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The Role Of Adjuvant Yoga Therapy In The Management Of Polycystic Ovary Syndrome: A Narrative Review

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ABSTRACT

Polycystic Ovary Syndrome (PCOS) is a prevalent endocrine–metabolic disorder affecting 8–13% of women of reproductive age, commonly associated with insulin resistance, hormonal imbalance, and psychological distress. Conventional therapies, including pharmacological and lifestyle interventions, often provide partial relief and face adherence challenges. Yoga has emerged as a promising adjuvant therapy offering a holistic, non-pharmacological approach to managing PCOS.

This narrative review synthesized studies published between 2010 and 2025 from PubMed, Scopus, Google Scholar, and ResearchGate using terms such as "Yoga," "Polycystic Ovary Syndrome," and "Adjuvant therapy." Eligible randomized controlled trials, observational studies, and reviews were analysed.

Findings suggest that yoga improves insulin sensitivity, glucose metabolism, lipid profile, and body mass index (BMI). It also reduces serum testosterone, LH/FSH ratio, and anti-Müllerian hormone (AMH), enhancing ovulatory function and menstrual regularity. Psychologically, yoga alleviates stress, anxiety, and depression, thereby improving overall quality of life.

In conclusion, adjuvant yoga therapy provides a safe, cost-effective, and integrative strategy addressing the biological, psychological, and social dimensions of PCOS. Further multicentric trials and standardized protocols are essential to strengthen its inclusion in evidence-based clinical practice.

KEYWORDS: Yoga, Yoga therapy, PCOS, Polycystic Ovarian Syndrome, Stein Leventhal Syndrome, adjuvant therapy.

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INTRODUCTION

PCOS is one of the most common endocrine–metabolic disorders affecting women of reproductive age, with global prevalence estimates ranging from 8% to 13%.1 It is also among the most prevalent gynaecological endocrine diseases, affecting approximately 6%–8% of women in this age group.2 PCOS was first described in 1935 by Stein and Leventhal, and has since been recognized as a complex disorder with multifactorial origins.3–5

The ethology of PCOS involves an intricate interplay of genetic, environmental, and lifestyle factors that contribute to its onset and progression. Women with PCOS are at increased risk of developing type 2 diabetes mellitus, cardiovascular disease, metabolic syndrome, and various mood disturbances.6 Conventional management typically includes lifestyle modifications (diet and exercise), pharmacological interventions oral contraceptives, anti-androgens, and insulin sensitizers, and occasionally, surgical procedures.7

Yoga, an ancient Indian mind–body discipline, has recently gained recognition as a potential adjuvant therapy for PCOS. By integrating physical postures (asanas), breathing techniques (pranayama), and meditative practices, yoga offers a holistic intervention that simultaneously targets metabolic, hormonal, reproductive, and psychological dimensions. 8–10Recent studies have demonstrated that yoga improves insulin sensitivity, regulates endocrine parameters, enhances ovulatory function, and alleviates symptoms of depression and anxiety in women with PCOS.11

Thus, yoga may serve as a valuable adjunct to conventional therapeutic approaches by promoting long-term adherence, minimizing side effects, and providing a comprehensive biopsychosocial model of care. This review aims to synthesize current evidence on the role of yoga as an adjuvant therapy in the management of PCOS across metabolic, hormonal, and psychological domains.

METHODOLOGY:

This narrative review was conducted using systematic literature search methods to identify studies exploring the role of yoga therapy in the management of PCOS. Major electronic databases, including PubMed, Scopus, Google Scholar, and ResearchGate were searched.

The search strategy employed a combination of key terms such as "Polycystic Ovary Syndrome," "PCOS," "Yoga therapy," "Adjuvant yoga therapy," "Lifestyle intervention," "Mind–body practices in PCOS," and "Insulin resistance." Boolean operators (AND, OR) were applied to refine and optimize the search process.

Inclusion criteria comprised randomized controlled trials (RCTs), observational studies, cohort studies, systematic reviews, and meta-analyses published in English between 2010 and 2025. Studies evaluating yoga either as a stand-alone intervention or as an adjunct to conventional PCOS therapies were included.

Exclusion criteria encompassed non-English publications, single-patient interventions, and studies lacking PCOS-specific outcomes.

The literature search yielded a substantial number of relevant publications. For instance, a preliminary PubMed search using the term "yoga AND PCOS" identified approximately 40 studies, underscoring the growing scientific interest in this domain.

