ISSN: 2393-8048
International Advance Journal of Engineering, Science and Management (IAJESM)
Multidisciplinary, Multilingual, Indexed, Double Blind, Open Access, Peer-Reviewed, Refereed-International Journal.
SJIF Impact Factor =8.152, January-June 2025, Submitted in June 2025

Ten Years Later: What Yoga Day Has Actually Changed About Our Health- A Narrative Review

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Abstract

Background: The United Nations declaration of International Yoga Day in 2015 marked a pivotal moment in recognizing yoga's potential role in global health, with particular significance for India as yoga's birthplace. This narrative review examines the evidence accumulated over the past decade regarding yoga's impact on health outcomes, with special attention to research conducted in Indian populations.

Methods: A narrative review was conducted examining original research studies, systematic reviews, and meta-analyses published between 2005-2024. Thirty high-quality studies were selected, including 17 original research studies (RCTs, cohort studies, cross-sectional studies), with emphasis on Indian research contributions and global evidence across major health domains.

Results: The 30 selected studies demonstrate robust evidence for yoga's health benefits across multiple conditions. Original research from India shows significant improvements in type 2 diabetes management, cardiovascular risk reduction, and mental health outcomes. Indian studies demonstrate culturally adapted interventions with moderate to large effect sizes. Global research confirms yoga's excellent safety profile (8,430 participants) and efficacy in chronic disease management, mental health, and healthy aging.

Conclusions: The decade following International Yoga Day has established yoga as an evidence-based intervention with measurable health benefits. Research from India and globally demonstrates yoga's potential in addressing contemporary health challenges, supporting its integration into healthcare systems worldwide.

Keywords: International Yoga Day, yoga research, India, mental health, chronic disease, original research

Introduction

On December 11, 2014, the United Nations General Assembly declared June 21st as International Yoga Day, acknowledging India's gift to the world and recognizing yoga's universal appeal for promoting health and well-being [1]. This declaration held special significance as it honoured the ancient Indian practice while calling for evidence-based evaluation of yoga's health benefits.

The decade following this declaration has witnessed unprecedented growth in yoga research, with Indian institutions leading significant studies alongside global research centres. This research expansion has coincided with India's rising burden of non-communicable diseases, making yoga research particularly relevant for addressing diabetes, cardiovascular disease, and mental health challenges prevalent in Indian populations [2].

Indian research institutions have contributed substantially to the evidence base, conducting culturally appropriate studies that demonstrate yoga's effectiveness in diverse populations. The All-India Institute of Medical Sciences (AIIMS), Swami Vivekananda Yoga Anusandhana Samsthana (SVYASA), and other leading institutions have published landmark studies showing yoga's therapeutic potential [3]. These studies are particularly valuable as they examine yoga in its traditional cultural context while meeting rigorous scientific standards.

The COVID-19 pandemic further highlighted yoga's relevance, with a large-scale pan-India study demonstrating yoga's benefits for maintaining healthy lifestyle and endurance under

lockdown restrictions [2]. Research conducted during this period provided valuable insights into yoga's role in crisis management and population health strategies.

This narrative review examines the accumulated evidence from the past decade, with particular emphasis on original research studies including those conducted in India. We aim to provide a comprehensive assessment of what this research has revealed about yoga's impact on human health, identifying both established benefits and areas where Indian research has made unique contributions.

Methods

This narrative review examined original research studies, systematic reviews, and meta-analyses published between 2005 and 2024, with special attention to research conducted in Indian populations. Literature was identified through systematic searches of PubMed/MEDLINE, focusing on high-quality peer-reviewed studies.

Inclusion criteria:

- Original research studies (RCTs, cohort studies, observational studies), systematic reviews, and meta-analyses
- Studies published in peer-reviewed journals
- Human subjects research, with preference for studies including Indian populations
- English language publications
- Focus on health outcomes relevant to contemporary public health challenges

The final selection included 30 verified studies: 17 original research studies (15 RCTs, 1 cross-sectional study, 1 cohort study), 10 systematic reviews, 2 meta-analyses, and 1 policy document. Data extraction focused on study design, population characteristics, intervention details, outcomes, and clinical implications relevant to Indian healthcare contexts.

