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REVIEW ARTICLE

A Critical Review on Role of Yoga in Prevention of Cardiovascular Risk Factors

Rohit Kumar[1]*, Abhishek Upadhyay[2], Deepti Bisht[3]

[1]Assistant Professor, Department of Ayur Yoga Preventive Cardiology, National Institute of Ayurveda, Jaipur (Deemed to be University), Jaipur, Rajasthan, India.
[2]Assistant Professor, Department of Kayachikitsa, National Institute of Ayurveda (Deemed to be University), Jaipur, Rajasthan, India.
[3]Associate Professor, Department of Ayur-Yoga Preventive Cardiology, National Institute of Ayurveda (Deemed to be University), Jaipur, Rajasthan, India.

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ABSTRACT

Cardiovascular disease remains a major cause of premature morbidity and mortality, and its burden is influenced by modifiable factors such as raised blood pressure, adverse lipid profile, excess adiposity, impaired glycemic control, physical inactivity, and psychological stress. Yoga has received increasing attention as a lifestyle-based intervention because it combines physical practice with regulated breathing, relaxation, and meditative components. The article examines evidence on yoga for modifying cardiovascular risk factors, with classical yogic principles providing conceptual background. A critical narrative review was undertaken using classical yogic literature and contemporary open-access evidence, with emphasis on systematic reviews and meta-analyses. Available reviews suggest that yoga may produce modest improvements in blood pressure and selected lipid and glycemic measures. Evidence for weight-related outcomes is limited, whereas reductions in perceived stress are promising but supported by low-certainty evidence. Heart rate variability and vascular mechanisms remain surrogate or mechanistic outcomes. Importantly, improvements in intermediate risk markers should not be equated with proven prevention of myocardial infarction, stroke, or cardiovascular death. Yoga is best considered a complementary lifestyle intervention rather than an alternative to established exercise, dietary, behavioral, or pharmacological management. Future studies need better-defined interventions, appropriate active comparators, longer follow-up, and patient-important cardiovascular outcomes.

1. INTRODUCTION

Cardiovascular disease (CVD) reflects interacting behavioral, metabolic, and psychological risks, including raised blood pressure, dyslipidemia, impaired glucose regulation, excess adiposity, inactivity, and stress. These factors often coexist, so prevention requires sustained lifestyle change alongside appropriate medical care.[1]

Yoga combines practices such as postures, regulated breathing, concentration, and meditation, but interventions differ in style, dose, and components. This heterogeneity limits direct comparisons and makes it important to distinguish plausible mechanisms from demonstrated clinical benefits.[2]

Corresponding Author:
Rohit Kumar, Assistant Professor,
Department of Ayur Yoga Preventive Cardiology, National Institute of Ayurveda, Jaipur (Deemed to be University), Jaipur, Rajasthan, India.
Email: verma081rohit@gmail.com

The discussion evaluates evidence on major modifiable cardiovascular risk factors, using classical yogic ideas as conceptual background and contemporary research to assess the strength and clinical meaning of reported effects. It does not assume that changes in risk markers prove prevention of cardiovascular events.

1.1. Aims and Objectives

The aim of this review is to critically examine the available evidence on yoga as an adjunctive approach to the prevention and management of modifiable cardiovascular risk factors.

The objectives are to:

i. Summarize evidence on yoga and blood pressure, lipid profile, glycemic control, adiposity, and psychological stress
ii. Distinguish findings on intermediate risk markers from evidence on cardiovascular events
iii. Discuss the potential role and limitations of yoga within contemporary preventive cardiology.

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2. REVIEW METHODOLOGY

The review drew on classical yogic literature and contemporary open-access research on yoga and cardiovascular risk, prioritizing systematic reviews and meta-analyses. Searches of PubMed Central and other publicly accessible sources used combinations of terms relating to yoga, CVD, hypertension, lipids, obesity, diabetes, stress, and heart rate variability (HRV). Only sources with accessible full text were retained. The review was organized thematically around blood pressure, lipids, glycemic risk, adiposity, inactivity, stress, autonomic function, and cardiovascular events.

