Indexed by : DOAJ Google Crossref Dimension sinta GARUDA

J.Biomed.Transl.Res
ISSN: 2503-2178

JOURNAL OF BIOMEDICINE AND TRANSLATIONAL RESEARCH

Available online at JBTR website: https://jbtr.fk.undip.ac.id

Review Article

Exploring the Potential of Yoga as a Complementary Therapy for Polycystic Ovarian Syndrome (PCOS)

Anatalya Diah Ayu Kumalasari[1*], Agyta Hanifa Faiza[1], Gabriela Valencia Putri Husodho[1], Tanti Ajoe Kesoema[2]

[1]*Faculty of Medicine, Universitas Diponegoro, Indonesia*
[2]*Department of Physical Medicine and Rehabilitation, Faculty of Medicine, Universitas Diponegoro, Indonesia*

Article Info
History
Received: 24 Sep 2025
Accepted: 26 Nov 2025
Available: 24 Dec 2025

Abstract

Polycystic ovarian syndrome (PCOS) is an endocrine and metabolic disorder that is most commonly experienced by women. This condition can reduce the quality of life because it can affect physical, psychological, emotional, social, and financial. The first-line and safest therapy for PCOS is lifestyle changes. One of them is doing physical activity. Yoga as one of the low-intensity physical activities has the potential as a complementary therapy for PCOS. This study implements a systematic review with qualitative analysis method. A literature search was done using the search engines PubMed, Science Direct, and Proquest by setting inclusion criteria and exclusion criteria. Yoga is a sport that can be done by everyone because it does not require fitness and flexibility at a certain level. Some of the mechanisms of yoga as complementary therapy for PCOS are the optimization of the autonomic nervous system, regulation of the endocrine system, reduction of stress levels, and balancing of neural hormones. Previous research has shown that yoga can improve various aspects in PCOS women such as anthropometric parameters, menstrual cycle, ovarian morphology, biochemical markers, hormones, cardiovascular, and psychiatric conditions. Yoga can improve various aspects including anthropometric parameters, menstrual cycle, ovarian morphology, biochemical markers, hormones, cardiovascular, and psychiatric conditions.

Keywords: *Endocrinology; PCOS; Complementary therapy; Yoga*
Permalink/ DOI: https://doi.org/10.14710/jbtr.v11i3.29516

INTRODUCTION

Polycystic ovarian syndrome (PCOS) is an endocrine and metabolic disorder that is most often experienced by women. About 5 – 15% of women of childbearing age are diagnosed with PCOS.[1,2] According to the Rotterdam criteria, a diagnosis of PCOS is established when two of the following three characteristics are met: (i) oligo/amenorrhea. absence of menstruation for 45 days or more and/or frequency of menstruation ≤8 times per year, (ii) clinical hyperandrogenism where the value of the score is *Modified Ferriman* and *Gallwey* by 6 or higher, and (iii) a picture of the polycystic ovary on pelvic ultrasound examination.[3]

In PCOS, there is an imbalance of the autonomic nervous system where the sympathetic nervous system is more dominant than the parasympathetic nervous system.[4] In addition, individuals with this condition often present with metabolic comorbidities such as glucose intolerance, insulin resistance, abnormal adipokine secretion, and increased cardiovascular risk. Women with PCOS often experience weight gain, mental health problems, and infertility. This can affect the level of quality of life. PCOS can affect physical, psychological, emotional, social, and financial aspects that can result in disharmonious marital relationships, decreased levels of confidence, and increased risk of depressive disorders in sufferers.[1,5]

The etiology and pathogenesis of PCOS are not yet known for sure so there are many ways to try PCOS therapy.[6,7] PCOS therapy currently includes pharmacological and non-pharmacological therapies. Current pharmacological therapies for PCOS include

*Corresponding author:
E-mail: *anatalyadiah@gmail.com*
(Anatalya Diah Ayu Kumalasari)

the consumption of hormonal birth control pills, anti-androgen agents such as spironolactone and cyproterone acetate, and insulin-sensitivity-enhancing drugs, such as metformin and thiazolidinedione.[8] However, pharmacological therapy has the potential to cause side effects such as thromboembolism and blood hypercoagulability in the consumption of birth control pills, and can have a feminizing effect on male fetuses if patients take pregnant anti-androgen drugs.[8] Pharmacological therapy is not a definitive solution for PCOS, as it only manage hormonal imbalances without providing a permanent cure. Therefore, further development of non-pharmacological therapies is needed.[9]

Non-pharmacological therapy of PCOS is lifestyle changes. Lifestyle changes are the most important and safe therapy, which includes changes in diet and physical activity that can reduce weight and improve hormonal balance.[6] A weight loss of 5 – 10% can restore a regular menstrual cycle, balance androgen hormone levels and improve the ovulation response.[1,7] Yoga as one of the low-intensity physical activities that does not require individuals to have a certain level of fitness or flexibility can be one of the physical activity options for PCOS patients.[1]

Yoga is a sport that can be a complementary therapy that comes from Indian philosophy.[10] The word "yoga" is derived from the word "*Yuj".* which has a meaning is a discipline that aims to balance the mind and body in order to calm the mind with various postural positions physically, namely *asana* or awareness, *Pranayama* or respiratory regulation, *Djokovic* or meditation, *Mantras* or singing, as well as lifestyle changes.[11] These components are combined to create a yoga module, which is a sequence performed by a person in order to undergo a yoga session; The yoga module is an intervention provided by researchers in studies that find out the effects of yoga on health.[11]

