

Unlocking Inner Peace: Benefits of Yoga in Patients with Major Depressive Disorder – A Randomized Controlled Trial

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Abstract

Background: Major depressive disorder (MDD) is a leading cause of disability worldwide, significantly affecting cognitive, emotional, and social functioning. While pharmacological and psychotherapeutic treatments are standard, many patients experience incomplete remission. Integrative approaches like yoga, particularly Sudarshan Kriya Yoga (SKY), have shown potential as adjunctive therapies for MDD.

Objective: The aim of the study was to assess the efficacy of SKY as a complementary intervention in MDD by evaluating its impact on depression severity, anxiety levels, and quality of life.

Materials and Methods: This randomized controlled trial included 80 participants diagnosed with MDD, randomly assigned to either the SKY group ($n = 40$) or a control group receiving standard treatment alone ($n = 40$).** Depression severity (Hamilton depression rating scale [HAM-D]), anxiety (beck anxiety inventory, [BAI]), and quality of life (quality of life scale, [QOLS]) were assessed at baseline, 6 weeks, and 12 weeks.

Results: The SKY group showed a significantly greater reduction in HAM-D scores compared to the control group ($P < 0.001$, Cohen's $d = 1.20$), indicating a large effect size. Quality of life improved significantly (QOLS, $P < 0.001$, Cohen's $d = 1.72$). However, anxiety reduction did not reach statistical significance (BAI, $P = 0.06$).

Conclusion: SKY is an effective and accessible complementary therapy for MDD, significantly improving depressive symptoms and overall well-being. While anxiety reduction was observed, further studies with larger samples and longer follow-ups are needed to confirm its impact. Given its minimal cost and ease of practice, SKY may serve as a valuable adjunct to conventional MDD treatments.

Keywords: Anxiety, Depression, Major Depressive Disorder, Sudarshan Kriya Yoga, Yoga

INTRODUCTION

Major depressive disorder (MDD) is a significant global health concern, affecting millions and profoundly impairing mood, cognition, and daily functioning.^[1] It is a mood disorder that causes a persistent feeling of sadness and loss of interest. Furthermore called clinical depression, it affects

how you feel, think, and behave and can lead to a variety of emotional and physical problems. MDD-affected individuals may have trouble doing normal day-to-day activities, and sometimes they may feel as if life is not worth living. The burden of MDD has been exacerbated by societal and lifestyle factors. The COVID-19 pandemic led to a 25% increase in depression cases globally,^[2] and sedentary behavior has been linked to higher depression risk.^[3]

MDD is a complex disorder that cannot be fully explained by any one single established biological or environmental pathway. Instead, MDD seems to be caused by a combination of genetic, environmental, psychological, and biological factors. MDD occurs about twice as often in

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women than it does in men and affects one in six adults in their lifetime. In addition, environmental factors, such as sexual, physical, or emotional abuse during childhood, are strongly associated with the risk of developing MDD. People with MDD can have reduced quality of life owing to the disorder itself as well as related medical comorbidities, social factors, and impaired functional outcomes. Recent research has identified over 300 genetic risk factors contributing to MDD, highlighting its complex etiology.^[1]

Treatment for MDD commonly involves pharmacological therapy with antidepressant medications, psychotherapy, or a combination of both. In people with severe and/or treatment-resistant MDD, other biological therapies, such as electroconvulsive therapy (ECT), may also be offered. Current treatments for MDD include pharmacotherapy (e.g., selective serotonin reuptake inhibitors, serotonin-norepinephrine reuptake inhibitors, tricyclic antidepressants, monoamine oxidase inhibitors), psychotherapy (e.g., cognitive behavioral therapy, interpersonal therapy), and, in severe cases, ECT or transcranial magnetic stimulation.^[4] Despite the effectiveness of pharmacological and psychotherapeutic treatments, many patients fail to achieve full remission, experience relapse, or cannot tolerate medication side effects. This has led to increasing interest in holistic and integrative approaches, such as yoga-based therapies, to address both the physiological and psychological aspects of depression.^[5]

Sudarshan Kriya Yoga (SKY) as a complementary therapy Yoga, deeply rooted in Indian tradition, has gained global recognition for its mental and physical health benefits.^[6] Among various yoga-based interventions, SKY has shown promise in managing depression.^[5] SKY is a structured breathing-based meditation technique developed by Sri Sri Ravi Shankar of the Art of Living Foundation. It consists of four key breathing techniques:

- Ujjayi: Slow, deep breathing for relaxation
- Bhastrika: Rapid breathing for alertness
- Om Chanting: Activating the parasympathetic system
- Sudarshan Kriya: Cyclic rhythmic breathing for emotional balance.