PATHOPHYSIOLOGY:

PCOS is a multifaceted endocrine–metabolic disorder affecting up to 10% of women of reproductive age worldwide. It is primarily characterized by hyperandrogenism, anovulation, and polycystic ovarian morphology (PCOM), and is often associated with insulin resistance, obesity, depression, and infertility.2

Medically referred to as Stein–Leventhal syndrome, PCOS represents one of the most prevalent endocrine disorders among women of reproductive age. It is clinically defined by a triad of features—irregular or absent menstrual cycles, elevated androgen levels, and polycystic ovaries on ultrasonography—which can manifest as infertility, hormonal imbalance, and an elevated risk of metabolic complications.4

The prevalence of PCOS varies considerably across populations, ranging from 2.2% to 26%, depending on the diagnostic criteria applied—such as the Rotterdam criteria, NIH criteria, or AE-PCOS criteria—and differences in ethnicity and population characteristics. This wide variation underscores the heterogeneity of PCOS in both its diagnostic and clinical presentation.12

Women with PCOS frequently exhibit a broad spectrum of physical and psychological symptoms, including obesity, infertility, amenorrhea, hirsutism, insulin resistance, acanthosis nigricans, disordered eating, poor body image, type 2 diabetes, dyslipidaemia, endometrial hyperplasia, hypertension, cardiovascular disease, depression, anxiety, sleep disturbances, and chronic stress. Among these, insulin resistance (IR) accompanied by compensatory hyperinsulinemia (HI) is particularly common, affecting approximately 65–70% of women with PCOS. This phenomenon is more prevalent in overweight and obese women but is also observed in over half of those with normal body weight.13

According to the 2003 Rotterdam criteria, as established by the ESHRE/ASRM consensus, a diagnosis of PCOS requires at least two of the following three criteria:

1. Oligo-ovulation or anovulation,

2. Clinical and/or biochemical signs of hyperandrogenism, and

3. Polycystic ovaries detected via ultrasound.11,14

Recent research among the Madurese population explored the effects of yoga therapy on PCOS-related metabolic parameters. The study demonstrated a significant reduction in HOMA-IR values, insulin levels, body weight (BW), and body mass index (BMI) following yoga intervention, highlighting yoga's potential effectiveness in managing PCOS symptoms.11

Moreover, growing evidence suggests a role for intrauterine environmental factors in the developmental origins of PCOS. Exposure to elevated levels of dihydrotestosterone (DHT) and insulin during the second trimester of pregnancy may induce fetal programming that predisposes female offspring to PCOS-like features in adolescence or adulthood. Such prenatal exposure has also been linked to an increased risk of spontaneous miscarriage.13,15

NEED FOR INTEGRATIVE MANAGEMENT:

Conventional pharmacological treatments for PCOS often target specific symptoms such as hyperandrogenism, anovulation, or

insulin resistance but may not fully address the multifactorial nature of the disorder. As a result, there is growing global interest in non- pharmacological and integrative approaches to management. Among these, yoga therapy stands out as a safe, affordable, and evidence-based complementary intervention. Yoga promotes systemic balance by regulating endocrine and metabolic functions, reducing stress reactivity, and enhancing psychological resilience and emotional well-being. As a sustainable form of lifestyle modification, yoga has demonstrated potential in alleviating many of the physiological and psychosocial symptoms associated with PCOS.16

From a psychosocial perspective, women with PCOS often experience social stigma and cultural misconceptions, particularly concerning body image, weight, and fertility. Such stigma can adversely impact self-esteem, mental health, and quality of life, potentially leading to emotional withdrawal, anxiety, and strained interpersonal relationships. Studies have highlighted how social discrimination and negative stereotypes can amplify the psychological burden of PCOS.6,17

In addition to conventional and pharmacological management, several complementary and alternative medical (CAM) modalities—including herbal medicine, naturopathy, and yogic practices—have shown promising results in managing symptoms related to menstrual irregularities, dysmenorrhea, and chronic pain. Among these, yoga has been particularly recognized for its stress-modulating and relaxation-inducing effects. Through breath regulation (pranayama), physical postures (asanas), and mindfulness-based meditation, yoga activates the body's parasympathetic (relaxation) response, thereby promoting neuroendocrine balance and overall well-being.18–20 Given the complex and multidimensional nature of PCOS, integrating Adjuvant Yoga Therapy (AYT) into conventional management protocols offers a holistic, biopsychosocial approach. This integrative model can address the biological, psychological, and social components of PCOS, ultimately contributing to improved quality of life and long-term health outcomes.