Evidence was interpreted in light of study design, comparator, consistency, heterogeneity, and clinical relevance. Surrogate or mechanistic outcomes were not treated as proof of fewer cardiovascular events. As this was not a registered systematic review with duplicate screening or formal risk-of-bias assessment, no Preferred Reporting Items for Systematic Reviews and Meta-Analysis designation or pooled estimate is claimed.

3. YOGA WITHIN CONTEMPORARY CARDIOVASCULAR PREVENTION

Yoga has been studied as a complementary option within lifestyle-based cardiovascular prevention.[2] Its physical practices may contribute to movement, while breathing and relaxation may support stress management; some programs also include dietary or behavioral advice.

When these components are combined, yoga resembles a multidimensional lifestyle program rather than an isolated exercise treatment, and any observed effect cannot necessarily be attributed to one component. The key question is whether yoga can help people sustain healthier routines—not whether it replaces exercise, medication, or dietary care. Evidence strength varies by outcome.

The preventive value of yoga may therefore lie in its acceptability and its capacity to combine movement with self-regulation. Whether it adds benefit beyond other structured lifestyle programs remains a separate question and requires active-comparator trials.

4. CLASSICAL YOGIC FOUNDATION RELEVANT TO CARDIOVASCULAR PREVENTION

Classical yoga extends beyond postures. The yoga sutras describe an eight-limbed framework – yama, niyama, asana, pranayama, pratyahara, dharana, dhyana, and samadhi – that emphasizes discipline, attention, and regulation.[3] These principles can inform a preventive approach, but they should not be assigned direct biomedical equivalents.

Modern programs use different combinations of these limbs, which is one reason findings from a specific intervention cannot be generalized to every form of yoga.[3] The classical framework provides context for behavior and self-regulation, not clinical proof of effects on contemporary cardiovascular diagnoses.

5. AYURVEDIC CONTEXT WITHOUT FORCED MODERN CORRELATION

Yoga and Ayurveda both emphasize daily conduct, diet, and mental balance. Ayurvedic descriptions of Hridaya and Hridroga provide historical context for Indian approaches to health but should not be treated as direct descriptions of modern hypertension, dyslipidemia, or atherosclerosis.

Terms such as dosha, agni, ojas, and srotas belong to a distinct explanatory system. Directly mapping each term onto a modern physiological structure risks overstating precision. Accordingly, Ayurvedic concepts are retained here as traditional context rather than as evidence for the clinical effects discussed below.

6. EVIDENCE FOR BLOOD PRESSURE REDUCTION

A systematic review of randomized trials found that yoga programs for hypertension varied in content and often combined postures, breathing, relaxation, or meditation. Pooled findings suggested reductions in systolic and diastolic blood pressure, but heterogeneity and study-quality limitations reduce certainty.[4] A 2021 review focused on prehypertension also reported reductions in blood pressure,[5] whereas an updated 2025 meta-analysis found very-low-certainty evidence and substantial heterogeneity, especially in comparisons with active controls.[6] A three-arm randomized trial reported a short-term reduction in 24-h systolic pressure with yoga without postures, but not a significant between-group difference in diastolic pressure.[7] A further 2025 review reported changes in physiological and biochemical markers, but these findings do not establish that all yoga programs have equivalent effects.[8] The broader cardiovascular review provides context but includes varied interventions and outcomes.[2]

Overall, the evidence supports a possible blood-pressure benefit, but the size and certainty of the effect remain uncertain across populations and comparators.[2,4-8] Yoga should be considered an adjunct and not equivalent to antihypertensive medication or a replacement for treatment when medication is indicated.

Comparator choice affects interpretation. Improvements against waiting-list or usual-care controls may reflect attention, regular activity, and broader behavior change; comparisons with active exercise answer a different question. Thus, the evidence supports yoga as a possible adjunct, not as a proven superior alternative.

7. YOGA AND DYSLIPIDEMIA

A systematic review and meta-analysis of randomized trials reported favorable changes in selected lipid measures after yoga, although results varied across studies.[9] A 2025 meta-analysis also reported changes in several lipid parameters, but very high heterogeneity limits the interpretation of pooled estimates as a uniform effect across patients.[10] Differences in program content, duration, participant characteristics, and comparator groups therefore limit confidence in the size and consistency of any effect.

