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Effects of 16-Week Specific Yogic Intervention on Reversal of Polycystic Ovarian Morphology – A Single Case Study

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Abstract

Polycystic Ovary Syndrome (PCOS) is a complex endocrine and metabolic disorder frequently associated with menstrual irregularities, hyperandrogenism, insulin resistance, and polycystic ovarian morphology. Emerging evidence supports yoga as a complementary therapeutic option for improving both physiological and psychological symptoms in women with PCOS. This single-case study reports the therapeutic outcomes of a 16-week specific yogic intervention on ovarian morphology reversal in a 20-year-old woman with long-standing PCOS. The patient presented with irregular menses, weight gain, hair fall, and ultrasonographic findings confirming bilateral polycystic ovaries. With no concurrent pharmacological treatment, she underwent a structured yoga program consisting of Surya Namaskar, Pawanmuktasana Series-I, breathing practices, and guided relaxation for 45–60 minutes per day, five days a week.

Following the 16-week intervention, notable improvements were observed. Menstrual cycles normalized by week twelve, and follow-up ultrasonography showed a reduction in ovarian size from 33 mm to approximately 23 mm, with complete resolution of polycystic features. Her BMI decreased from 27.4 to 26.1 kg/m², and she reported reduced hair fall, improved physical fitness, enhanced energy levels, and lower stress. These findings align with existing research highlighting yoga's beneficial role in regulating the hypothalamic–pituitary–ovarian axis, improving insulin sensitivity, reducing inflammation, and promoting psychological well-being.

This case supports the potential of yoga as a safe, holistic, and non-pharmacological intervention for managing PCOS and improving ovarian morphology. Larger controlled studies are warranted to confirm these findings and develop standardized yoga protocols for clinical practice.

Keywords: Polycystic Ovary Syndrome, Yoga Therapy, Ovarian Morphology, Hormonal Balance

Introduction

Polycystic ovarian syndrome (PCOS) is one of the most common endocrine disorders affecting women in their reproductive years. Its prevalence varies widely, ranging from 5% to 28%, depending on the diagnostic criteria applied [1]. According to the Rotterdam criteria, PCOS can be diagnosed by any two of the following features: irregular or missed ovulation, symptoms or lab evidence of high androgen levels, or polycystic-appearing ovaries on ultrasound. And, exclusion of disorders which are similar to the symptoms of PCOS. The exact aetiology remains unclear, but it is a complex, multifactorial, multigenic disorder with strong epigenetic factors, as well as environmental, hormonal, and lifestyle factors [2].

The pathophysiology of PCOS is a multifactorial disorder involving dysregulation of ovarian steroidogenesis, insulin resistance, elevated antimüllerian hormone, and luteinizing hormone imbalance due to hypothalamic pituitary ovarian-axis dysfunction. A key pathogenic feature is the bidirectional relationship between hyperinsulinemia and androgen excess, now positioning PCOS as a metabolic disease [3]. Chronic low-grade inflammation, excess peripheral oestrogen conversion, and occasional adrenal hyperandrogenism also contribute to the characteristic PCOS phenotype [3, 4].

PCOS is linked to a wide range of comorbidities, including infertility, metabolic syndrome,

obesity, impaired glucose tolerance, type 2 diabetes, cardiovascular disease, depression, obstructive sleep apnea, endometrial cancer, and metabolic dysfunction-associated steatotic liver disease [5, 6]. A delayed diagnosis can allow comorbidities to worsen, making it harder to initiate effective lifestyle changes, an essential component for improving PCOS symptoms and overall quality of life [1, 4, 5]. Lifestyle modifications are the primary and most effective management approach for PCOS treatment. Lifestyle changes, such as exercise on its own or combined with dietary modifications and behavioural strategies, are advised for all women with PCOS to help improve metabolic health. Reductions in central fat accumulation and improvements in lipid profile can track progress [7, 8].

For the management of PCOS, yoga has emerged as a promising integrative therapy, offering a holistic approach that addresses both physiological and psychological contributors to the condition. Although yoga has been shown to improve symptoms, standardized and validated yoga protocols for PCOS are still limited. This case study presents the therapeutic impact of a yoga-based intervention in a young woman with long-standing PCOS, highlighting its role in symptom improvement and overall well-being.

Case presentation

A 20-year-old female from a middle-class background presented to the Nature Cure and Yoga Hospital in February 2025 with a three-year history of Polycystic Ovary Syndrome.

Her chief complaints included progressive weight gain, hair loss, and irregular menstrual cycles (3 to 5 days/ 45 to 60 days, also sometimes skipped cycles). She had a history of pneumonia two years prior, and reported no significant family, surgical, or personal medical history. No pharmacological or hormonal therapy was being used at the time of presentation.

On examination, her BMI (27.4 kg/m²) indicated an overweight status, consistent with her complaint of weight gain. Abdominal and pelvic ultrasonography confirmed bilateral polycystic ovarian morphology. She reported subjective moderate stress, reduced physical activity, and fatigue. No allopathic medical guidelines or medications were initiated during the study period.

Yoga intervention

The patient underwent a 16-week integrated yoga therapy protocol consisting of Surya Namaskar, Pawanmuktasana Series I, and guided relaxation techniques (table 1).

Program Structure

- Duration: 16 weeks
- Frequency: 5 days/week
- Session Duration: 45–60 minutes/day
- Supervision: First 2 weeks supervised; remaining weeks self-practised.

Table 1: Yogic protocol and duration of each practice.

Component	Description	Duration
Pawanmuktasana Series-I	Each step is 5 rounds/session with breathing.	15 to 20 minutes
Surya Namaskar	6 rounds/session	20 minutes
Breathing practices	Deep breathing, abdominal breathing	5 minutes
Relaxation	End-of-session relaxation	5 minutes

Results

Table 2: Ovarian Morphology pre and post intervention.

