

The Effectiveness of Rajyoga Meditation as an Adjuvant for Panic Anxiety Syndrome

Abstract

Objective: One of the most prevalent psychiatric conditions that affect a person's quality of life, ability to function and productivity, and consequently the loss of national income, are anxiety disorders. Rajyoga meditation (RM) is a form of meditation that is performed without rituals or mantras and can be practiced anywhere at any time. In this study, we attempted to evaluate the modulation of psycho-physiological parameters in panic disorder patients by a technique of short-term on RM. **Methods:** In this prospective randomized control study, 110 patients with panic disorder were randomized into two groups, Group A (standard treatment + RM) and Group B (Standard treatment). The participants of both group participants were subjected to sleep quality score, Physical Health Questionnaire-9 score, Panic Disorder Severity Scale (PDSS), and Hamilton Anxiety Rating Scale (HAM-A) questionnaires before starting the study (baseline) and at the end of the 8th week. Study groups were compared at baseline and at the end of 8 weeks. **Results:** We found that the PDSS/HAM-A was not statistically different among the study groups at baseline ($P > 0.05$); however, there was a statistically significant difference in mean z-scores of PDSS and post-HAM-A scores among the study groups at 8 weeks ($P < 0.001$). The composite score was created by adding the z-scores of pre- and post-PDSS and HAM-A. We found a statistically significant difference in postcomposite scores between the study groups ($P < 0.001$). Analysis of co-variance for PDSS and HAM-A among study groups showed statistical significance ($P < 0.001$). **Conclusion:** When used in conjunction with pharmaceutical treatments for the treatment of panic disorder, RM is a successful therapy. The key factors are adherence and motivation while being supervised by a licensed therapist.

Keywords: Composite score, Hamilton Anxiety Rating Scale, panic anxiety syndrome, Panic Disorder Severity Scale, Rajyoga meditation, z-score

Introduction

One of the most prevalent psychiatric conditions that affects a person's quality of life, ability to function and productivity, and consequently, the loss of national income, are anxiety disorders (ADs). According to the World Mental Health Survey, the lifetime prevalence of ADs varies between 3% and 19% among nations.^[1] According to the Global Burden of Disease 2015 report, ADs contributed to the sixth-highest number of years with a disability.^[2] Despite the enormous disease burden, ADs are generally underdiagnosed and undertreated, which results in significant health damage and financial loss.

Panic disorder (with or without agoraphobia), agoraphobia without panic, social phobia (social AD), specific phobia, generalized AD (GAD), acute

stress disorder, posttraumatic stress disorder, obsessive-compulsive disorder, and AD not otherwise specified are the major categories of ADs listed in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-IV) (American Psychiatric Association).^[3]

Panic attacks happen frequently and without warning in people with panic disorder. Even when there is no obvious threat or trigger, these attacks are distinguished by a rapid wave of panic, discomfort, or a sense of losing control. Not everybody who has a panic episode goes on to have a panic disorder.

One of the most prevalent ADs is panic disorder, with lifetime prevalence rates in the general population estimated to range between 2.1% and 4.7%.^[4,5] Since panic disorder is frequently accompanied by a

**Kamlesh Jha,
Pankaj Kumar,
Yogesh Kumar,
C. P. Ganashree,
Chandrabhushan
Tripathi¹,
B. K. Shrikant²**

*Department of Physiology,
All India Institute of Medical
Sciences, Patna, Bihar,*

*¹Department of Biostatistics,
IHBAS, New Delhi, ²Natinal
Co-ordinator, pARCWing of
BKWSU, Mount Abu, Rajasthan,
India*

Address for correspondence:

*Dr. C. P. Ganashree,
Department of Physiology,
All India Institute of Medical
Sciences, Patna, Bihar, India.
E-mail: drganashree1979@
gmail.com*

Access this article online

Website: <https://journals.iwwo.com/IJOY>

DOI: 10.4103/ijoy.ijoy_149_23

Quick Response Code:



This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Jha K, Kumar P, Kumar Y, Ganashree CP, Tripathi C, Shrikant BK. The effectiveness of Rajyoga meditation as an adjuvant for panic anxiety syndrome. *Int J Yoga* 2023;16:116-22.