Because lipid levels are also affected by diet, body weight, medication, and other lifestyle changes, the contribution of yoga alone is difficult to isolate. Yoga may support a broader prevention routine, but the evidence does not establish it as a substitute for indicated lipid-lowering treatment.

8. YOGA, BODY WEIGHT, AND ADIPOSITY

Evidence on body weight and adiposity is mixed. A 2026 systematic review and meta-analysis examined cardiometabolic outcomes in adults with overweight or obesity, whereas a 2023 review found inconclusive anthropometric results because of methodological limitations and low-to-moderate or very-low certainty across comparisons.[11,12] These findings do not support a reliable, generalizable weight-loss claim.

Yoga may increase movement and support self-regulation, but these plausible benefits do not establish a consistent reduction in body mass

index, waist circumference, or body fat. Weight-related claims should remain cautious until better-targeted trials are available.

Yoga may nevertheless support people who find conventional exercise difficult to sustain, particularly when the practice also addresses stress and body awareness. This is a practical rationale for inclusion in a wider program, not evidence that yoga alone reliably reduces adiposity.

9. YOGA AND GLYCEMIC RISK

Systematic reviews of adults with type 2 diabetes report possible improvements in glycemic measures, including glucose and glycated hemoglobin (HbA1c), after yoga-based interventions.[13,14] A 2026 Bayesian meta-analysis also reported reductions in HbA1c and fasting glucose but rated the certainty of evidence as low.[15] Interventions and study quality vary, and findings do not establish the same effect for every yoga style or patient group.

Yoga may be considered an adjunct to lifestyle management for people with metabolic risk, but it should not replace prescribed glucose-lowering treatment or routine monitoring.

From a cardiovascular perspective, glycemic control is one component of a broader risk profile. Improvements in HbA1c are clinically relevant, but these reviews do not establish that yoga reduces myocardial infarction, stroke, or cardiovascular mortality.

10. YOGA, PHYSICAL INACTIVITY, AND SEDENTARY BEHAVIOR

Yoga contributes to movement, but evidence about physical activity and mortality should not be misread as yoga-specific evidence. A large harmonized meta-analysis associated objectively measured physical activity with lower all-cause mortality,[16] but it does not show that yoga alone replaces recommended aerobic and resistance activity. The amount and intensity of movement vary substantially between yoga styles.

For people reluctant to begin conventional exercise, yoga may provide an accessible starting point and a routine they can maintain. This practical possibility should be distinguished from evidence that yoga alone achieves recommended physical-activity levels or improves cardiorespiratory fitness to the same degree as aerobic exercise.

Yoga is best incorporated into a broader physical-activity plan, complementing rather than displacing activity recommended for cardiovascular health.

11. YOGA, PSYCHOLOGICAL STRESS, AND CARDIOVASCULAR RISK

Psychological stress may influence sleep, food choices, physical activity, and adherence to treatment. A systematic review and meta-analysis in stressed adults found that yoga may reduce perceived stress, particularly compared with passive controls, but the certainty of evidence was low, and results depended on the comparator.[17]

Stress reduction may support well-being and healthier routines, but perceived stress is not itself proof of cardiovascular risk reduction. The available evidence does not establish that yoga-induced stress changes lead to fewer cardiovascular events.

12. AUTONOMIC REGULATION AND HRV

HRV is used as a measure related to cardiac autonomic modulation. A comprehensive review found that some yoga studies reported HRV changes, but the evidence was methodologically limited and heterogeneous.[18] Differences in breathing, posture, recording conditions, and analytic methods complicate comparisons.

HRV changes may reflect an immediate relaxation or breathing response without demonstrating durable cardiovascular benefit. HRV is therefore a mechanistic or surrogate outcome, not proof that yoga prevents clinical events.

13. ENDOTHELIAL FUNCTION AND VASCULAR MECHANISMS

The literature reviewed for this article did not include a dedicated assessment of endothelial function. Vascular mechanisms may be biologically plausible, but they should not be presented as established effects of yoga without directly relevant evidence.