Previous research has shown that yoga can have a positive impact on the body, for example on inflammatory markers, quality of life, brain health, and others.[10,12,13] Yoga involves physical movement and breathing techniques contributing to increased muscle flexibility and strength, as well as being able to improve blood circulation and oxygen distribution throughout reproductive cells and tissues. In addition, relaxation techniques in yoga play a role in optimizing the function of the autonomic nervous system, lowering blood pressure and triglyceride levels, improving breathing patterns, and improving the ability to regulate emotions.[6]

Yoga improves reproductive function through three main mechanisms, namely regulation of the endocrine system, reducing stress levels, and balancing neural hormones. In addition, the practice of yoga has also been shown to be effective in lowering serum cortisol levels by increasing the process of cortisol excretion, which indirectly contributes to the improvement of various clinical manifestations of PCOS.[6] Because the pathophysiology of PCOS is closely linked to autonomic-nervous imbalance, endocrine dysfunction and chronic psychosocial stress, yoga is highly relevant as a complementary intervention to target these interconnected systems. This review therefore aims to fill a gap in the literature by synthesizing current evidence specifically on yoga's role in PCOS.

MATERIALS AND METHODS

Study design

This study was a systematic review conducted to synthesize existing evidence on the efficacy of yoga as a complementary therapy for PCOS. This design was chosen as it allows for comprehensive identification, analysis, and evaluation of relevant studies, providing a robust foundation for understanding the topic. This systematic review was conducted and reported according to the PRISMA 2020 guidelines.

Research question

Our primary research question was formulated using the Population, Intervention, Comparison, and Outcome (PICO) framework.[14] Population: PCOS patients, Intervention: yoga, Comparison: control group (if applicable), Outcome: antropometric parameters, effect on menstrual cycle, ovarian morphology, biochemical markers, secondary outcomes (cardiovascular system, mental health). Our study was guided by the following research question: "What is the efficacy of yoga as a complementary therapy in improving clinical, biochemical, and psychological outcomes among patients with polycystic ovary syndrome?"

Search strategy

A comprehensive search strategy was developed to capture a wide array of studies addressing this topic. Search terms were constructed using the keywords ("polycystic ovarian syndrome" OR "PCOS" OR "polycystic ovary syndrome") AND "yoga"), in which boolean operators AND/OR were utilized to ensure precision and inclusivity. We searched three databases, including PubMed, ScienceDirect, and ProQuest, to identify relevant literature. We employed the following inclusion and exclusion criteria in choosing the articles:

1. Inclusion criteria
   a. The research article uses a research design in the form of clinical trial research
   b. The research article was published in the last 10 years, namely in 2015 - 2025.
   c. The research article is written in English.
2. Exclusion criteria
   a. The research article does not have complete data and has not been published.
   b. The research article does not match the keywords in the title and abstract.
   c. The research article is not fully accessible.

Screening of the article

All articles retrieved through database searches were imported into Rayyan.ai for consolidation and deduplication. Subsequently, independent reviewers among ADAK, AHF, and GVPH conducted a three-step screening process. 1) Title Screening: Titles were screened for relevance; 2) abstract screening: Abstracts were evaluated to confirm alignment with the inclusion criteria; 3) full-text screening: Eligible studies underwent thorough full-text analysis to finalize the

selection. Discrepancies were resolved through discussion and consultation.

Data extraction

A standardized data extraction form agreed upon by the authors was used to systematically collect from the included studies. Data collected from the articles included the following: author and year of publication, experimental model, sample, therapy, parameter, and results. Three reviewers performed the data extraction and discrepancies were resolved through discussion and consultation.

Quality appraisal of the included studies

The risk of bias was assessed using the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-I) tool.[15] Two authors independently assessed the studies based on the tool's criteria. Any discrepancies were resolved by discussion. In each study, bias was assessed in seven domains: confounding, classification of interventions, selection of participants, deviations from intended interventions, missing outcome data, outcome measurement, and selection of reported results. Bias in each domain was categorized as low, moderate, serious, or critical. Finally, the prior assessment results were used to determine the overall risk of bias in each study.

Data analysis

A conventional inductive content analysis approach was employed in the data analysis process, resulting in the decision to categorize results based on parameters measured in the studies' outcome. A descriptive approach was used to analyze the efficacy of yoga as a complementary therapy for PCOS.

DISCUSSION

As per our study on assessing the role of yoga in PCOS, a total of 410 records were identified. Following screening and eligibility assessment, nine studies were finally included as outlined in Figure 1. The risk of bias assessment for the included studies is presented in Figure 2, with overall judgments indicating predominantly low risk of bias and only a few moderate ratings across domains. To provide a clear overview of the included evidence, the key characteristics of each study are summarized in Table 1.