Submitted: 04-Aug-2023

Revised: 01-Oct-2023

Accepted: 04-Oct-2023

Published: 21-Nov-2023

chronic progression that causes financial hardship and a loss of quality of life, it is crucial to properly prevent and treat panic disorder.

Psychological and pharmaceutical therapies are two of the main strategies for treating panic disorder. Cognitive-behavioral therapy is a type of psychological intervention. There are elements of their therapy regimens that may additionally improve their corresponding medical illnesses in patients with a panic disorder and concurrent comorbid medical ailments.

Meditation is usually defined as a form of mental training that aims to improve an individual's psychological capacities. Meditation encompasses a family of complex practices that include yoga meditation, mindfulness meditation, mantra meditation, and tai chi.^[6] Rajyoga meditation (RM) is a form of meditation that is performed without rituals or mantras and can be practiced anywhere at any time. Rajyoga word has been derived from Raja, meaning king, and yoga, meaning union between soul (spiritual energy) and supreme soul (ocean of spiritual energy).^[7]

The objective of this study was to evaluate the modulation of psycho-physiological parameters in panic disorder patients by a technique of short term on RM.

Methods

In this prospective randomized control Study, 110 patients with panic disorder, as defined by the DSM-5 criteria,^[8] were selected by consecutive sampling from the Psychiatry Department at the All India Institute of Medical Sciences, Patna. The same control group design was applied.

All the participants were subjected to the preapproved demographic questionnaire and Physical Health Questionnaire-9 (PHQ 9), which were used for screening purpose.

Patients in the age group of 18–60 years of either gender diagnosed according to the DSM-5 criteria for Panic AD with comorbid depression and PHQ 9 score <20 were included in the study. Patients with a history of comorbid psychiatric syndrome, subjects with a history of neurological trauma, vascular disease, and organic brain disorder, and patients with alcohol addiction were excluded from the study.

All the study subjects have been explained about the study protocol in their language of communication and were asked to sign the informed consent before beginning of the study. Prior ethical approval has been taken from the Institute Ethical Committee vide letter number AIIMS/Pat/IEC/2019/411 dated November 30, 2019. The study has also been registered on the trial registry portal of Government of India vide Registration Number CTRI/2020/12/029462 before starting the study.

The study participants were randomized into two groups using computer-generated block randomization tables. The two groups were defined as follows:

- Group A: Experiment (standard treatment + RM) group: $n = 55$
- Group B: Control (standard treatment) group: $n = 55$.

Standard treatment

Selective serotonin re-uptake inhibitor (SSRI) as well as cognitive behaviour therapies (CBT) as per psychiatric advice and clinical psychologist supervision was given as standard treatment.

Rajyoga meditation

The RM technique from the Brahma Kumaris school of thought, which emphasizes the cultivation of positive thoughts for oneself and others through guided technique, was used in the RM practice in the current study. With a focus on the idea of the ultimate soul, a hypothetical primary source of energy for each and every person, particularly emphasizes the intentional transfer of cognitive process from a body-conscious to the soul-conscious state.

The intervention arm of the study population has been subjected to supervised RM sessions tailored specifically for the purpose of anxiety spectrum disorder by a team of long-term (>10 years) Rajyoga meditators. The RM session protocol (6 domains) was practiced sequentially by all the intervention group participants 25–30 min each morning and evening daily for 5 days or more every week for 8 weeks.

Meditation quality was assessed by subjective and objective feedback.

Subjective feedback

Each fortnight, the six components of the meditation practice were assessed for the self-reported effectiveness by the participants on 0–10 scale with a score of 0 if the participants could not attain any focus for the meditation practice most of the time during the fortnight and a score of 10 if he could attain desired focus most of the time during the fortnight. The maximum possible score could be 60 for the fortnight and the maximum possible total score for the complete duration would be 240.