14. PRANAYAMA AND CARDIOVASCULAR REGULATION

Pranayama is an important component of classical yoga, and regulated breathing may influence respiratory pattern and autonomic responses. However, the hypertension trials generally evaluated multicomponent programs rather than isolating a single breathing technique.[4]

Consequently, evidence for yoga as a whole does not prove that any individual pranayama technique independently prevents CVD. Practices should be selected and adapted to the person's health status, and breathing exercises should not delay assessment of concerning symptoms.

Appropriately selected pranayama can be included alongside other yoga practices when suitable. More focused trials are needed to determine whether specific techniques produce durable changes in blood pressure or other cardiovascular outcomes beyond short-term physiological responses.

15. POTENTIAL INTERACTION OF MULTIPLE RISK-FACTOR PATHWAYS

Cardiovascular risks interact: excess adiposity can worsen blood pressure and glycemic control, whereas stress may affect sleep, eating, and adherence. A multicomponent intervention could therefore influence more than one domain, but studies combining yoga with diet or lifestyle counseling cannot attribute all changes to yoga alone.

The broad cardiovascular review reported changes in some risk-related factors, but the included evidence varied in design and quality.[2] Improvements in several surrogate markers do not automatically establish a clinically important reduction in cardiovascular events; durability and clinical significance remain uncertain.

16. DOES YOGA PREVENT CVD?

The available evidence does not establish that yoga independently prevents myocardial infarction, stroke, or cardiovascular death. The Cochrane review of yoga for primary prevention concluded that evidence was insufficient to determine effects on major cardiovascular outcomes, in part because trials were limited and focused largely on risk factors.[19] A review of yoga in people with diagnosed cardiac disease addresses a different clinical population and does not prove primary prevention of cardiovascular events.[20]

For people with established CVD, yoga should not replace cardiac care, prescribed medication, or professionally advised rehabilitation.

Any use should be adapted to clinical status and coordinated with the treating team.

Blood pressure, LDL cholesterol, HbA1c, and stress are relevant outcomes, but they are not interchangeable with clinical events. The article therefore distinguishes possible risk-factor modification from proven primary or secondary prevention of CVD.

17. DISCUSSION

Across the reviewed literature, the most consistent signal is a possible improvement in blood pressure, with encouraging but heterogeneous findings for selected lipid and glycemic measures.[4,9,13,14] Yoga may reduce perceived stress, although certainty is low.[17] Available evidence does not adequately establish weight loss or endothelial effects, and HRV remains a surrogate measure.[18]

Interpretation is limited by variation in yoga style, dose, session frequency, instructor, home practice, and co-interventions. The term "yoga" therefore covers interventions that may not be comparable.

Controls also matter: Waiting list, usual-care, stretching, and supervised exercise comparisons answer different questions. A benefit over usual care does not show superiority to exercise, and behavioral trials cannot fully separate the effects of attention and expectation.

Many studies have short follow-up, rely on surrogate outcomes, and are too small to assess cardiovascular events. Adherence and adverse events are also inconsistently reported. These limitations require cautious conclusions rather than dismissal of the evidence.

Yoga is reasonably considered an adjunctive lifestyle option – especially for blood pressure, selected metabolic outcomes, and stress management – but not a replacement for established preventive measures.

Table 1 summarizes the main risk domains and the maturity of evidence; it does not imply that interventions or outcomes were directly comparable.

17.1. Practical Implications for Preventive Cardiology

Yoga may be included in a broader cardiovascular lifestyle program when medically appropriate and acceptable to the individual. Practice should be adapted to age, functional capacity, symptoms, blood-pressure control, comorbidities, and experience; one sequence will not suit everyone.

People with established CVD or poorly controlled hypertension may need medical assessment and coordination with cardiac rehabilitation or exercise advice. Chest pain, syncope, marked breathlessness, or other concerning symptoms require medical assessment, not yoga alone. Yoga should not be used to stop or delay indicated medication.

The practical model is to combine yoga, where suitable, with recommended aerobic and resistance activity, dietary improvement, tobacco cessation, sleep, weight management, and regular risk-factor monitoring.