Results and Discussion

Overview of Included Studies

This narrative review analysed 30 verified studies representing diverse research methodologies and populations, with 57% comprising original research studies that provide direct evidence for yoga's health impacts.

Table 1: Complete List of Studies Included in This Narrative Review (n=30)

Citation	Study Type	First Author/Year	Population/Setting	Sample Size	Primary Outcome	Key Finding
[1]	Policy Document	UN General Assembly, 2014	Global policy	N/A	International recognition	Yoga Day declaration
[2]	Cross-sectional	Nagarathna, 2021	Indian COVID lockdown	23,290	Lifestyle/coping	Better stress management
[3]	RCT	Manjunath, 2005	Geriatric sleep, India	69	Sleep quality	60min sleep increase
[4]	RCT	Sharma, 2005	Depression, India	30	Depression scores	Significant improvement
[5]	Meta-analysis	Cramer, 2018	Anxiety disorders	319	Anxiety reduction	Small-large effects
[6]	RCT	Singh, 2012	Asthma, India	60	Lung function	Improved TLCO, FVC
[7]	Meta-analysis	Pascoe, 2017	Stress physiology	42 studies	Physiological markers	Reduced cortisol, BP
[8]	RCT	Deepeshwar, 2018	Knee OA, India	66	Functional mobility	Improved TUG, strength

Citation	Study Type	First Author/Year	Population/Setting	Sample Size	Primary Outcome	Key Finding
[9]	Systematic Review	Wu, 2023	Major depression	2,341	Depressive symptoms	Moderate effects
[10]	Systematic Review	Gothe, 2019	Brain health	11 studies	Neuroplasticity	Structural changes
[11]	Systematic Review	Innes, 2016	Type 2 diabetes	2,170	Glycemic control	Multi-parameter benefits
[12]	Systematic Review	Shin, 2021	Elderly fitness	12 studies	Physical function	Strength, balance
[13]	Systematic Review	Li, 2021	Coronary heart disease	4,671	Quality of life	Significant improvement
[14]	Review	Nair, 2016	Women's health	N/A	Therapeutic overview	Health benefits
[15]	RCT	Gupta, 2006	Anxiety/stress, AIIMS	Mixed	State/trait anxiety	Significant reduction
[16]	Systematic Review	Wieland, 2017	Chronic back pain	1,080	Pain/function	Functional improvement
[17]	Systematic Review	Cramer, 2015	Safety profile	8,430	Adverse events	Excellent safety
[18]	RCT	Behere, 2011	Schizophrenia, India	66	PANSS symptoms	Improved functioning
[19]	Systematic Review	Bridges, 2017	Depression treatment	23 studies	Treatment efficacy	Effective intervention
[20]	Systematic Review	Jayawardena, 2018	Diabetes vs exercise	842	Glycemic control	Superior to exercise
[21]	Systematic Review	Gothe, 2015	Cognitive function	22 studies	Cognition	Moderate improvements
[22]	Review	Field, 2016	Comprehensive review	Multiple	Various conditions	Broad benefits
[23]	RCT	Das, 2018	Metabolic syndrome, India	135	Multiple parameters	Comprehensive benefits
[24]	Systematic Review	Thakur, 2021	PCOS	16 studies	Hormonal balance	Symptom management
[25]	RCT	Yadav, 2024	COVID-19 patients, India	63	Mental health	Reduced anxiety/stress
[26]	RCT	Ebnezar, 2012	Knee OA, India	250	Pain/function	Superior to exercise
[27]	Review	Raveendran, 2018	Type 2 diabetes	N/A	Therapeutic role	Comprehensive benefits
[28]	Review	Agarwal, 2018	Cancer care	10,660 patients	Evidence review	Comprehensive benefits
[29]	RCT	Umadevi, 2013	Caregivers, India	60	Anxiety/depression	Significant improvement
[30]	RCT	Sharma, 2022	Lung function, India	100	Pulmonary function	Improved lung volumes

Mental Health and Psychological Well-being

Mental health research has emerged as a priority area, particularly relevant given India's growing mental health burden and the impact of the COVID-19 pandemic.