Objective feedback

Each fortnight, the six domains were scored between 0 and 4 for the level of understanding of the concept of meditation by the participants. A score of 0 was given if a participant could not understand the domain and 4 if the participant could be able to make a very good understanding of it. The maximum score could be 28 for the fortnight, and 140 for the total period [Table 1].

The participants of both the group participants were subjected to the following before starting the study (baseline) and at the end of 8th week.

Table 1: The quantitative scores for the individual components of meditation based upon subjective feedback of the participants

Domains	Score				
	0	1	2	3	4
I. Knowledge of self	No understanding	Little understanding	Reasonable understanding	Good understanding	Very good understanding
II. Knowledge of supreme	No understanding	Little understanding	Reasonable understanding	Good understanding	Very good understanding
III. Knowledge of universal flow of energy	No understanding	Little understanding	Reasonable understanding	Good understanding	Very good understanding
IV. Yoga					
Morning (30 min)	Felt nothing	Felt somewhat	Felt reasonably	Good feeling	Very good feeling
Evening (30 min)	Felt nothing	Felt somewhat	Felt reasonably	Good feeling	Very good feeling
V. Dharana (quality of traffic control)	Felt nothing	Felt somewhat	Felt reasonably	Good feeling	Very good feeling
VI. Service/good wishes and gratitude (quality of practice)	Felt nothing	Felt somewhat	Felt reasonably	Good feeling	Very good feeling

1. Preapproved demographic and clinical questionnaire
2. Sleep quality score: Subjective feedback: 0-Complete loss of sleep to 10-Perfectly sound sleep
3. PHQ-9 score
4. Panic Disorder Severity Scale (PDSS) questionnaire
5. Hamilton Anxiety Rating Scale (HAM-A) questionnaire.

Data analysis

The data have been compiled using Microsoft Excel [Internet] (Microsoft Corporation, 2010). The data have been further analyzed using SPSS version 27.0 (IBM Corp. (2020). IBM SPSS Statistics for Windows). All the normally distributed continuous variables have been compared, computing mean and standard deviation with a 95% confidence interval. Nonparametric tests have been used for nonnormally distributed variables; the outcome is presented as proportions. Pearson’s correlation has been used for assessing the associations. A value of $P < 0.05$ has been taken as the level of significance.

Results

Sociodemographic characteristics

The sociodemographic data of the participants of the two groups are presented in Table 2. The two study groups were comparable in terms of sociodemographic variables ($P > 0.05$).

Table 3 shows the comparison of comorbidities among study groups. The two study groups were comparable in terms of mean sleep hours, diagnosis, mean duration of untreated period, family history, and comorbidities ($P > 0.05$). Figure 1 shows panic disorder and panic attacks with anxiety was distributed equally among study groups ($P > 0.05$).

We calculated individual z-score for pre- and post-PDSS/HAM-A. We found that the pre-PDSS/HAM-A were not statistically different among the study groups ($P > 0.05$); however, there was a statistically

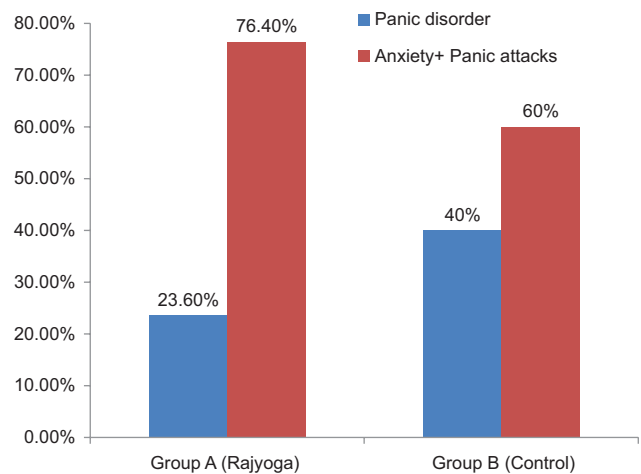


Figure 1: Bar graph showing diagnosis of study groups

significant difference in mean z-scores of post-PDSS and post-HAM-A scores among the study groups ($P < 0.001$).