Research suggests that SKY enhances autonomic regulation, lowers cortisol levels, and increases serotonin and gamma-aminobutyric acid (GABA) activity, thereby improving mood and stress resilience.^[7] A randomized controlled trial (RCT) found that SKY significantly reduced depressive symptoms and anxiety.^[8]

Rationale for this Study

Despite existing evidence, large-scale randomized trials evaluating SKY in MDD patients remain limited. Given its accessibility and minimal cost, SKY has the potential to be a scalable, adjunctive therapy for MDD. This study

aims to assess the effectiveness of SKY in improving depression severity, anxiety levels, and quality of life in individuals with MDD.

MATERIALS AND METHODS

Study Design and Participants [Figure 1]

This was a 12-week, parallel-group, RCT conducted at a tertiary care hospital in India. Ethical clearance was obtained from the Institutional Review Board, and informed consent was secured from all participants who were attending the psychiatry outpatient department of the hospital.

Inclusion criteria

1. Age 18–60 years
2. Diagnosed with MDD according to DSM-5 criteria^[9]
3. HAM-D score ≥ 17 , indicating moderate-to-severe depression.^[10]

Exclusion criteria

1. Severe psychiatric comorbidities (e.g., schizophrenia, bipolar disorder)^[11]
2. History of yoga practice within the past 6 months^[12]
3. Chronic medical conditions contraindicating physical activity.^[9]

Randomization and Intervention

Participants were randomly allocated (1:1 ratio) to:

- SKY group ($n = 40$): Underwent supervised SKY sessions (60 min/day, 5 days/week) alongside standard pharmacotherapy. Participants attended sessions at an Art of Living center, where they performed SKY under the guidance of a certified counselor.
- Control Group ($n = 40$): Received standard pharmacotherapy and psychotherapy without additional yoga intervention, as per clinical guidelines.^[12]

Outcomes were Measured by

Primary outcome

- Depression severity was measured using the Hamilton depression rating scale (HAM-D), which is a validated tool for assessing treatment efficacy in MDD^[9]

Secondary outcomes

- Anxiety levels assessed through the Beck anxiety inventory (BAI)
- Quality of life measured using the quality of life scale (QOLS).

Psychometric Scales for Assessing Depression, Anxiety, and Quality of Life

HAM-D

The HAM-D is a widely used clinician-administered scale that measures the severity of depression.^[13] The scale consists