Depression

Original research from Indian institutions has provided compelling evidence for yoga's antidepressant effects. Sharma et al. conducted a randomized controlled trial with 30 participants diagnosed with major depression using DSM-IV criteria [4]. The study compared Sahaj Yoga combined with conventional antidepressants versus antidepressants alone for 8 weeks. Results showed significant improvements in both Hamilton Depression Rating Scale (HAM-D) and Hamilton Anxiety Rating Scale (HAM-A) scores in both groups ($p<0.001$), but the percentage improvement was significantly higher in the yoga group. Notably, the number of patients achieving remission was significantly higher in the yoga group ($p=0.02$).

This Indian research is supported by comprehensive global meta-analyses. Wu et al.'s systematic review and meta-analysis included 34 RCT studies with 2,341 patients (1,269 treatment, 1,072 control) [9]. The results demonstrated moderate effects of yoga on depression improvement: Beck Depression Inventory-II results showed Cohen's d = -0.60 (95% CI: -1.00 to -0.21; $p < 0.01$), and Hamilton Depression Rating Scale results showed Cohen's d = -0.64 (95% CI: -0.98 to -0.30; $p < 0.01$). Importantly, no adverse events occurred in the yoga group during treatment.

Anxiety Disorders

Anxiety research has shown robust benefits across populations. Cramer et al.'s systematic review and meta-analysis examined 8 RCTs with 319 participants (mean age: 30.0-38.5 years) with anxiety disorders or elevated anxiety levels [5]. Meta-analyses revealed evidence for small short-term effects of yoga on anxiety compared to no treatment (SMD = -0.43; 95% CI = -0.74, -0.11; P = .008), and large effects compared to active comparators (SMD = -0.86; 95% CI = -1.56, -0.15; P = .02).

An important Indian study by Gupta et al. at AIIMS examined yoga-based lifestyle intervention effects on state and trait anxiety in patients with various conditions including hypertension, coronary artery disease, diabetes, and psychiatric disorders [15]. The 10-day intervention consisting of asanas, pranayama, relaxation techniques, group support, and yoga philosophy significantly reduced both state and trait anxiety scores. Among diseased subjects, significant improvements were seen in patients with hypertension, coronary artery disease, obesity, and psychiatric disorders.

Another significant Indian study by Umadevi et al. focused on caregivers of neurological patients, an often-overlooked population experiencing significant stress [29]. This randomized controlled trial with 60 caregivers of inpatients in neurology wards compared a specific yoga module comprising yogasanas, pranayama, and chanting with waitlisted controls. Following one month of yoga intervention, there was significant ($P<0.001$) decrease in anxiety and depression scores, as well as improved quality-of-life among participants compared to controls.

COVID-19 Mental Health Impact

The pandemic provided unique insights into yoga's mental health benefits. Yadav et al. conducted a randomized controlled trial with 63 COVID-19 positive hospitalized patients [25]. The yoga group received breathing practices twice daily for ten days in addition to conventional care. Results showed the experimental group had significantly better scores for depression, anxiety, stress, total DASS scores, and fear of COVID-19 ($p<0.001$) compared to controls. No adverse effects were observed with yoga-based breathing practices.

The large-scale pan-India study by Nagarathna et al. during COVID-19 lockdown included 23,290 valid responses [2]. Yoga practitioners showed superior ability to cope with stress and anxiety associated with lockdown, displayed better physical ability and endurance, and were less likely to use substances and unhealthy food while having better quality sleep.

Table 2: Mental Health Outcomes from Original Research Studies

Study Location	Condition	Sample Size	Duration	Primary Measure	Effect Size	Clinical Significance
India (multi-centre)	Depression	30	8 weeks	HAM-D/HAM-A	Large effect	Higher remission rates
India (AIIMS)	Anxiety/stress	Mixed	10 days	State/trait anxiety	Significant	Reduced anxiety scores
India (Hospital)	COVID-19 mental health	63	10 days	DASS-21	Large effect	Better coping
India (Pan-India)	Lockdown stress	23,290	Cross-sectional	CHAS	Moderate	Superior stress management
India (Tertiary care)	Caregiver stress	60	1 month	Anxiety/depression	Significant	Reduced caregiver burden

Chronic Disease Management

India faces a significant burden of non-communicable diseases, making yoga research in chronic disease management particularly relevant for national health strategies.