Anthropometric Transformation: The Role of Yoga in Managing PCOS

The most important and safe therapy for PCOS is lifestyle changes. One of them is by doing physical activity so that weight can be lost. In line with this, yoga has potential for PCOS therapy.[1,6,7] There have been four studies that have been conducted to look for the effect of yoga on weight loss in PCOS patients with different types of yoga.[4,5,7,9] Additionally, one study combining yoga with a Mediterranean diet high in probiotics demonstrated even greater reductions in body weight compared to yoga alone.[16] A high body mass index (BMI) can lead to an increased risk of PCOS.[17] Across the reviewed evidence, most studies reported reductions in BMI following yoga-based interventions, including yoga nidra, integrated yoga, and combinations of yoga with naturopathy or Mediterranean diet programs.[4,7,5,16] These findings suggest that yoga can contribute to improving weight-

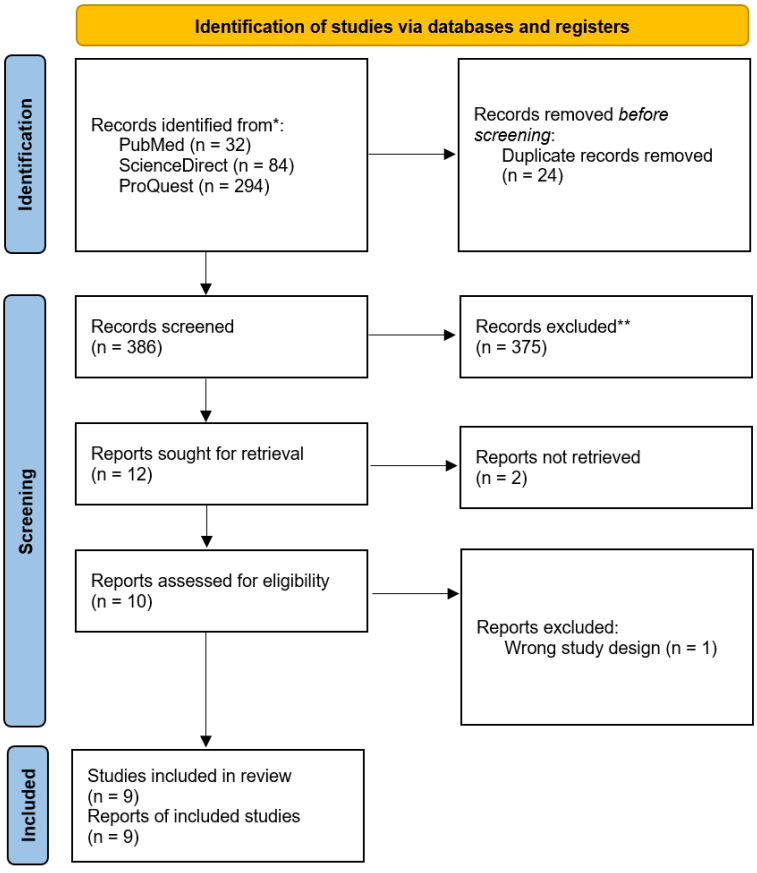

Figure 1. PRISMA of the search flow

related outcomes in PCOS patients. However, studies with shorter or less frequent sessions showed nonsignificant changes, indicating that intervention duration and intensity may influence effectiveness.[6,18]

Anthropometric parameters that can be related to PCOS are waist circumference, hip circumference, hip waist ratio, and abdominal circumference. Most studies reported reductions in waist and hip circumference after structured yoga programs, either alone or combined with naturopathy or dietary modification.[5,7,16] However, changes in waist–hip ratio were less consistent across studies.[7,16] These variations likely reflect differences in intervention duration and the addition of complementary therapies, suggesting that central adiposity may require longer or more intensive protocols to achieve measurable improvement.

The mechanisms underlying these improvements appear to involve both physical pathways and neuroendocrine modulation. Yoga increases light-to-moderate energy expenditure, enhances muscle tone, and improves postural efficiency, while its breathing and relaxation components help reduce sympathetic activation and cortisol levels, thereby supporting improvements in appetite regulation, fat distribution, and central adiposity.[4,10] Although these findings are promising, their generalizability is constrained by methodological heterogeneity across studies, including differences in yoga style, duration, frequency, and the use of combined interventions, as well as the small sample sizes that reduce statistical power. Overall, yoga appears to reduce BMI and waist circumference through integrated physical and neuroendocrine pathways, but these methodological limitations temper the certainty of the evidence.

Harmonization of the Menstrual Cycle: The Positive Impact of Yoga for Women with PCOS

The menstrual cycle is one of the key diagnostic criteria for PCOS, and women with PCOS frequently experience oligomenorrhea or amenorrhea due to androgen excess and disrupted ovulatory function.[19,20] In an effort to manage the symptoms of PCOS, physical activity such as yoga can balance hormones and improve the menstrual cycle. Evidence remains limited, with only one study assessing menstrual outcomes after yoga intervention. Ratnakumari, et al. reported no significant changes after a 12-week naturopathy-plus-yoga program, indicating that existing data are insufficient to draw firm conclusions.[7] Although evidence is limited, yoga may help regulate menstruation by normalizing HPO axis activity, warranting further controlled trials.[10]

Uncovering Ovarian Morphology: The Influence of Yoga Through Ultrasound on PCOS Sufferers

Ultrasound examinations (ultrasounds) play an important role in the diagnosis and monitoring of PCOS.[21] Ultrasound can check the condition of the ovaries, uterus, and pelvis, and show cysts in the ovaries or enlargement of the ovaries. In the diagnosis of PCOS, ultrasound usually shows a group of 12 or more cysts under the surface of the ovaries, with a diameter of no more than 9 mm.[21] There are two types of ultrasound that are commonly used, namely transvaginal ultrasound and abdominal ultrasound. Transvaginal ultrasound is more often chosen because it can find small cysts more precisely.[22] One of the main therapies for PCOS itself is to change the lifestyle from diet to physical activity. One of the physical activities that is often recommended for PCOS sufferers is yoga