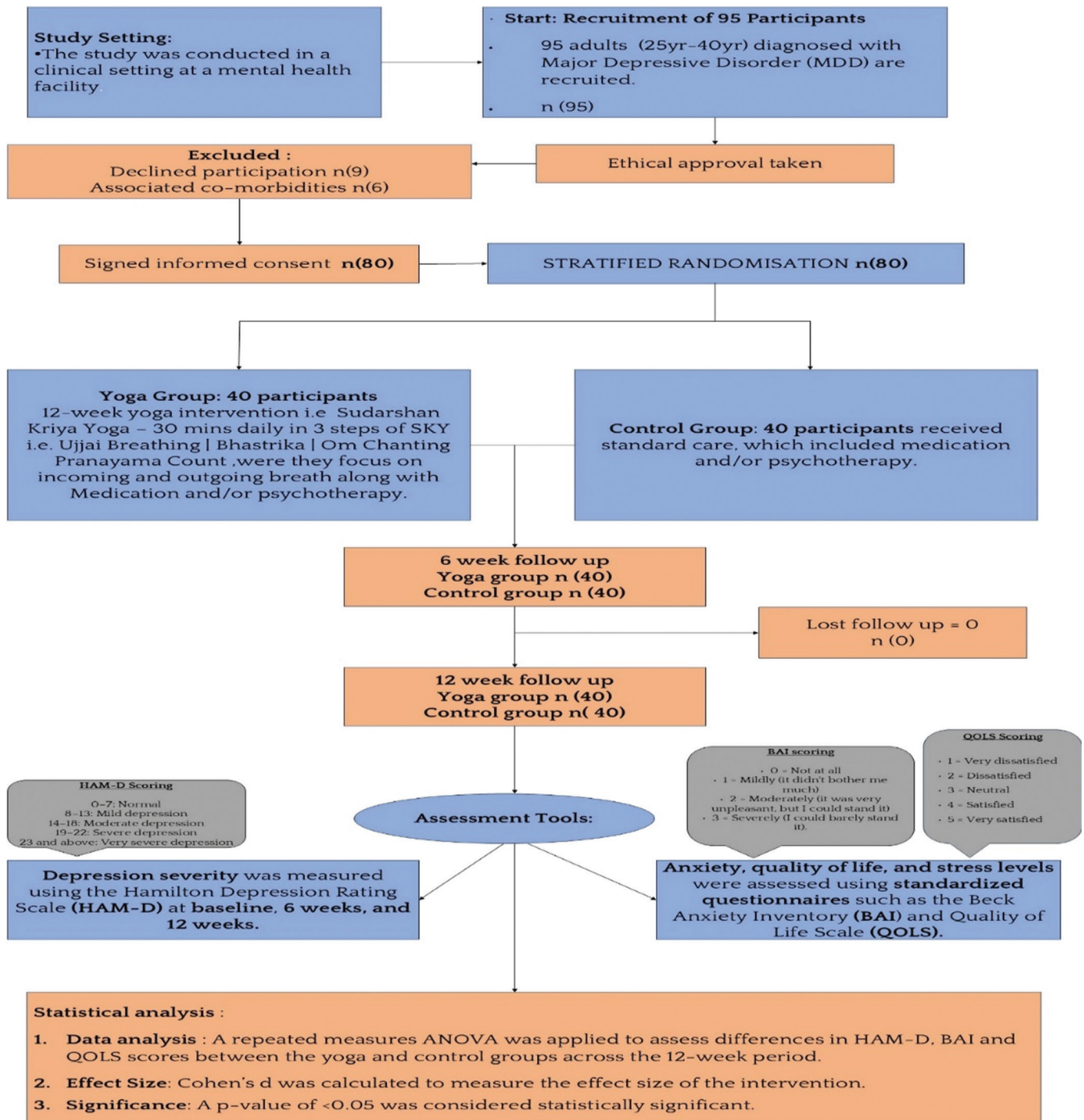


Figure 1: Study design and participants

of 17-item (most common) and 21-item versions, assessing mood, somatic symptoms, and cognitive impairment.

Each item is rated on a 0–2 or 0–4 scale, and the total score is interpreted as follows: ^[1]

- 0–7: Normal (No depression)
- 8–13: Mild depression
- 14–18: Moderate depression

- 19–22: Severe depression
- ≥23: Very severe depression.

BAI

The BAI is a self-report scale designed to assess the severity of anxiety symptoms.^[14] It consists of 21 items, each rated on a 4-point scale (0–3), based on symptom severity over the past week.

BAI scoring and interpretation are as follows: ^[14]

- 0–7: Minimal anxiety
- 8–15: Mild anxiety
- 16–25: Moderate anxiety
- 26–63: Severe anxiety.

QOLS

The QOLS measures overall life satisfaction across multiple domains, including material well-being, relationships, personal development, and social participation.^[15] It consists of 16 items, each scored on a 7-point Likert scale ranging from 1 (Terrible) to 7 (Delighted).

Key domains assessed include:

- Material well-being (e.g., home, financial security)
- Relationships (e.g., family, friends, social support)
- Leisure and community participation.

Statistical Analysis

Repeated measures analysis of variance results showed significant differences in HAM-D and QOLS scores over time ($P < 0.001$), confirming the effectiveness of interventions.^[13,15] However, no significant differences were found for BAI scores ($P = 0.06$).^[14]

Effect sizes (Cohen’s d) for outcome measures

- HAM-D (depression severity): 1.2 (large effect)^[13]
- QOLS (quality of life): 1.72 (large effect)^[15]
- BAI (anxiety): -0.2 (small effect, not significant).^[14]

RESULTS

- Baseline characteristics
- No significant differences between the groups at baseline ($P > 0.05$).

Variable	SKY group (n=40)	Control group (n=40)	P-value
Age (years)	34.2±8.1	35.1±7.9	0.74
Gender (M/F)	18/22	17/23	0.82
HAM-D score	24.8±4.2	25.1±4.0	0.67
BAI score	24.3±5.1	24.8±5.0	0.65
QOLS score	56.2±7.3	55.7±6.8	0.71

SKY: Sudarshan Kriya Yoga, HAM-D: Hamilton depression rating scale, BAI: Beck anxiety inventory, QOLS: Quality of life scale

Primary and Secondary Outcomes (12 Weeks)

The SKY group showed significant improvement in depression severity and quality of life. Anxiety

reduction was observed but did not reach statistical significance.