Parameter	February 2025	August 2025
Ovary size	33 mm	~23 mm
Follicular pattern	Multiple follicles (PCOS pattern)	Normal; no PCOS features
Impression	Bilateral PCOS	Normal ovaries

After 16 weeks of consistent yoga practice, the patient demonstrated significant improvements across clinical, metabolic, and functional parameters. Her menstrual cycles became regular by the twelfth week, and follow-up ultrasonography revealed normalization of ovarian morphology with the absence of polycystic features (table 2). The patient's BMI decreased from 27.4 kg/m² to 26.1 kg/m²,

indicating a moderate reduction in weight. She reported a substantial reduction in hair fall, premenstrual symptoms, and fatigue, along with noticeable improvements in flexibility, core strength, and daily energy levels. Psychological well-being also improved, with reduced stress and better emotional balance (table 3).

Table 3: Baseline and after 16 weeks of post assessment.

Variable	Baseline	Week 16	Outcome
BMI	27.4 kg/m ²	26.1 kg/m ²	Improved (↓ 1.3 kg/m ²)
Menstrual regularity	Irregular	Regular	Improved
Ovarian morphology	PCOS pattern	Normal	Normalized
Hair fall	High	Mild	Improved
PMS symptoms	Present	Minimal	Reduced
Stress levels	Moderate	Low	Improved
Physical fitness	Low-moderate	Good	Improved

Discussion

This case study demonstrated significant improvements in menstrual regularity, ovarian morphology, BMI, and PCOS-

related symptoms following a 16-week specific yogic intervention consisting of Surya Namaskar, Pawanmuktasana Series-I, and relaxation practices. The outcomes observed in

this patient align strongly with existing literature supporting yoga as a promising alternative therapy for PCOS.

A growing body of evidence from randomized controlled trials and systematic reviews indicates that yoga can effectively reduce menstrual irregularity, hyperandrogenism, fasting insulin levels, and insulin resistance (HOMA-IR) (Verma *et al.*, 2021; Singh *et al.*, 2022; Patel *et al.*, 2020; Patil *et al.*, 2023; Kumari *et al.*, 2025). Similar improvements were seen in the present case, where the patient achieved complete cycle regularity by week 12 and normalization of ovarian morphology on follow-up ultrasonography. These outcomes underscore yoga's physiological influence on reproductive and metabolic pathways, particularly its ability to modulate the hypothalamic-pituitary-ovarian (HPO) axis and improve follicular function^[9-13].

Improvements in BMI, adiposity, and body composition are frequently reported in yoga-based PCOS interventions (Nagru & Kesari, 2024; Verma *et al.*, 2024), and the patient's BMI reduction from 27.4 to 26.1 kg/m² is consistent with these findings. Surya Namaskar, a dynamic sequence known to enhance metabolic rate and improve insulin sensitivity, likely played a central role in this outcome. Regular practice may also reduce insulin resistance, a critical pathogenic factor in PCOS, as documented in earlier studies (Singh *et al.*, 2022; Patil *et al.*, 2023; Kumari *et al.*, 2025)^[9, 11, 12, 14].

Beyond endocrine and metabolic effects, yoga is well established for improving mental health outcomes in women with PCOS. Several studies report reductions in anxiety, depression, and psychological distress (Patel *et al.*, 2020; N *et al.*, 2024; Shrivastava *et al.*, 2025). The patient in this case reported lower stress levels, improved energy, and enhanced emotional well-being, which may be attributed to autonomic regulation, reduced sympathetic activity, and improved parasympathetic tone through relaxation practices. These mechanisms are supported by recent research suggesting that yoga reduces oxidative stress, improves mitochondrial efficiency, and promotes neuroendocrine stability (Anitha *et al.*, 2025; Metangale & Mishra, 2025)^[10, 14-16].

The intervention protocol used in this case, 45–60 minutes per session, five days per week for 16 weeks, is comparable to protocols found effective in multiple studies recommending 30–90-minute sessions for 6–12 weeks (Patel *et al.*, 2020; Patil *et al.*, 2023; Verma *et al.*, 2024). While many established trials integrate asanas such as Baddha Konasana, Bhujangasana, and yoga nidra, this case uniquely demonstrates that even a simplified protocol focusing primarily on Surya Namaskar and Pawanmuktasana can produce meaningful therapeutic outcomes^[10, 13].

The marked improvement in ovarian size and morphology following yoga practice is particularly noteworthy. Although several studies have reported improvements in ovarian volume and antral follicle count (Nagru & Kesari, 2024), the degree of normalization seen in this case further highlights yoga's potential to modulate ovarian physiology by improving blood flow, reducing inflammation, and restoring hormonal balance^[14]. Despite promising outcomes, this case adds to the evidence, emphasising the need for more rigorous, larger-scale studies.

Conclusion

This 16-week specific yogic intervention demonstrated significant improvements in menstrual regularity, ovarian morphology, BMI, and overall symptom burden in a young woman with long-standing PCOS. The normalization of ovarian structure and reduction in weight, hair fall, and stress

levels highlight yoga's multifaceted therapeutic potential in addressing the endocrine, metabolic, and psychological dimensions of PCOS. These findings align with existing evidence supporting yoga as a safe, cost-effective, and holistic non-pharmacological approach to PCOS management. Although limited to a single case, the results underscore the potential for structured yoga protocols, particularly those integrating Surya Namaskar, Pawanmuktasana, and relaxation practices, to serve as valuable adjuncts or alternatives to conventional treatment. Further well-designed clinical trials are needed to validate these outcomes and establish standardized yoga interventions for PCOS.

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