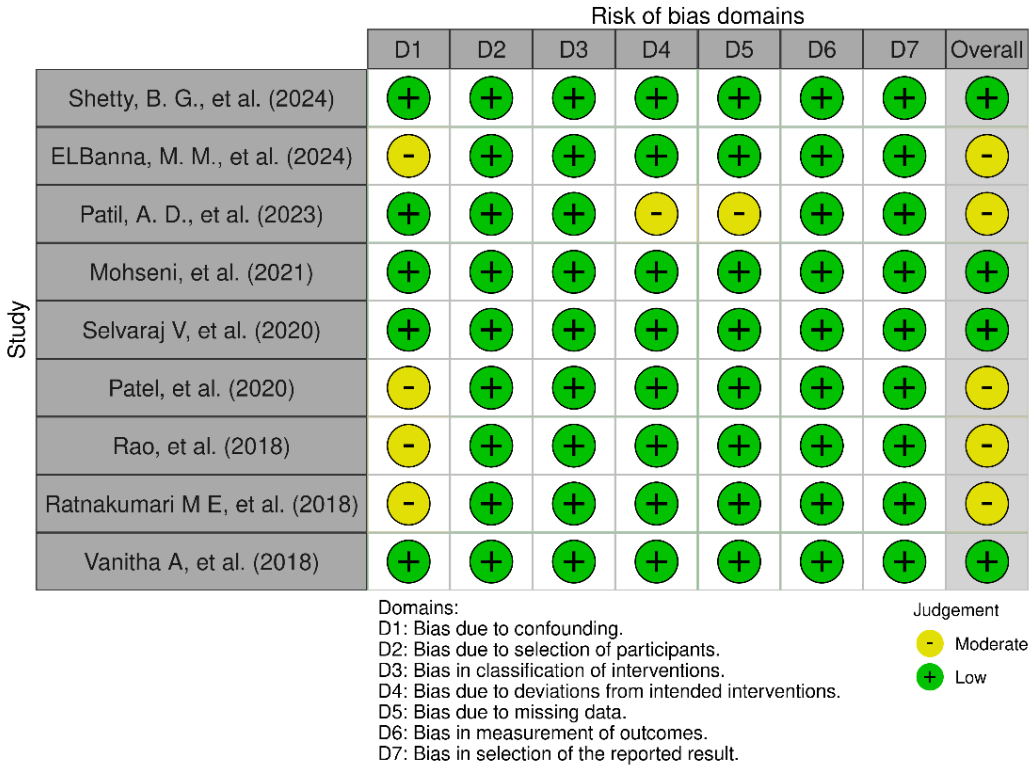

Figure 2. Traffic-light plot of ROBINS-I quality assessment

because it can help improve hormonal conditions and reduce stress so that in a certain period of time it can improve ovarian morphology.

There are 2 articles that discuss the effect of yoga on the ultrasound image of the ovaries in PCOS patients.[5,7] Patil, et al. 2023 get a decrease in ovarian volume and *follicle number per ovary* (FNPO) in the intervention group. Inversely proportional to this, the control group experienced an increase in ovarian volume and FNOP.[5] Deeper ultrasound examination on the right to left side with yoga and *Naturopathy* by Ratnakumari, et al. 2018 showed significant differences in the intervention and control groups. In the intervention group, there was a significant decrease in the number of follicles in the right and left ovaries, as well as a significant decrease in the volume of the left ovary compared to the control group. Meanwhile, other parameters such as the volume of the right ovary, the size of the right and left ovaries, and the size of the largest follicles right and left were not significantly different. However, overall ovarian morphology showed significant improvement in the intervention group compared to the control group.[7] These morphological improvements may reflect enhanced insulin sensitivity, reduced sympathetic drive, and improved hormonal regulation, all of which can decrease follicular arrest and ovarian stromal hypertrophy.

Balancing Hormones: Yoga as a Therapy for Biochemical Markers in PCOS

Biochemical and hormonal parameters are widely used as metabolic biomarkers in PCOS patients due to their close association with various metabolic dysfunctions. Metabolic markers in PCOS, particularly glucose–insulin regulation and lipid profiles, show variable responses to yoga across the included studies. Insulin insensitivity and glucose homeostasis are highly correlated with the pathophysiology of PCOS, where hyperinsulinemia occurs due to metabolic syndrome caused by PCOS, resulting in an increase in blood glucose levels.[8] Three studies measured blood glucose levels before and after yoga interventions, where fasting blood glucose (GDP) results were significantly reduced in 2 studies.[1,5,16] In the study, a 1-hour yoga intervention was carried out daily for 12 weeks accompanied by a Mediterranean diet high in probiotics, but the results of both groups remained improved.[16] Another study did 90-minute yoga every day for 12 months.[5] Patel, et al. 2020 found less significant results on GDP, but the intervention was to do yoga 1 hour a day 3 times a week for 4 months, so the frequency of yoga was lower than studies showing significant results.[1] Measurements of HBA1C in a study of yoga interventions with herbal medicine by Rao, et al. showed that HBA1C levels were lower in a group of PCOS patients who underwent yoga plus herbal treatment compared to those who underwent yoga alone.[9]

There are 3 articles that examine insulin levels and insulin resistance levels using *Homeostatic Model Assessment of Insulin Resistance* (HOMA-IR), where 2 articles stated the results of a significant decrease in insulin levels and HOMA-IR after a significant yoga intervention and 1 article was not significant.[1,5,16] Studies that had insignificant results used interventions with lower frequency of yoga than others.[1] It can be concluded that overall, yoga interventions can improve glucose homeostasis in PCOS patients.