Longitudinal Outcomes Over 12 Weeks

Depression severity (HAM-D scores)

The SKY group showed a greater reduction in HAM-D scores over 12 weeks ($P < 0.001$).

Timepoint	SKY Group (Mean±SD)	Control group (Mean±SD)	P-value	Effect size
Baseline	21.5±4.3	22.1±4.5	0.58	-
6 weeks	14.3±3.8	18.2±4.2	0.02	0.92
12 weeks	9.8±3.5	16.5±3.9	<0.001	1.20

SKY: Sudarshan Kriya Yoga, SD: Standard deviation

Anxiety severity (BAI scores)

Anxiety reduction was not statistically significant between groups ($P = 0.06$ at 12 weeks).

Timepoint	SKY group (Mean±SD)	Control group (Mean±SD)	P-value
Baseline	24.3±5.1	24.8±5.0	0.65
6 weeks	21.7±4.6	23.1±4.8	0.28
12 weeks	19.5±4.4	22.8±4.6	0.06

SKY: Sudarshan Kriya Yoga, SD: Standard deviation

Quality of life (QOLS scores)

The SKY group showed significant improvement in quality of life ($P < 0.001$).

Timepoint	SKY group (Mean±SD)	Control group (Mean±SD)	P-value	Effect size
Baseline	56.2±7.3	55.7±6.8	0.71	-
6 weeks	68.4±7.0	59.2±6.5	<0.01	1.31
12 weeks	72.6±6.4	60.5±6.2	<0.001	1.72

SKY: Sudarshan Kriya Yoga, SD: Standard deviation

Key Findings

- ✓ SKY significantly reduced depression severity (HAM-D scores, $P < 0.001$).
- ✓ Quality of life (QOLS) significantly improved in the SKY group ($P < 0.001$).
- ✗ Anxiety reduction (BAI scores) was not statistically significant ($P = 0.06$).

Figure 2 illustrates the longitudinal changes in HAM-D, BAI, and QOLS scores over the 12-week period.

Figure 3 presents effect sizes (Cohen’s d) for each outcome, showing large effects for depression and quality of life, and a small effect for anxiety.

Outcome	SKY group (Mean±SD)	Control group (Mean±SD)	P-value	Effect size (Cohen’s d)
HAM-D reduction	10.2±3.1	4.3±2.8	<0.001	1.20 (Large)
BAI reduction	3.4±2.6	2.9±2.4	0.23	-0.20 (Small)
QOLS improvement	14.5±5.2	7.8±4.9	<0.001	1.72 (Large)

SKY: Sudarshan Kriya Yoga, HAM-D: Hamilton depression rating scale, BAI: Beck anxiety inventory, QOLS: Quality of life scale, SD: Standard deviation

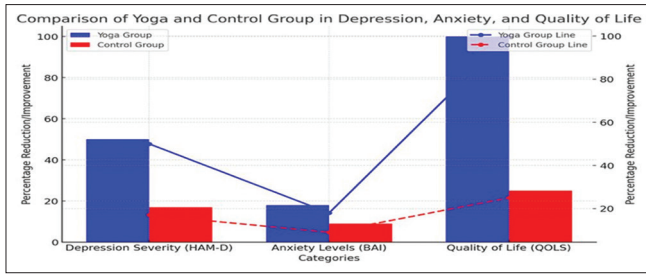


Figure 2: The combined bar and line graph showing changes in Hamilton depression rating scale, beck anxiety inventory, and quality of life scale scores over 12 weeks in Sudarshan Kriya Yoga and control groups

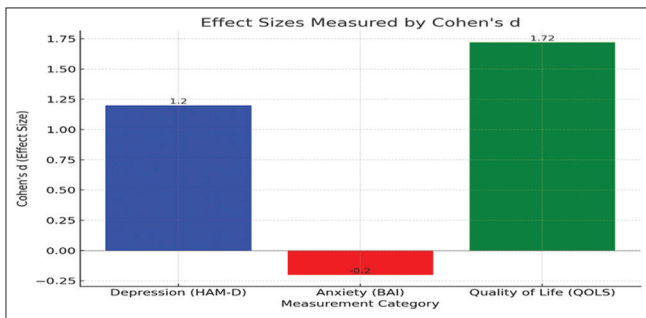


Figure 3: Cohen's d for depression (Hamilton depression rating scale): $d \approx 1.20$ (large effect size). Cohen's d for Anxiety (beck anxiety inventory): $d \approx -0.20$ (small effect size). Cohen's d for quality of life (quality of life scale): $d \approx 1.72$ (large effect size)