RATIONALE FOR ADJUVANT YOGA THERAPY:

PCOS is a complex disorder requiring multidimensional management. Lifestyle modification remains the cornerstone of therapy, but adherence to diet and exercise regimens is inconsistent, particularly among adolescents and young women. Pharmacological options such as oral contraceptives, metformin, and anti-androgens target specific symptoms but do not adequately address the psychological and lifestyle dimensions of PCOS. Yoga offers a low-cost, culturally adaptable, and side-effect-free intervention. Its accessibility and safety make it especially appealing for women of reproductive age, including adolescents who may be at risk for early PCOS onset. Unlike conventional exercise, yoga integrates physical activity with mindfulness and relaxation, providing benefits across metabolic, reproductive, and psychosocial domains. 8,21

MECHANISMS OF YOGA IN PCOS:

Yoga exerts multidimensional effects on the biological, behavioural, and psychological pathways implicated in the pathophysiology of PCOS. Through modulation of metabolic, neuroendocrine, autonomic, inflammatory, and psychophysiological systems, yoga provides an integrative therapeutic framework that addresses both the root causes and the clinical manifestations of PCOS.

Regulation of Insulin Sensitivity

Insulin resistance plays a central role in the pathogenesis of PCOS, contributing to hyperandrogenism, anovulation, and metabolic disturbances. Several randomized controlled trials and case–control studies have demonstrated that yoga significantly improves insulin sensitivity by promoting GLUT-4 translocation, enhancing cellular glucose uptake, and reducing fasting glucose, serum insulin levels, and HOMA-IR.7

A study among obese women with PCOS in Madurai reported a marked reduction in HOMA- IR after 12 yoga sessions. Similarly, a combined intervention involving yoga, a Mediterranean diet, and probiotic supplementation produced greater improvements in insulin sensitivity and body mass index (BMI) than yoga alone.7 These changes were accompanied by reduced HbA1c levels and improved glycaemic control, underscoring yoga's role in restoring metabolic homeostasis.22 Neuroendocrine and HPA Axis Modulation Chronic stress and sympathetic overactivity disrupt the hypothalamic–pituitary–ovarian (HPO) axis in PCOS, leading to abnormal gonadotropin secretion and anovulation. Yoga, through asanas, pranayama, and meditation, exerts a regulatory influence on the hypothalamic– pituitary–adrenal (HPA) axis, lowering cortisol levels and normalizing luteinizing hormone (LH) pulsatility.23

This neuroendocrine modulation contributes to improved ovulatory function, balanced sex hormone profiles, and restoration of menstrual regularity. Studies have further reported favorable changes in the LH/FSH ratio, anti-Müllerian hormone (AMH), and serum testosterone following yoga interventions, indicating enhanced reproductive hormonal balance.15
Autonomic Nervous System Rebalancing

Women with PCOS frequently demonstrate sympathetic overactivation and reduced heart rate variability (HRV), which increase metabolic and cardiovascular risk. Yoga enhances parasympathetic tone and reduces sympathetic dominance through controlled breathing, relaxation, and mindfulness-based movement.24

This autonomic rebalancing promotes cardiometabolic resilience, improves stress adaptability, and enhances overall physiological stability.23

Anti-inflammatory and Antioxidant Effects

Chronic low-grade inflammation and oxidative stress are hallmark features of PCOS, contributing to insulin resistance, endothelial dysfunction, and follicular dysregulation. Regular yoga practice has been shown to reduce pro-inflammatory cytokines such as TNF-α and IL-6, while increasing antioxidant enzyme activity and decreasing oxidative stress markers.

These biochemical improvements mitigate cellular and endothelial damage, supporting better metabolic and reproductive outcomes. By reducing systemic inflammation, yoga indirectly enhances ovarian health and metabolic regulation.25,26

Psychophysiological Pathways

Beyond its physiological benefits, yoga profoundly impacts psychological and behavioral mechanisms relevant to PCOS management. The mindfulness and meditative components of yoga foster stress reduction, emotional regulation, and self-efficacy, enhancing adherence to lifestyle modifications and treatment plans.

Studies have shown that yoga significantly reduces depression and anxiety, improves body image perception, and enhances quality of life across multiple PCOS-specific domains. These psychophysiological adaptations reinforce beneficial neuroendocrine and metabolic responses, creating a positive feedback loop between mind and body.7,16

CLINICAL EFFECT OF YOGA IN PCOS:

A total of 13 research studies investigating the clinical effects of yoga in women with PCOS are summarized in Table 1(Review table). These studies highlight yoga's impact on metabolic, hormonal, reproductive, and psychological parameters, demonstrating its potential as an adjuvant therapy across diverse populations and age groups.