The composite score was created by adding the z-scores of pre- and post-PDSS and HAM-A. We found a statistically significant difference in postcomposite scores between the study groups ($P < 0.001$) [Table 4].

We used preintervention PDSS/HAM-A as a covariate when comparing the postintervention PDSS/HAM-A between Group A and Group B. Therefore, we ran a one-way ANCOVA with: (a) Postintervention PDSS/HAM-A as the dependent variable; (b) The control and two intervention groups as levels of the independent variable, and (c) The preintervention PDSS/HAM-A as the covariate.

Tables 5 and 6 show whether there was an overall statistically significant difference in postintervention PDSS/HAM-A between the study groups once their means had been adjusted for preintervention PDSS/HAM-A.

The data have further been evaluated for the possible correlation between the difference in clinical scores of the

Table 2: Sociodemographic variables among study groups

	Group A (Rajyoga), n (%)	Group B (control), n (%)	P
Age (years), mean±SD	34.49±8.3	34.36±11.1	0.946*
Gender			
Males	38 (69.1)	27 (49.1)	0.052 [#]
Females	17 (30.9)	28 (50.9)	
Type of family			
Nuclear	22 (40)	22 (40)	1 [#]
Joint	33 (60)	33 (60)	
Education			
Uneducated	2 (3.6)	5 (9.1)	0.215 [#]
Elementary school	4 (7.3)	1 (1.8)	
High school	17 (30.9)	25 (45.5)	
Graduation	24 (43.6)	19 (34.5)	
Postgraduation	7 (12.7)	3 (5.5)	
Higher qualification	1 (1.8)	2 (3.6)	
Occupation			
Unemployed	13 (23.6)	6 (10.9)	0.344 [#]
Housewife	12 (21.8)	17 (30.9)	
Self employed	9 (16.4)	8 (14.5)	
Government job	6 (10.9)	5 (9.1)	
Student	2 (3.6)	0	
Agriculture	6 (10.9)	10 (18.2)	
Others	7 (12.7)	9 (16.4)	
SES			
Upper	4 (7.3)	3 (5.5)	1 [#]
Upper middle	4 (7.3)	4 (7.3)	
Lower middle	28 (50.9)	29 (52.7)	
Upper lower	19 (34.5)	19 (34.5)	
Dietary pattern			
Vegetarian	12 (21.8)	13 (23.6)	1 [#]
Nonvegetarian	43 (78.2)	42 (76.4)	
Tobacco use	5 (9.1)	5 (9.1)	1 [#]
Alcohol use	0	1 (1.8)	0.315 [#]

*t-test, [#]Chi-square test. SD: Standard deviation, SES: Socioeconomic status

Table 3: Comparison of panic anxiety syndrome among study groups

	Group A (Rajyoga), n (%)	Group B (control), n (%)	P
Mean hours of sleep	7.4±1.1	7.3±2.1	0.714*
Diagnosis			
Panic disorder	13 (23.6)	22 (40)	0.101 [#]
Anxiety + panic attacks	42 (76.4)	33 (60)	
Mean duration of untreated period from onset of illness (months)	18.65±13.9	17.3±15.9	0.629*
Family history			
Yes	6 (10.9)	5 (9.1)	1 [#]
No	49 (89.1)	50 (90.9)	
Co-morbidities			
Nil	45 (83.3)	43 (78.2)	0.647 [#]
Anxiety	1 (1.9)	4 (7.3)	
Depression	2 (3.7)	2 (3.6)	
Agoraphobia	6 (11.1)	5 (9.1)	
Dissociative symptoms	1 (1.8)	1 (1.8)	

*t-test, [#]Chi-square test

severity of the condition before and after intervention and the total meditation quality scores among study participants

using Pearson’s correlation after testing for Levine’s test for the equality of variance. There was a positive correlation

Table 4: Z-score and composite score for Panic Disorder Severity Scale and Hamilton Anxiety Rating Scale among study groups