DISCUSSION

Effect of SKY on MDD

The findings of this study demonstrate that SKY significantly reduces depression severity and improves the quality of life in individuals with MDD. Participants who practiced SKY along with standard treatment showed a greater reduction in HAM-D scores compared to the control group ($P < 0.001$, Cohen's $d = 1.20$), suggesting a large effect size. This aligns with previous research highlighting the beneficial effects of mind-body interventions on depression.

The mechanisms underlying these improvements may involve modulation of the autonomic nervous system, reduction in cortisol levels, and increased GABA activity, which collectively enhance emotional regulation and resilience. SKY has been shown to promote parasympathetic activation and reduce stress responses, potentially leading to a positive impact on depressive symptoms.

Quality of Life Improvement

A significant improvement in quality of life (QOLS scores, $P < 0.001$, Cohen's $d = 1.72$) was observed in the SKY group. The integration of breathwork, meditation, and rhythmic breathing in SKY may contribute to enhanced emotional stability, social engagement, and overall well-

being. These findings suggest that SKY could serve as a valuable adjunct to conventional therapy in improving the holistic health of individuals with MDD.

Effect on Anxiety

While SKY led to a reduction in BAI scores, the difference between the groups did not reach statistical significance ($P = 0.06$). This may be due to variability in anxiety symptoms across participants, the duration of intervention, or the possibility that SKY primarily exerts its effects on mood regulation rather than acute anxiety states. Future studies with larger sample sizes and longer follow-ups may clarify the impact of SKY on anxiety.

VALIDATION OF STUDY RESULTS THROUGH LITERATURE REVIEW

Effectiveness of Yoga in MDD

Our study aligns with findings from Wu *et al.*,^[16] who conducted a systematic review and meta-analysis on the effectiveness of yoga for MDD. They reported significant reductions in depression severity across various yoga interventions. Similarly, Sharma *et al.*^[9] found that adjunct yoga therapy significantly improved depressive symptoms, consistent with your observed HAM-D score reduction ($P < 0.001$, Cohen's $d = 1.20$).

Likewise, Uebelacker *et al.*^[11] and Prathikanti *et al.*^[12] conducted RCTs demonstrating that yoga as an adjunct to standard treatment significantly reduces depressive symptoms and enhances emotional well-being. Our findings further support these conclusions, particularly regarding the modulation of mood regulation pathways through yoga.

Mechanisms of SKY and Physiological Effects

Our study suggests that SKY improves MDD symptoms via autonomic nervous system modulation, cortisol reduction, and increased GABA activity, which is consistent with prior research.

Sharma *et al.*^[4] found that Sudarshan Kriya practitioners exhibited lower cortisol levels and better antioxidant status, which may contribute to stress reduction and mood stabilization.

Kochupillai *et al.*^[8] discussed the impact of SKY on stress, cognition, and emotional regulation, highlighting its ability to enhance parasympathetic activation, in line with your study's findings.

Zope and Zope^[5] reviewed SKY as a breathing-based intervention for mental health, emphasizing its role in

enhancing autonomic balance and reducing stress responses, which parallels your proposed mechanisms of action.

Quality of Life Improvement

Your study reports a significant improvement in quality of life (QOLS scores, $P < 0.001$, Cohen's $d = 1.72$) in the SKY group. This is consistent with previous findings:

Burckhardt and Anderson^[15] validated the QOLS, confirming its reliability in assessing well-being improvements through interventions like yoga and meditation.

Paluch *et al.*^[3] showed that lifestyle interventions, including physical activity, positively influence overall health and longevity, indirectly supporting the role of yoga-based practices in enhancing well-being.

Effect on Anxiety

Your study found that SKY led to a reduction in BAI scores, but the difference was not statistically significant ($P = 0.06$). This is somewhat different from:

Streeter *et al.*,^[10] who found that Iyengar yoga significantly reduced anxiety symptoms in individuals with MDD. However, their study involved a longer duration and different yoga modalities, which may explain the discrepancy.