S. No.	Year	Author(s)	Study Title	Study Period	Yoga Intervention	Key Outcomes
1	2012	Ram Nidhi et al.	Effect of Yoga Program on Quality of Life in Adolescent PCOS: RCT	12 weeks	Lecture (5 min) + physical practices (40 min) + pranayama (5 min) + relaxation (10 min)	Improved quality of life more than physical exercise
2	2012	Ram Nidhi et al.	Effect of Yoga on Glucose Metabolism and Lipid Levels in Adolescent PCOS	12 weeks	1-hour yoga practice	Improved glucose, lipid profile, and insulin resistance better than conventional exercise

3	2013	Ram Nidhi et al.	Effect of a Holistic Yoga Program on Endocrine Parameters in Adolescents with PCOS: RCT	12 weeks	Holisticyoga module vs. matched physical exercise	Reduced AMH, LH, testosterone, mFG score ; improved menstrual frequency; no significant changes in body weight, FSH, prolactin
4	2018	M E zhil Ratnaku mari et al.	Study to Evaluate Changes in Polycystic Ovarian Morpholog y aft er Naturopathi c and Yogic Intervention s	12 weeks	Yoga + naturopathic intervention	Significant improvement s in ovarian morphology and anthropometr ic measures
5	2019	Vishesha Patel et al.	Regular Mindful Yoga Practice to Improve Androgen Levels in Women with PCOS: RCT	3 months	1-hour yoga, thrice weekly	Improved serum androgen levels, independent of weig ht loss; benefits persisted even after temporary lapses in practice
6	2020	Valarmat hi Selvaraj et al.	Impact of Yoga an d Exercises on P COS Risk among Adolescent Schoolgirls	6 months	Yoga for 2 months + walking for 2 months	Reduced PCOS risk factors among adolescents
7	2021	Maryan Mohseni et al.	Yoga Effect on Anthropom etric Indices and P COS Symptoms in W omen Undergoing Infertility Treatment: RCT	6 weeks	90-min yoga sessions	Improvement s in hirsutism and anthropometr ic parameters (abdomen, hip circumferenc e)

8	2023	Zakkiyatu s Zainiyah et al.	Yoga Exercise Reduces HOMA-IR and Insulin Levels in PCOS Insulin Resistant	–	Yoga targeting HOMA-IR, insulin, body weight (BW), BMI	Significant improvement s in HOMA- IR, insuli n, BW, and BMI post-intervention
9	2023	Anushree Devashis h Patil et al.	Yoga Intervention Improves Metabolic Parameters and Q oL among Infertile Women with PCOS	12 weeks	90-min yoga sessions	Improved anthropometr ic, hormonal, biochemical, and QoL outcomes; suggested integration into infertility management
10	2023	Kumari Jyoti et al.	Effect of Yoga on Clinical, Biochemica l, an d Doppler Parameters in In fertile Women with PCOS	12 weeks	45-min yoga sessions	Favorable changes in biochemical and hormonal profiles; improved uterine artery blood flow
11	2024	Ragini Shrivasta va et al.	Effect of Yoga an d Naturopath y on Sleep Quality and Pain in PCOS Patients with Dysmenorr hea: A Case Series	–	45-min yoga + 15-min naturopathy (hip bath) + dietary advice	Yoga and naturopathy with dietar y modification improved dysmenorrhe a management

12	2024	Mai M. ELBanna et al.	Effect of Yoga Training and High Probiotic Food Supplement on Insulin Resistance in PCOS: RCT	12 weeks	1 hour yoga daily + probiotic supplement	Improved insulin, HOMA-IR, fasting glucose, BMI, waist and hip circumferenc e
13	2024	Balakrish na Shetty et al.	RCT in Obese Adults with PCOS: Short-term Integrated Naturopath y and Yoga Intervention s	10 days	Naturopathic + yoga interventions	Reduced testosterone, MDA, HAM- A, HAM-D, BMI, and lipid profile; BMI predicted testosterone reduction

Table 1

Metabolic Outcomes
Research consistently demonstrates that yoga improves body mass index (BMI), waist–hip ratio, fasting glucose, fasting insulin, and lipid profiles in women with PCOS.10,27 When combined with conventional therapy, yoga produces greater improvements in insulin sensitivity compared to standard care alone, which is particularly significant given the increased risk of type 2 diabetes and cardiovascular disease in this population.