PCOS patients often experience dyslipidemia due to the disease's correlation with obesity.[23] The study by Shetty, et al. and Patil, et al. measured lipid profiles, HDL, LDL, and cholesterol intake, and both studies showed lower levels in the group of PCOS patients with obesity and infertility who were given yoga intervention than those who did not.[2,5] Shetty, et al. also compared MDA and TAC levels in patients given yoga intervention with combined naturopathy for 10 days, and the results were a greater reduction in both parameters in the intervention group compared to the control group.[2] Increased adinopectin in PCOS patients is also often found due to adipocyte cell dysfunction resulting in dyslipidemia.[24] Patel, et al. analyzed adinopectin levels after yoga, and found a significant decrease.[1] These metabolic changes may reflect enhanced parasympathetic tone, reduced stress reactivity, and improved insulin sensitivity, mechanisms that can promote better glucose–insulin balance and lipid metabolism.

Reproductive hormonal outcomes show similar variability. Testosterone levels are often found to increase and SHBG decreases in PCOS patients, resulting in the patient having a clinical presentation of hirsutism.[24] Four studies showed that testosterone decreased after patients underwent yoga.[1,2,5,9] The research of Patel, et al. and Patil, et al. also measured DHEA and SHBG associated with *Free Androgen Index*, and lower outcomes were found in the group undergoing yoga, although the yoga intervention conducted by Patel, et al. was lower in frequency compared to other studies.[1,5]

The role of thyroid hormones with PCOS is not fully known, but some cases have found that subclinical hypothyroidism may increase the risk of PCOS.[25] Two studies measured the results of thyroid hormone levels (i.e. TSH and T4) and obtained reversible results, where the Rao, et al. study obtained decreased TSH and T4 results after the patients underwent yoga, while the Patil, et al. study found an increase in TSH levels, but the increase was very small and still within normal limits so it was not very significant.[5,9] LH and FSH also have a role in the pathogenesis of PCOS as they can increase androgens, AMH as well as prolactin.[23] The two previous studies also evaluated the pituitary hormones LH, FSH, and prolactin. LH was found to be significantly decreased in both studies, while FSH was not significantly reduced, and prolactin was found to be decreased in the Rao, et al. study and very little improvement in the study of Patil, et al.[5,9] AMH levels were also measured in both studies, and there was a significant decrease in the intervention group.[5,9] Hormonal improvements observed in some trials may be mediated by stress reduction, autonomic regulation, and downstream effects on the hypothalamic–pituitary–ovarian axis. Overall, yoga may positively influence both metabolic and reproductive hormonal profiles, but substantial methodological heterogeneity and small sample sizes restrict causal inference.

Table 1. Characteristics of Included Studies on Yoga as Complementary Therapy for PCOS

No	Author (Year)	Country*	Study Design	Sample Size & Population	Intervention (Type, Duration, Frequency)	Comparator	Outcomes Measured
1	Shetty et al. (2024)	India	RCT	n = 120 obese adolescents with PCOS	Integrated naturopathy + yoga; 10 days; yoga + hydrotherapy + massage + fasting + diet therapies	Standard care	Testosterone, lipid profile, MDA, TAC, HAM-A, HAM-D
2	ELBanna et al. (2024)	Egypt	RCT	n = 52 women (20–30 y) with PCOS & insulin resistance	Yoga 1h/day + Mediterranean diet high in probiotics for 12 weeks	Yoga only	FBG, insulin levels, HOMA-IR, BMI, WC, HC
3	Patil et al. (2023)	India	Non-randomized controlled trial	n = 52 infertile PCOS women	90-min yoga, 3×/week, 12 weeks	Standard care	Anthropometry, BP, thyroid hormones, LH/FSH, testosterone, SHBG, AMH, glucose-insulin, lipid profile, liver enzymes, HOMA-IR, ovarian morphology, QoL
4	Mohseni et al. (2021)	Iran	RCT	n = 61 infertile PCOS women	90-min yoga, 2×/week supervised + 5×/week home practice, 6 weeks	Standard treatments	Anthropometry, BP, menstrual cycle, clinical signs (acanthosis, alopecia, hirsutism)
5	Selvaraj et al. (2020)	India	Non-randomized controlled trial	Adolescent schoolgirls at moderate–high PCOS risk	Yoga program for 2 months + 2 months brisk walking; includes meditation, pranayama, butterfly pose, asanas	Usual activity	Demographics, PCOS risk score, BMI
6	Patel et al. (2020)	USA/India	RCT	n = 31 premenopausal PCOS women	1-hour yoga, 3×/week, 3 months (pranayama, vinyasa, restorative, meditation)	No yoga	Free testosterone, DHEA/DHEA-S, mFG score, glucose-insulin, HOMA-IR, adinopectin, BMI, WHR, anxiety, depression
7	Rao et al. (2018)	India	Non-randomized trial	n = 70 PCOS women	Yoga 1h/day, 5×/week, 3 months + Ayurvedic detoxification	Ayurvedic detox only	Weight, prolactin, LH/FSH, testosterone, AMH, HbA1c, thyroid hormones, PSS, anxiety, depression, ovarian size
8	Ratnakumari et al. (2018)	India	Single-blinded pre–post clinical trial	n = 50 PCOS women	Yoga 20 min/day, 6 days/week, 12 weeks + naturopathy	Diet only	Ovarian morphology, anthropometry, menstrual cycle
9	Vanitha et al. (2018)	India	Non-randomized uncontrolled trial	n = 40 PCOS women (18–35 y)	Yoga nidra 40 min/day, 12 weeks	None	Anthropometry, HR, BP