Clinical scores	Mean±SD		Effect size	P
	Group A	Group B		
PDSS (z-score)				
Pre	-0.136±1.02	0.136±0.96	0.27	0.155*
Post	-0.72±0.68	0.72±0.71	2.07	<0.001*
HAM-A (z-score)				
Pre	-0.64±0.98	0.064±1.02	0.704	0.503*
Post	-0.73±0.56	0.73±0.79	2.13	<0.001*
Composite score PDSS and HAM-A				
Pre	-0.1±8.75	0.1±0.88	0.032	0.234*
Post	-0.72±0.52	0.72±0.63	2.49	<0.001*

*t-test. PDSS: Panic Disorder Severity Scale, HAM-A: Hamilton Anxiety Rating Scale, SD: Standard deviation

Table 5: Analysis of co-variance for Panic Disorder Severity Scale and Hamilton Anxiety Rating Scale among study groups

ANCOVA	Group A	Group B	F	P
PDSS	11.53±3.5	4.38±3.4	145.84	<0.001*
HAM-A	17.4±5.44	7.33±3.89	161.64	<0.001*

*Statistically Significant. PDSS: Panic Disorder Severity Scale, HAM-A: Hamilton Anxiety Rating Scale, ANCOVA: Analysis of co-variance

Table 6: Repeated measures ANOVA for Panic Disorder Severity Scale and Hamilton Anxiety Rating Scale among study groups

Variable	Group, mean±SD		Partial eta square	P
	Control	Experimental		
ZD				
Pre	0.068±0.50	-0.067±0.79	0.016	0.192
Post	-0.038±0.58	0.038±0.74		
PDSS				
Pre	15.31±4.96	13.91±5.92	0.322	<0.001
Post	11.53±3.53	4.38±3.40		
HAMA				
Pre	26.35±6.64	25.51±6.40	0.406	<0.001
Post	17.40±5.44	7.33±3.90		

Two-way RMANOVA. PDSS: Panic Disorder Severity Scale, HAM-A: Hamilton Anxiety Rating Scale, SD: Standard deviation, ZD: Z-score for difference in scores

between clinical score and meditation quality; however, it was not statistically significant ($P > 0.05$) [Table 7].

Discussion

To improve a patient's total health and well-being, complementary treatments or alternative medicines are utilized in conjunction with traditional medical management.^[9] Yoga, massage therapy, progressive muscle relaxation, acupuncture, acupressure, reflexology, aromatherapy, music therapy, guided imagery, and meditation are a few examples of these treatments. Normally, medications are used to treat anxiety before

and after surgery, but mounting research supports the value of complementary therapies in the healing process. These treatments are used to lessen stress, headaches, the length of hospital stays, and the need for sedatives, and to improve patients' relaxation, sleep, satisfaction, and overall health.^[10,11]

Our study found that the z-scores of PDSS and HAM-A were not statistically different among the study groups ($P > 0.05$) during preintervention period; however, there was a statistically significant difference in mean z-scores of PDSS and post-HAM-A scores after intervention among the study groups ($P < 0.001$). Our study also found a statistically significant difference in postcomposite scores between the study groups ($P < 0.001$). We also found that there was an overall statistically significant difference in postintervention PDSS/HAM-A between the study groups once their means had been adjusted for preintervention PDSS/HAM-A.

According to neuroimaging studies, meditation causes the prefrontal cortex, thalamus, and inhibitory thalamic reticular nucleus to become more active, as well as the functional differentiation of the parietal lobe.^[12] Anxiolytic effects may result from neurochemical changes brought on by meditation, enhanced parasympathetic activity, decreased locus ceruleus firing with decreased noradrenaline, enhanced GABAergic drive, increased serotonin, and lower levels of the stress hormone cortisol are the elements that reduce anxiety during meditation. The anti-anxiety effects of meditation are also influenced by the elevated levels of endorphins and arginine-vasopressin.^[12]

According to a study by Parmentier *et al.*,^[13] mindfulness meditation lessens anxiety and depressive symptoms by regulating emotions, reducing concern, and decreasing thinking rumination.