Hormonal and Reproductive Outcomes
Yoga has been associated with favourable hormonal changes, including reductions in serum testosterone, LH/FSH ratio, and anti-Müllerian hormone (AMH) levels.15 These changes are often more pronounced compared to conventional physical exercise. Improvements in menstrual cyclicity, ovulation, and conception rates have also been documented. In one structured yoga program at a PCOS infertility clinic, the yoga group reported higher pregnancy rates compared to pharmacological interventions alone.28 Similarly, reductions in serum androgens and improved menstrual regularity were consistently reported in both adolescent and adult PCOS patients.29

Psychological and Quality-of-Life Outcomes
Women with PCOS are at increased risk of depression, anxiety, and low self-esteem. Yoga interventions have demonstrated improvements in PCOSQ (Polycystic Ovary Syndrome Questionnaire) scores, body image, and infertility-related stress. In populations where depression prevalence reaches up to 65%, yoga practice significantly reduces depressive symptoms, supporting enhanced psychological well-being.10,21

Symptomatic and Lifestyle Improvements
Beyond metabolic and reproductive outcomes, yoga positively influences symptoms such as dysmenorrhea, fatigue, sleep disturbances, and hirsutism.10 Case series combining yoga with naturopathy demonstrated notable improvements in sleep quality and pain reduction.19,30 Yoga has also been shown to improve anthropometric indices, contributing to overall enhancement in day-to-day functioning among PCOS patients.22

Preventive Role in Adolescents
In adolescent girls, yoga combined with walking exercises effectively reduces PCOS risk levels, shifting participants from high-risk to moderate- or low-risk categories.5 Yoga has also been shown to improve sleep quality, alleviate dysmenorrhea-associated pain, and enhance daily functioning in this population.31

Integrative and Synergistic Approaches
Yoga has been studied alongside Ayurveda, naturopathy, diet, and probiotics, highlighting its synergistic potential in multidimensional PCOS care. Herbal remedies such as Foeniculum vulgare and Tinospora cordifolia have shown enhanced metabolic and reproductive benefits when combined with yoga.19 Similarly, yoga combined with a probiotic-rich Mediterranean diet yielded greater improvements in BMI and insulin resistance than either intervention alone.7 These integrative approaches underscore yoga's potential as a personalized, holistic strategy for PCOS management.

DISCUSSION:

The evidence synthesized in this review supports yoga as an effective adjuvant therapy for PCOS, demonstrating benefits across metabolic, hormonal, reproductive, psychological, and symptomatic domains. Unlike conventional therapies that often target a single aspect of the disorder, yoga offers a multidimensional intervention, making it particularly suitable for a complex condition like PCOS.

Mechanistically, yoga's influence on insulin signalling, HPA axis regulation, autonomic balance, and anti-inflammatory pathways provides a strong biological rationale for its clinical utility. Regular yoga practice improves insulin sensitivity, restores endocrine balance, and reduces systemic inflammation, which collectively contribute to improved ovulatory function, hormonal regulation, and metabolic health.

Despite these promising findings, several limitations exist in the current literature. Many studies are small-scale RCTs or observational studies with limited sample sizes, heterogeneous methodologies, and variable yoga protocols in terms of duration, intensity, and content. This variability complicates cross-study comparisons and generalizability of findings. Outcome measures are often inconsistent, further limiting the ability to draw definitive conclusions.

Future research should focus on large, multicentred RCTs with standardized yoga protocols and long-term follow-up. Mechanistic studies exploring molecular pathways such as adiponectin regulation, GLUT-4 expression, and cytokine modulation are warranted to strengthen the biological plausibility of yoga's effects. Additionally, integrative approaches combining yoga with dietary, pharmacological, and Ayurvedic strategies may provide enhanced, individualized care and should be investigated further.

CONCLUSION:

Adjuvant yoga therapy represents a promising, multidimensional approach for managing PCOS. Evidence indicates that yoga improves insulin sensitivity, hormonal balance, ovulatory function, psychological well-being, and physical symptoms associated with PCOS. Its safety, accessibility, and preventive potential in adolescents further support its integration into standard PCOS care.

Yoga's potential impact on the bio-psycho-social dimensions of PCOS includes improvements in psychological symptoms through stress reduction, mood enhancement, and better coping strategies. The physical activity component of yoga contributes to metabolic health and weight management, which is critical given the link between obesity and reduced quality of life in PCOS patients. Furthermore, yoga fosters social engagement and community interaction, potentially mitigating feelings of isolation and stigma associated with the condition.

While the existing evidence is encouraging, standardized yoga protocols and high-quality, multicenter trials are necessary to establish yoga as a mainstream adjunctive therapy. Ultimately, yoga has the potential to transform PCOS management by addressing its complex biological, psychological, and social dimensions, offering a holistic and patient-centred approach.

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