Healthy Cardiovascular: The Positive Effects of Yoga for PCOS Patients

PCOS is related to an imbalance of the autonomic nervous system. Women with PCOS experience increased sympathetic activity along with decreased parasympathetic activity. When the sympathetic nervous system is overactivated over a long period of time, this can result in an increased risk of mortality and cardiovascular morbidity. In PCOS, the cause is believed to come from chronic stress which triggers an increase in sympathetic arousal and produces changes in physiological responses such as heart rate and blood pressure. The negative relationship between stress and cardiovascular and endocrine function can be explained through changes in sympathetic-parasympathetic responses, endothelial dysfunction of blood vessels, and hormonal changes due to regulatory disorders in *hypothalamic-pituitary-adrenal* (HPA) *Axis*.[4]

Yoga can increase the stress threshold so that it can create an optimal balance in the autonomic nervous system. In addition, yoga also provides a stabilizing effect on HPA *Axis* which plays an important role in the regulation of stress response in the body.[4,5] Research conducted by Vanitha et al in 2018 showed that yoga nidra intervention in PCOS patients for 30 years was able to induce the dominance of the parasympathetic nervous system. Yoga nidra was applied as a relaxation method in PCOS patients that showed a positive influence on cardiovascular parameters including heart rate count, systolic blood pressure, and diastolic blood pressure.[4]

Patil, et al in 2023 conducted a study with one of them finding out the effect of yoga on blood pressure in PCOS patients measured using a sphygmomanometer. The kapalabhati yoga technique is useful in improving blood circulation in the body. The kapalabhati yoga technique begins with 30 breathing movements and is gradually increased to 120 movements, performed three times with a total duration of 4 minutes.[5] Contrary to two other studies, a study conducted by Mohseni, et al in 2021 showed results that there was no significant effect between yoga interventions and changes in blood pressure in PCOS patients. The yoga carried out in the study was carried out for 45 minutes each session including movements *Bhujangasana Dharmikasana, Paschimottanasana, Sardulasana, Bhadrasana, Matsyedrasana*and *Savasana*.[6] These inconsistent findings may reflect differences in intervention intensity, emphasis on breath regulation, and the degree of parasympathetic activation elicited; practices with stronger breathing components may exert greater influence on autonomic and HPA-axis modulation, whereas posture-dominant routines may produce weaker cardiovascular effects.

Better Mental Health: Yoga in Addressing Anxiety and Depression in People with PCOS

Women with PCOS are more prone to mental health disorders.[26] One of the leading causes of mental health problems in people with PCOS is hormonal imbalances. Excessive androgen hormones, such as testosterone, can cause physical symptoms that interfere with body image, such as excessive hair growth, acne, and weight gain. This can lower self-confidence, which ultimately contributes to anxiety and depression.[27,28] In addition, psychosocial factors such as social stigma and cultural pressure also play a role in worsening the mental health of PCOS sufferers.[29]

There are 3 studies that discuss the influence of yoga on the psychiatric condition of PCOS patients. Research by Shetty, et al. 2024 shows that yoga interventions can lower *Score* from *Hamilton Depression Rating Scale* (HAM-D) and *Hamilton Anxiety Rating Scale* (HAM-A), which was found in previous studies is believed to be closely related to the decrease in BMI that occurred as well. Meanwhile, in the control group, the opposite happened, namely an increase in HAM-D and HAM-A scores, which indicated that the condition was worse than before. The intervention carried out in the study was yoga twice a day with a duration of 50 minutes per session and *Naturopathy* which is carried out for 10 days.[2] Another study by Patel, et al. 2020 found significant improvement in the intervention group from *Score Beck Anxiety Inventory* (BAI) and *Beck Depression Inventory* (BDI), unlike in the control group where no significant differences were found in the results of the two questionnaires. The women in the intervention group said that by joining the study and doing yoga together, they fostered a sense of togetherness with each other so that they could reduce stress levels. Yoga performed by the intervention group lasted one hour each session and was performed every three weeks for three months.[1] Rao, et al. 2018 examined the differences in influence between the groups that did yoga and *Herbal detoxification* (Ayruveda) with groups that do Ayruveda only. Yoga lasts one hour and is done five times a week for 3 months. The assessment uses *perceived stress scale* (PSS) and *hospital anxiety depression inventory* (HADS), there was a significant difference in both the yoga and non-yoga groups, but the results in the yoga group showed better improvement than in the non-yoga group. Yoga has been shown to be effective in reducing anxiety and depression by reducing cortico-limbic activity and lowering serum cortisol, while psychosocial pathways such as improved body image, increased perceived control, and group support may further amplify its benefits. Because psychological well-being and endocrine function influence each other bidirectionally in PCOS, reductions in stress and negative affect may indirectly support hormonal balance, thereby reinforcing improvements in mental health.[9]

Although the included studies demonstrate encouraging effects of yoga across metabolic, hormonal, cardiovascular, and psychological domains, several limitations reduce the certainty of these findings. Most studies used small sample sizes, short intervention durations, and heterogeneous yoga protocols, and many incorporated co-interventions such as naturopathy or dietary modification, making it difficult to isolate the independent effect of yoga. These observations are broadly consistent with prior reviews, which note beneficial effects of yoga on stress regulation and metabolic health but emphasize the limited evidence specific to PCOS populations.[30] Clinically, yoga may serve as a promising adjunctive strategy to support symptom management and

psychological well-being in PCOS, but its role should complement rather than replace established therapies. In addition, the overall methodological quality of the included studies was acceptable, with most rated as having low to moderate risk of bias. The evidence base was derived from a mix of randomized and non-randomized designs, and although generally robust, it remains geographically concentrated, with most studies conducted in India and only a few from Egypt, Iran, and the United States. These factors should be considered when interpreting the broader applicability of the findings.