Type 2 Diabetes Mellitus

Research has consistently demonstrated yoga's effectiveness in diabetes management. Innes and Selfe conducted a comprehensive systematic review of 25 controlled trials (13 nonrandomized, 12 randomized) with 2,170 participants [11]. Findings suggest that yogic practices may promote significant improvements in several indices important for diabetes management, including glycaemic control, lipid levels, and body composition. The review noted that yoga may also lower oxidative stress and blood pressure, enhance pulmonary and autonomic function, mood, sleep, and quality of life, and reduce medication use in adults with diabetes.

Jayawardena et al.'s systematic review and meta-analysis compared yoga to physical exercise in diabetes management, analysing 8 studies with 842 participants [20]. Results showed significant reductions in Favor of yoga: fasting blood glucose (15.16 mg/dl), post-prandial blood glucose (28.66 mg/dl), HbA1c (0.39%), and BMI (0.71 kg/m²) compared to the physical exercise control group. No significant differences were observed for lipid parameters, other body composition measures, or blood pressure.

Raveendran et al.'s comprehensive review emphasized that yoga practice helps attain glycaemic control and reduces the risk of complications in people with diabetes through psycho-neuro-endocrine and immune mechanisms [27].

Metabolic Syndrome

Das and Roy conducted a significant study on metabolic syndrome with 135 subjects aged 15-65 years in India [23]. Participants were grouped into yoga with diet, yoga only, and control groups for 6 months. The yoga interventions included asanas, pranayama, and meditation for 1 hour daily, 5 days per week. Results showed statistically and clinically significant improvements in body weight and other metabolic parameters after 6 months of intervention.

Cardiovascular Disease

Li et al.'s systematic review and meta-analysis examined 7 RCTs with 4,671 participants for yoga's role in coronary heart disease secondary prevention [13]. Six RCTs compared yoga with usual care, and one compared yoga with designed exercise. Results showed that compared with

usual care, yoga had no effect on all-cause mortality (RR, 1.02; 95% CI, 0.75-1.39), but significantly improved health-related quality of life (SMD, 0.07; 95% CI, 0.01-0.14). Serum triglyceride, HDL cholesterol, blood pressure, and BMI were also significantly improved. No severe adverse events related to yoga were reported.

Respiratory Conditions

Singh et al. studied yoga's effects on pulmonary function in 60 stable asthmatic patients in India [6]. The yoga training group showed statistically significant improvement ($P<0.001$) in Transfer factor of the lung for carbon monoxide (TLCO), forced vital capacity (FVC), forced expiratory volume in 1st second (FEV1), peak expiratory flow rate (PEFR), maximum voluntary ventilation (MVV), and slow vital capacity (SVC) after 2 months of yoga practice. Quality of life also increased significantly.

Sharma et al. conducted a comparative study examining lung function in 100 healthy individuals (50 yoga practitioners vs. 50 controls) aged 30-50 years [30]. The yoga practitioners, who had been practicing for 5 years, demonstrated significant improvements in all measured parameters including FVC, FEV1, MVV, PEFR, FEV3, and breath holding time, while showing decreased respiratory rate compared to controls. This study demonstrates yoga's beneficial effects on respiratory function even in healthy populations.

Table 3: Chronic Disease Outcomes from Research

Disease	Study Type	Duration	Key Outcome	Improvement	Clinical Impact
Type 2 Diabetes	Systematic Review (25 trials)	Varied	Glycemic control	Multiple parameters	Comprehensive benefits
Diabetes vs Exercise	Meta-analysis (8 studies)	Varied	HbA1c	-0.39% vs exercise	Superior to exercise
Metabolic Syndrome	RCT (135 subjects)	6 months	Multiple parameters	Significant improvement	Clinically meaningful
Coronary Heart Disease	Meta-analysis (7 RCTs)	Varied	Quality of life	SMD 0.07	Significant improvement
Asthma	RCT (60 patients)	2 months	Pulmonary function	Multiple improvements	Enhanced breathing
Healthy Lung Function	Comparative study (100 subjects)	5 years practice	Respiratory parameters	All measures improved	Preventive benefits

Physical Function and Healthy Aging

Research has consistently demonstrated yoga's benefits for physical function and healthy aging across multiple domains.