Another study, a randomized clinical trial by Hoge *et al.* (2013) on a subset of participants with GAD, found that although both the intervention group had shown a significant reduction in the HAM-A score after an 8-week

Table 7: Correlation between meditation quality and clinical improvement

Clinical scores	Meditation quality score from baseline (n=300)		Meditation quality score from 1 st fortnight (n=240)	
	Correlation co-efficient (r)	P	Correlation co-efficient (r)	P
D1: (Pre-HAM-Post-HAM)	0.090	0.513	0.011	0.917
D2: (Pre-PDSS-Post-PDSS)	0.150	0.273	0.038	0.713
Composite PDSS and HAM	0.135	0.325	0.031	0.760

PDSS: Panic Disorder Severity Scale, HAM-A: Hamilton Anxiety Rating Scale

intervention of mindfulness-based stress reduction (MBSR) and stress management education, the group that had received the MBSR intervention had a significantly lower stress score and better tolerability.^[14]

The prefrontal cortex and amygdala are crucial for controlling emotions and the stress response. The prefrontal cortex is known to focus more on the positive handling of similar inputs, whereas the amygdala is known to attribute meaning to unpleasant emotional stimuli. The cortical brain region’s inverse relationship to a person’s behavior in a stressful circumstance appears to be modulated by meditation. According to studies, during meditation, prefrontal activity surpasses amygdala reaction.^[15,16]

RM is a term that is frequently used in relation to meditation and has references in numerous traditional Indian literary works, such as the Bhagwadgita and Patanjali’s Yoga Sutras. According to some recent studies, RM boosts happiness through neuroplasticity. In one study, it was found that RM practices were linked to a significant increase in the grey matter volume in the brain regions related to emotion regulation, happiness, and reward centers, the right insular cortex, and the left inferior orbitofrontal cortex.^[17] It is widely established that the etiology of panic disorder is directly related to both the orbitofrontal cortex and the insular cortex.^[18] The neural plasticity brought on by the guided meditation practice of the intervention group members may have contributed to the short-term meditation intervention’s success in reducing anxiety symptoms and the severity of the condition in the current study.

According to a study by Kiran *et al.*,^[19] patients who practiced Rajyoga also had elevated blood cortisol levels on the 2nd postoperative day, but the increase was markedly less than in the control group. On the 5th postoperative day, the Rajyoga group’s cortisol levels generally returned to normal range as the stress was resolved. In addition, Creswell *et al.* discovered that practicing mindfulness meditation for a brief amount of time changes how the brain and body react to stress.^[10] Similarly to this, Turakitwanakan *et al.* have found that practicing mindfulness meditation lowers blood cortisol levels, which suggests that it can reduce stress.^[20] Gainey *et al.* found that in diabetic patients, meditation decreased glycated hemoglobin and cortisol levels.^[21]

Conclusion

When used in conjunction with pharmaceutical treatments for the treatment of panic disorder, RM is a successful

therapy. The key factors are adherence and motivation while being supervised by a licensed therapist. The results of the current study indicate that RM techniques can improve sleep quality and lower clinical panic AD scores. We conclude that irrespective of the quality of meditation, mere meditation practice for the long term would help alleviate the anxiety and panic disorder symptoms.

Ethical approval

The work has been approved by the Institutional Ethical Committee of AIIMS, Patna, in which it was performed and that subjects gave informed consent to the work. The study has also been registered on the trial registry portal of the Government of India vide registration number CTRI/2020/12/029462. Name of the ethics committee: IEC, AIIMS Patna. Approval number and date: AIIMS/Pat/IEC/2019/411 dated November 30, 2019.

Acknowledgment

The authors acknowledge Department of Science and Technology, Government of India for the funding support for the study under DST-SATYAM initiative (research grant no DST/SATYAM/255/18). The authors express their gratitude toward the patients, facilities, scientific and technical assistance provided by Department of Physiology and Psychiatry in completing this work.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Kessler RC, Aguilar-Gaxiola S, Alonso J, Chatterji S, Lee S, Ormel J, *et al.* The global burden of mental disorders: An update from the WHO World Mental Health (WMH) surveys. *Epidemiol Psychiatr Soc* 2009;18:23-33.
2. World Health Organization. Depression and Other Common Mental Disorders: Global Health Estimates. Geneva: World Health Organization; 2017.
3. American Psychiatric Association. Diagnostic and Statistical Manual for the Assessment of Mental Disorders. 4th ed. Washington, DC: American Psychiatric Association; 1994.
4. Baxter AJ, Vos T, Scott KM, Ferrari AJ, Whiteford HA. The global burden of anxiety disorders in 2010. *Psychol Med* 2014;44:2363-74.
5. Carta MG, Moro MF, Aguglia E, Balestrieri M, Caraci F, Dell’Osso L, *et al.* The attributable burden of panic disorder in