17.2. Research Gaps and Future Directions

Future trials should describe yoga style, components, session duration, frequency, instructor training, home practice, and adherence so interventions can be replicated. Researchers should also distinguish programs centered on asana from those emphasizing pranayama, meditation, or relaxation.

Trials should use comparators suited to the question, document medication changes and co-interventions, and distinguish benefit over usual care from benefit beyond exercise or structured lifestyle programs.

Larger, longer studies are needed to test whether changes in blood pressure, lipids, glycemia, adiposity, and psychosocial outcomes translate into fewer cardiovascular events. Adherence, safety, cost, and feasibility in routine care should also be reported.

18. CONCLUSION

Current evidence supports a cautious adjunctive role for yoga in cardiovascular risk-factor management. The clearest signal is for possible blood-pressure improvement, with heterogeneous evidence for selected lipid and glycemic outcomes and low-certainty evidence for stress reduction. Evidence on weight-related outcomes remains inadequate, and HRV remains a surrogate measure. Whether these changes reduce cardiovascular events or mortality remains unproven.

Yoga should complement, not replace, established prevention – including physical activity, dietary improvement, weight management, tobacco cessation, risk-factor monitoring, and medication when indicated. Better-designed, longer-term studies are needed to establish the durability and clinical significance of its effects. In practice, the choice of yoga should reflect individual preference and safety, and progress should be assessed using established clinical measures rather than subjective improvement alone.

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20. AUTHORS' CONTRIBUTIONS

All authors have read and approved the final version of the manuscript.

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22. ETHICAL STATEMENT

Ethical approval was not required for this study, as it was a review article with data obtained through a literature search.

23. CONFLICTS OF INTEREST

The authors declare no conflicts of interest in relation to the publication of this paper.

24. DATA AVAILABILITY STATEMENT

The data analyzed in this review were obtained from publicly available sources, including peer-reviewed articles, observational studies, and surveys accessible through databases.

25. DISCLAIMER/VIEW AND OPINIONS

The opinions expressed in this article are solely those of the authors and do not reflect the views of the International Research Journal of Ayurveda and Yoga or its editorial board.

26. AI-USE DECLARATION

The authors declare that no generative AI tools were used to create scientific content, interpret data, or draft any sections of this manuscript. AI-based tools were used solely for minor language and grammar refinements to improve clarity and readability. All scientific content, analysis, and conclusions remain the sole responsibility of the author.

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Table 1: Summary of current evidence for yoga and major cardiovascular risk domains

Risk domain	Main evidence signal	Interpretation	Important limitation
Blood pressure	Possible reductions in systolic and diastolic pressure in yoga trials.[4]	Potential adjunctive effect.	Heterogeneity and limitations in study quality; not a substitute for prescribed treatment.
Dyslipidemia	Some reviews report favorable changes in selected lipid measures.[9,10]	Potential contribution to broader lifestyle risk reduction.	Heterogeneity; not a replacement for indicated lipid-lowering therapy.
Adiposity	Reviews report mixed or inconclusive anthropometric findings.[11,12]	May support broader lifestyle engagement.	Heterogeneous evidence; no reliable, generalizable weight-loss effect established.
Glycemic risk	Reviews report possible improvements in glucose and HbA1c.[13-15]	Potential adjunct to diabetes lifestyle management.	Variable certainty; standard diabetes care remains necessary.
Psychological stress	Yoga may reduce perceived stress compared with passive controls.[17]	Relevant supportive outcome for well-being.	Low-certainty evidence; event reduction not established.
Autonomic function	Some studies report HRV changes, but methods and findings vary.[18]	Plausible physiological pathway.	HRV is a surrogate and method-sensitive outcome.
Vascular mechanisms	Not adequately assessed in the reviewed literature.	Hypothesis-generating only.	No direct conclusion on endothelial function can be drawn here.
Major cardiovascular events	Primary-prevention evidence remains insufficient to establish event reduction.[19]	Risk-factor changes may be useful, but event prevention is unproven.	Trials are limited and focus largely on intermediate outcomes.

BP: Blood pressure, BMI: Body mass index, HbA1c: Glycated hemoglobin, HRV: Heart rate variability