Musculoskeletal Health and Pain Management

Ebnezar et al. conducted a large randomized controlled trial with 250 participants aged 35-80 years with knee osteoarthritis in Bangalore [26]. The study compared integrated hatha yoga therapy with therapeutic exercises after transcutaneous electrical stimulation and ultrasound treatment. Results showed significant improvements in the yoga group compared to controls for walking pain (37.3% vs 24.9% at day 15, 64.9% vs 42% at day 90), knee disability (59.7% vs 32.7% at day 15, 83% vs 53.6% at day 90), range of knee flexion, joint tenderness, swelling, crepitus, and walking time.

Deepeshwar et al.'s study with 66 individuals with knee osteoarthritis showed significant improvements in the yoga group [8]. There were significant reductions in Timed Up and Go

Test ($p < 0.001$), right and left flexion ($p < 0.001$), and significant improvements in left hand grip strength ($p < 0.01$) and bilateral extension ($p < 0.05$ to $p < 0.001$) from baseline.

Wieland et al.'s Cochrane systematic review included 12 trials with 1,080 participants for chronic non-specific low back pain [16]. Results showed low- to moderate-certainty evidence that yoga compared to non-exercise controls results in small to moderate improvements in back-related function at three and six months. The standardized mean difference was -0.44 (95% CI -0.66 to -0.22) at six months, corresponding to a change in the Roland-Morris Disability Questionnaire of -2.15 points.

Physical Fitness in Elderly

Shin's systematic review of 12 studies examined yoga's effects on physical fitness in elderly populations [12]. Results showed that yoga practice had moderately positive effects on muscle strength, balance, mobility, and lower body flexibility, but no significant effect on cardiorespiratory endurance and upper body flexibility. Sub-group analysis revealed that subjects in their 60s and 70s and yoga practice for 9-12 weeks had large positive effects on physical fitness.

Sleep Quality

Manjunath and Telles studied 69 residents from a home for the aged, comparing yoga, Ayurveda, and wait-list control groups [3]. The yoga group showed significant improvements after six months: decreased time taken to fall asleep (approximately 10 minutes, $P<0.05$), increased total sleep hours (approximately 60 minutes, $P<0.05$), and improved feeling of being rested in the morning ($P<0.05$). The other groups showed no significant changes.

Neurological and Psychiatric Conditions

Schizophrenia

Behere et al. conducted important research on facial emotion recognition deficits in schizophrenia at an Indian institution [18]. The study included 66 antipsychotic-stabilized patients randomized to yoga (n=27), exercise (n=17), or waitlist groups (n=22). The yoga group showed significant improvements in positive and negative symptoms, socio-occupational functioning, and performance on emotion recognition tests ($P<0.05$), while the other groups did not. Maximum improvement occurred at 2 months, with benefits persisting at 4 months.

Cognitive Function

Gothe and McAuley's meta-analysis examined 15 RCTs and 7 acute exposure studies on yoga's cognitive effects [21]. Results showed a moderate effect ($g = 0.33$, 95% CI = 0.18-0.48, $p < .001$) of yoga on cognition for RCTs, with strongest effects for attention and processing speed ($g = 0.29$, $p < .001$), followed by executive function ($g = 0.27$, $p = .001$) and memory ($g = 0.18$, $p = .051$).

Gothe et al.'s systematic review of brain health studies included 11 investigations examining yoga's effects on brain structure and function [10]. Studies demonstrated positive effects on the hippocampus, amygdala, prefrontal cortex, cingulate cortex, and brain networks including the default mode network. The findings offer promising evidence that yoga may help mitigate age-related and neurodegenerative declines.

Women's Health

Polycystic Ovary Syndrome (PCOS)

Thakur et al.'s systematic review examined 16 relevant studies on yoga's effectiveness for PCOS management published between 2012-2019 [24]. The review included research papers measuring yoga's effects on blood lipid levels, glucose metabolism, endocrine parameters, quality of life, resting cardiovascular parameters, and levels of anxiety and depression in women with PCOS. Studies concluded successful use of different yogic practices for PCOS management with or without medications.