Much needs to be further developed regarding the research of yoga as a complementary therapy for PCOS. There has been no research that explains in detail how the yoga modules are used as an intervention in each study, so there is no definitive comparison regarding which type of yoga is most effective, especially against PCOS. The sample used in the majority of studies is also relatively small, so it is not necessarily representative of the entire population of PCOS patients. Research designs in research related to yoga and PCOS are very diverse, where only a few use randomized controlled trial (RCT) designs. In the future, researchers should use RCT designs, rather than designs that do not have randomization or control groups, in order to increase the validity of the research results.

CONCLUSION

Yoga can modify anthropometric parameters in PCOS patients back to normal. PCOS patients who received yoga interventions also experienced improvements in their menstrual cycles. In terms of ovarian morphology as seen from ultrasound examination, it was found that there was a decrease in the number of follicles and a decrease in volume in the right and left ovaries in PCOS patients. Yoga can also reverse abnormal biochemical markers and hormones in PCOS. Yoga interventions have also shown improvements in psychiatric aspects in women with PCOS. Women with PCOS who received yoga interventions appeared to experience improvements in cardiovascular aspects such as heart rate count, systolic blood pressure, and diastolic blood pressure. Nonetheless, the type of yoga practice performed and the length of the practice affect how effective yoga is as a complementary therapy for PCOS.

ACKNOWLEDGMENTS

This work was supported by the Faculty of Medicine, Universitas Diponegoro, Central Java, Indonesia.

REFERENCES

1. Patel V, Menezes H, Menezes C, Bouwer S, Bostick-Smith CA, Speelman DL. Regular mindful yoga practice as a method to improve androgen levels in women with polycystic ovary syndrome: A randomized, controlled trial. journal of osteopathic medicine. 2020 May 1;120(5):323–35. doi: 10.7556/jaoa.2020.050.
2. Shetty B, Shetty GB, Nanjeshgowda HL, Shetty P. A randomized controlled trial in obese adults with polycystic ovarian syndrome: Examining the impact of short-term integrated naturopathy and yoga interventions on testosterone, oxidative stress, and mental health. International Journal of Yoga. 2024 Sep;17(3):195–202. doi: 10.4103/ijoy.ijoy_180_24.
3. Shrivastava R, Mishra S, Singh R, Shrivastava P. Effect of integrated approach of yoga and naturopathy on polycystic ovarian syndrome: A case study. Journal of Family Medicine and Primary Care. 2022 Apr;11(4):1525–7. doi: 10.4103/jfmpc.jfmpc_651_21.
4. Vanita A, Pandiaraja M, Maheshkumar K, Venkateswaran T. Effect of yoga nidra on resting cardiovascular parameters in polycystic ovarian syndrome women. Natl J Physiol Pharm Pharmacol. 2018;8(9):1505. doi: 10.5455/njppp.2018.8.0411112082018.
5. Patil AD, Pathak SD, Kokate P, Bhogal RS, Badave AS, Varadha M, et al. Yoga intervention improves the metabolic parameters and quality of life among infertile women with polycystic ovary syndrome in indian population. International Journal of Yoga. 2023 May;16(2):98–105. doi: 10.4103/ijoy.ijoy_88_23.
6. Mohseni M, Eghbali M, Bahrami H, Dastaran F, Amini L. Yoga effects on anthropometric indices and polycystic ovary syndrome symptoms in women undergoing infertility treatment: A randomized controlled clinical trial. Kung WM, editor. Evidence-Based Complementary and Alternative Medicine. 2021 Jun 10;2021:1–9. doi: 10.1155/2021/5564824.
7. Ratnakumari ME, Manavalan N, Sathyanath D, Ayda Yr, Reka K. Study to evaluate the changes in polycystic ovarian morphology after naturopathic and yogic interventions. Int J Yoga. 2018;11(2):139. doi: 10.4103/ijoy.IJOY_62_16.
8. Dong J, Rees DA. Polycystic ovary syndrome: pathophysiology and therapeutic opportunities. BMJ Med. 2023 Oct 12;2(1):e000548. doi: 10.1136/bmjmed-2023-000548.
9. Rao V, Metri K, Rao S, Nagaratna R. Improvement in biochemical and psychopathologies in women having PCOS through yoga combined with herbal detoxification. 2018;13(4).
10. Gothe NP, Khan I, Hayes J, Erlenbach E, Damoiseaux JS. Yoga effects on brain health: A systematic review of the current literature. Brain Plast. 2019 Dec 26;5(1):105–22. doi: 10.3233/BPL-190084.
11. Katla N, Ramsahaye A, Thulasi A, Ilavarasu J, Jagannathan A, Bhargav H, et al. Yoga module development and validation: A systematic review with methodological guidelines. International Journal of Yoga. 2022 Sep;15(3):175–86. doi: 10.4103/ijoy.ijoy_59_22.
12. Khanal H, Khanal U. Benefits, barriers and determinants of practicing yoga: A cross sectional study from Kathmandu, Nepal. J Ayurveda Integr Med. 2021;12(1):102–6. doi: 10.1016/j.jaim.2021.01.007.