- the impairment of quality of life in a national survey in Italy. *Int J Soc Psychiatry* 2015;61:693-9.
6. Ospina MB, Bond K, Karkhaneh M, Tjosvold L, Vandermeer B, Liang Y, *et al.* Meditation practices for health: State of the research. *Evid Rep Technol Assess (Full Rep)* 2007;155:1-263.
 7. Telles S, Desiraju T. Autonomic changes in Brahmakumaris Raja yoga meditation. *Int J Psychophysiol* 1993;15:147-52.
 8. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington, D.C: American Psychiatric Association; 2013.
 9. Hart J. Complementary therapies before and after surgery. *Altern Complement Ther* 2009;15:184-8.
 10. Creswell JD, Pacilio LE, Lindsay EK, Brown KW. Brief mindfulness meditation training alters psychological and neuroendocrine responses to social evaluative stress. *Psychoneuroendocrinology* 2014;44:1-12.
 11. Kiran U, Behari M, Venugopal P, Vivekanandhan S, Pandey R. The effect of autogenic relaxation on chronic tension headache and in modulating cortisol response. *Indian J Anaesth* 2005;49:474-8.
 12. Tang YY, Hölzel BK, Posner MI. The neuroscience of mindfulness meditation. *Nat Rev Neurosci* 2015;16:213-25.
 13. Parmentier FB, García-Toro M, García-Campayo J, Yañez AM, Andrés P, Gili M. Mindfulness and symptoms of depression and anxiety in the general population: The mediating roles of worry, rumination, reappraisal and suppression. *Front Psychol* 2019;10:506.
 14. Hoge EA, Bui E, Marques L, Metcalf CA, Morris LK, Robinaugh DJ, *et al.* Randomized controlled trial of mindfulness meditation for generalized anxiety disorder: Effects on anxiety and stress reactivity. *J Clin Psychiatry* 2013;74:786-92.
 15. Keng SL, Smoski MJ, Robins CJ. Effects of mindfulness on psychological health: A review of empirical studies. *Clin Psychol Rev* 2011;31:1041-56.
 16. Creswell JD, Way BM, Eisenberger NI, Lieberman MD. Neural correlates of dispositional mindfulness during affect labeling. *Psychosom Med* 2007;69:560-5.
 17. Babu MG, Kadavigere R, Koteswara P, Sathian B, Rai KS. Rajyoga meditation induces grey matter volume changes in regions that process reward and happiness. *Sci Rep* 2020;10:16177.
 18. Martin EI, Ressler KJ, Binder E, Nemeroff CB. The neurobiology of anxiety disorders: Brain imaging, genetics, and psychoneuroendocrinology. *Psychiatr Clin North Am* 2009;32:549-75.
 19. Kiran U, Ladha S, Makhija N, Kapoor PM, Choudhury M, Das S, *et al.* The role of Rajyoga meditation for modulation of anxiety and serum cortisol in patients undergoing coronary artery bypass surgery: A prospective randomized control study. *Ann Card Anaesth* 2017;20:158-62.
 20. Turakitwanakan W, Mekseepalard C, Busarakumtragul P. Effects of mindfulness meditation on serum cortisol of medical students. *J Med Assoc Thai* 2013;96 Suppl 1:S90-5.
 21. Gainey A, Himathongkam T, Tanaka H, Suksom D. Effects of Buddhist walking meditation on glycemic control and vascular function in patients with type 2 diabetes. *Complement Ther Med* 2016;26:92-7.