General Women's Health

Nair and Khawale's comprehensive review examined therapeutic fasting and yoga practices in

women's health [14]. The review highlighted yoga's benefits for reproductive and mental health, as well as its role in preventing and ameliorating conditions common in middle-aged and elderly women, including musculoskeletal disorders.

Stress Physiology and Biomarkers

Physiological Stress Markers

Pascoe et al.'s comprehensive meta-analysis included 42 studies examining yoga's effects on stress-related physiological measures [7]. Interventions that included yoga asanas were associated with reduced evening cortisol, waking cortisol, ambulatory systolic blood pressure, resting heart rate, high frequency heart rate variability, fasting blood glucose, cholesterol, and low-density lipoprotein compared to active controls. The findings suggest that yoga practices improve regulation of the sympathetic nervous system and hypothalamic-pituitary-adrenal system.

Safety Profile

Comprehensive Safety Analysis

Cramer et al. conducted the most comprehensive safety analysis of yoga, examining 94 randomized controlled trials (1975-2014) with 8,430 participants [17]. The analysis found no differences in the frequency of intervention-related, nonserious, or serious adverse events when comparing yoga with usual care or exercise. Compared with psychological or educational interventions, more intervention-related adverse events occurred in the yoga group (odds ratio = 4.21, 95% CI: 1.01, 17.67; P = 0.05), but serious adverse events and dropouts were comparable. The findings indicate that yoga appears as safe as usual care and exercise.

Table 4: Safety Profile from Major Studies

Study	Participants	Duration	Adverse Events	Comparison	Safety Conclusion
Cramer meta-analysis	8,430	Varied	No difference vs usual care	Exercise/usual care	Safe as standard care
Wu depression studies	2,341	Varied	None reported	Various controls	No adverse events
COVID-19 breathing	63	10 days	None observed	Standard care	Safe in acute illness
Elderly sleep study	69	6 months	Not reported	Ayurveda/control	Well tolerated

Cultural Context and Global Implementation

The research demonstrates that yoga interventions are most effective when adapted to local contexts while maintaining core therapeutic elements. Indian studies consistently show excellent adherence rates and outcomes when interventions incorporate traditional elements familiar to local populations.

Field's comprehensive review emphasized that yoga has been more effective than control and waitlist control conditions, although not always more effective than treatment comparison groups such as other forms of exercise [22]. The review highlighted yoga's therapeutic effects across multiple conditions and suggested that yoga could be considered "yoga therapy."

Public Health Implications

The evidence supports yoga's integration into healthcare systems as a cost-effective intervention. The significant benefits demonstrated across multiple chronic diseases, combined with excellent safety profiles and cultural acceptability, make yoga a valuable component of public health strategies.

The COVID-19 research particularly highlighted yoga's potential for population health management during crises, with the large-scale Indian study demonstrating yoga's role in

maintaining mental health and resilience during challenging circumstances.

Limitations and Future Directions

While the evidence base has grown substantially, several limitations remain. Many studies have relatively small sample sizes and would benefit from larger multi-centre trials. Standardization of interventions across different yoga traditions remains a challenge, and longer-term follow-up studies are needed.

Future research priorities include:

- Large-scale pragmatic trials in diverse healthcare settings
- Economic evaluations of yoga interventions
- Investigation of optimal intervention duration and intensity
- Development of standardized protocols for different conditions
- Integration studies with existing healthcare delivery systems

Conclusions

The decade following the UN declaration of International Yoga Day has produced compelling evidence demonstrating yoga's measurable health benefits across multiple domains. Original research from India and global studies have shown consistent benefits in mental health, chronic disease management, physical function, and healthy aging.

The comprehensive safety data from over 8,400 participants provides strong evidence for yoga's excellent safety profile when properly taught. The consistency of findings across different populations, conditions, and study designs strengthens confidence in yoga's therapeutic value.

Indian research institutions have made significant contributions to the global evidence base, providing culturally relevant studies that demonstrate yoga's effectiveness in its traditional context while meeting rigorous scientific standards. The research supports yoga's integration into healthcare systems as an evidence-based complementary intervention.

The vision that motivated the UN's declaration of International Yoga Day—recognizing India's ancient wisdom while promoting global health—has found robust scientific validation. The evidence demonstrates that yoga has a meaningful role in addressing contemporary health challenges and promoting human flourishing in the 21st century.

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