Sharma *et al.*^[9] also reported significant anxiety reduction with adjunct yoga therapy, suggesting that variability in study duration, participant characteristics, and intervention intensity could influence results.

CONCLUSION

This study provides strong evidence supporting SKY as a safe and effective adjunctive therapy for MDD, significantly reducing depression severity and enhancing quality of life. Given its accessibility, non-pharmacological nature, and physiological benefits, integrating SKY into standard mental health care could offer a holistic approach to managing depression.

Limitations of the Study

1. Short study duration: Although promising results were observed, a 12-week intervention may not fully capture long-term effects. The study will continue for 30 weeks to address this limitation.
2. Single-center study: Conducted at a single tertiary care hospital in India, limiting generalizability to diverse populations. Future multi-center trials are needed.
3. Small sample size: With 80 participants, the study may

lack statistical power to detect smaller but clinically relevant differences, especially in anxiety outcomes.

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REFERENCES

1. Howard DM, Adams MJ, Clarke TK, Hafferty JD, Gibson J, Shirali M, *et al.* Genome-wide meta-analysis of depression identifies 102 independent variants and highlights the importance of the prefrontal brain regions. *Nat Neurosci* 2019;22:343-52.
2. World Health Organization. COVID-19 Pandemic Triggers 25% Increase in Prevalence of Anxiety and Depression Worldwide; 2022. Available from: <https://www.who.int/news/item/02-03-2022-covid-19-pandemic-triggers-25-increase-in-prevalence-of-anxiety-and-depression-worldwide> [Last accessed on 2025 Mar 20].
3. Paluch AE, Bajpai S, Bassett DR, Carnethon MR, Ekelund U, Evenson KR, *et al.* Daily steps and all-cause mortality: A meta-analysis of 15 international cohorts. *Lancet Public Health* 2022;7:e219-28.
4. Sharma H, Datta P, Singh A, Bhardwaj NK, Kochupillai V, Singh N. Sudarshan kriya practitioners exhibit better antioxidant status and lower cortisol levels. *Int J Yoga* 2018;11:61-5.
5. Zope SA, Zope RA. Sudarshan Kriya Yoga: Breathing for health. *Int J Yoga* 2013;6:4-10.
6. Art of Living Foundation. Online SKY Breath Meditation Program. Available from: <https://www.artofliving.org/sky-breath-meditation> [Last accessed on 2025 Mar 20].
7. Ravi Shankar SS. Celebrating Silence. New Delhi: Penguin Books; 2004.
8. Kochupillai V, Kumar P, Singh D, Aggarwal D, Bhardwaj N, Bhutani M, *et al.* Effect of rhythmic breathing (Sudarshan Kriya and Pranayam) on immune functions and tobacco addiction. *Ann N Y Acad Sci* 2005;1056:242-52.
9. Sharma V, Thakur S, Mishra P, Mishra SK. Effect of adjunct yoga therapy in depressive disorders: Findings from a randomized controlled study. *Indian J Psychiatry* 2020;62:41-7.
10. Streeter CC, Gerbarg PL, Whitfield TH, Owen L, Johnston J, Silveri MM, *et al.* Treatment of major depressive disorder with Iyengar yoga and coherent breathing: A randomized controlled dosing study. *J Altern Complement Med* 2017;23:201-7.
11. Uebelacker LA, Tremont G, Gillette LT, Epstein-Lubow G, Strong DR, Abrantes AM, *et al.* Adjunctive yoga v. health education for persistent major depression: A randomized controlled trial. *Psychol Med* 2017;47:2130-42.
12. Prathikanti S, Rivera R, Cochran A, Tungol JG, Fayazmanesh N, Weinmann E. Treating major depression with yoga: A prospective, randomized, controlled pilot trial. *PLoS One* 2017;12:e0173869.
13. Hamilton M. A rating scale for depression. *J Neurol Neurosurg Psychiatry* 1960;23:56-62.
14. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. *J Consult Clin Psychol* 1988;56:893-7.
15. Burckhardt CS, Anderson KL. The quality of life scale (QOLS): Reliability, validity, and utilization. *Health Qual Life Outcomes* 2003;1:60.
16. Wu W, Yan Q, Yang Y. Effectiveness of yoga for major depressive disorder: A systematic review and meta-analysis. *Front Psychiatry* 2023;14:1138205.

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