions, i.e., at pretest (8:30 am), after the tutorial session (9:20 am), after 20-min MM (9:50 am), and 1-h later time (10:50 am).<sup>[50]</sup> The s-IgA level was evaluated using an enzyme-linked immunosorbent assay test. The mean s-IgA concentrations of the samples taken after MM 1 h later from the testing group were 96.3  $\mu\text{g}/\text{m}$ , which was 77.3% higher than the value, i.e., 54.3  $\mu\text{g}/\text{ml}$ , taken at pretest time. The corresponding change of the s-IgA level of the control group is from 53.5  $\mu\text{g}/\text{ml}$  to 66.2  $\mu\text{g}/\text{ml}$ , a 23.7% increase, which is 3.26 times lower than that of the testing group.<sup>[50]</sup> This difference is statistically significant. Since the s-IgA level is a type of antibody found in body fluids, the higher the s-IgA level, the better the body's immune system. This study indicated that performing MM even for a single-20 min session can have a positive influence on the ant-body fluid, s-IgA, and can improve the immune states of the meditators.

The favorable effect toward immunity by loud MM presented by Torkamani *et al.* certainly is very encouraging. However, due to the limited available studies, the present review cannot provide firm evidence on the efficacy of MM on immunity. Consequently, more scientific studies in immunity are needed to coin this effect.

### Concluding Remarks

Based on the studies in the four important areas presented, there is no doubt of a strong connection between MM and human health. Strong evidence has been found that practicing MM is effective in relieving stress and in coping with hypertension. For the other two areas: anxiety and immunity, the evidence is inconclusive or not strong enough to firmly support the claim that the MM can be used to reduce anxiety or to improve immunity. It is suggested that future high-quality research in the area of anxiety and immunity is needed for reaching a firmer conclusion.

In general, although there is some evidence that MM had outcomes for improving mental or physical health, more rigorous MM studies with larger sample or participant

sizes, with better design (such as guidelines for chanting or meditation periods and others), with more electronic instrumental measures (such as ECG, EEG, EMG, and fMRI), and with less self-reporting surveys, are requested before firm conclusions can be drawn.

For a better understanding of the impact of MM on the health of practitioners, more studies in some emerging areas or using emerging techniques should be encouraged. For example, the rhythmic effects of MM should be explored. By examining 23 healthy adults, Bernardi *et al.* reported that the respiratory rate during MM slowed down from the normal  $14.1 \pm 4.8$  breaths/min to  $5.7 \pm 0.6$ /min, which is close to the 6/min Mayer rhythm ( $=0.1$  Hz).<sup>[51]</sup> It has been recently found that the respiratory rate at 6 breaths/min or at the Mayer rhythm can induce favorable psychological and possibly physiological effects. Consequently, further rigorous studies are needed to clarify these psychological and physiological effects.<sup>[51,52]</sup>

Furthermore, the effects of MM on the neuropsychological response or performance are also critical. Some studies used the digit-letter substitution task (DLST) or other similar tasks to assess the neuro-performance of MM practitioners.<sup>[53,54]</sup> Here, DLST is a game-like test measuring the information processing speed of the brain, in which the participants are required to match particular symbols-digits signs within a preset time. The test is not a direct measurement of the function of the brain. As a result, more studies using modern instruments, such as CANE, are necessary to directly measure neuropsychological functions to draw more accurate and reliable results. Note that CANE, an acronym of Capturing Activated Neuronal Ensembles, is a newly developed instrument for labeling and tracing neural circuits in the brain that would be invaluable for better understanding the effects of MM on the human mind and body.<sup>[55,56]</sup>

Finally, the influences of MM on the quality of life are worthwhile to study because the purpose of health improvement is always to increase the quality of life. The traits of stress, anxiety, hypertension, and immunity considered in this article are all having the goal of improving the quality of life. Although several investigators, including Dewi, Arifin, and Ismail, have directly addressed some of these MM influences,<sup>[57]</sup> additional research using modern instruments rather than self-reported questionnaires is desirable in providing direct measurements and reaching quantitative conclusions.

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### Conflicts of interest

There are no conflicts of interest.

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