13. Estevao C. The role of yoga in inflammatory markers. Brain Behav Immun Health. 2022 Feb 1;20:100421. doi: 10.1016/j.bbih.2022.100421.
14. Hosseini MS, Jahanshahlou F, Akbarzadeh MA, Zarei M, Vaez-Gharamaleki Y. Formulating research questions for evidence-based studies. Journal of Medicine, Surgery, and Public Health. 2024 Apr 1;2:100046. doi: 10.1016/j.glmedi.2023.100046.
15. Sterne JA, Hernán MA, Reeves BC, Savović J, Berkman ND, Viswanathan M, et al. ROBINS-I: A tool for assessing risk of bias in non-randomised studies of interventions. BMJ. 2016 Oct 12;355:i4919. doi: 10.1136/bmj.i4919.
16. ELBanna MM, Kamel DM, Shaaban A, Botla AM, Hamoda RE. Effect of yoga training and high probiotic food supplements on insulin-resistance in polycystic-ovarian-syndrome: A randomized controlled trial. IJKSS. 2024 Jul 30;12(3):52–61. doi: 10.7575/10.7575/aiac.ijkss.v.12n.3p.52.
17. Zhao Y, Xu Y, Wang X, Xu L, Chen J, Gao C, et al. Body mass index and polycystic ovary syndrome: A 2-sample bidirectional mendelian randomization study. The Journal of Clinical Endocrinology & Metabolism. 2020 Jun 1;105(6):1778–84. doi: 10.1210/clinem/dgaa125.
18. Selvaraj V, Vanitha J, Dhanaraj FM, Sekar P, Babu AR. Impact of yoga and exercises on polycystic ovarian syndrome risk among adolescent schoolgirls in South India. Health Science Reports. 2020 Dec;3(4):e212. doi: 10.1002/hsr2.212.
19. Rasquin LI, Anastasopoulou C, Mayrin JV. Polycystic ovarian disease. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025.
20. Rababa'h AM, Matani BR, Yehya A. An update of polycystic ovary syndrome: Causes and therapeutics options. Heliyon. 2022 Oct 1;8(10):e11010. doi: 10.1016/j.heliyon.2022.e11010.
21. Bachanek M, Abdalla N, Cendrowski K, Sawicki W. Value of ultrasonography in the diagnosis of polycystic ovary syndrome – literature review. Journal of Ultrasonography. 2015;15:410–22. doi: 10.15557/JoU.2015.0038.
22. Zhu RY, Wong YC, Yong EL. Sonographic evaluation of polycystic ovaries. Best Practice & Research Clinical Obstetrics & Gynaecology. 2016 Nov 1;37:25–37. doi: 10.1016/j.bpobgyn.2016.02.005.
23. Singh S, Pal N, Shubham S, Sarma DK, Verma V, Marotta F, et al. Polycystic ovary syndrome: etiology, current management, and future therapeutics. J Clin Med. 2023 Feb 11;12(4):1454. doi: 10.3390/jcm12041454.
24. Liu Q, Xie Y jie, Qu L hua, Zhang M xia, Mo Z cheng. Dyslipidemia involvement in the development of polycystic ovary syndrome. Taiwanese Journal of Obstetrics and Gynecology. 2019 Jul 1;58(4):447–53. doi: 10.1016/j.tjog.2019.05.003.
25. Fan H, Ren Q, Sheng Z, Deng G, Li L. The role of the thyroid in polycystic ovary syndrome. Front Endocrinol (Lausanne). 2023 Oct 5;14:1242050. doi: 10.3389/fendo.2023.1242050.
26. Claire Brutocao, Feras Zaiem, Mouaz Alsawas, Allison S. Morrow, M. Hassan Murad, Asma Javed. Psychiatric disorders in women with polycystic ovary syndrome: A systematic review and meta-analysis | Endocrine. Endocrine. 2018;62(1):318–25. doi: 10.1007/s12020-018-1692-3.
27. Chaudhari AP, Kaustubh Mazumdar, Pooja Deepak Mehta. Anxiety, depression, and quality of life in women with polycystic ovarian syndrome. Indian Journal of Psychological Medicine. 2018;40(3):239–46. doi: 10.4103/IJPSYM.IJPSYM_561_17.
28. Dybciak P, Humeniuk E, Raczkiewicz D, Krakowiak J, Wdowiak A, Bojar I. Anxiety and depression in women with polycystic ovary syndrome. Medicina. 2022 Jul;58(7):942. doi: 10.3390/medicina58070942.
29. Manizheh Sayyah-Melli, Mahasti Alizadeh, Nosratollah Pourafkary, Elaheh Ouladsahebmadarek, Mehri Jafari-Shobeiri, Jaleh Abbassi, et al. Psychosocial factors associated with polycystic ovary syndrome: A case control study. Journal of Caring Sciences. 2015;4(3):225–31. doi: 10.15171/jcs.2015.023.
30. Chu P, Gotink RA, Yeh GY, Goldie SJ, Hunink MM. The effectiveness of yoga in modifying risk factors for cardiovascular disease and metabolic syndrome: A systematic review and meta-analysis of randomized controlled trials. Eur J Prev Cardiolog. 2016 Feb;23(3):291–307. doi: 10.1177/2047487314562741.