Journal of Clinical and Nursing Research, 2025, Volume 9, Issue 8
http://ojs.bbwpublisher.com/index.php/JCNR
Online ISSN: 2208-3693
Print ISSN: 2208-3685

Weight Loss Achieves Menstrual Regularity in an Overweight Polycystic Ovary Syndrome Patient: Integrated Lifestyle-Drug Intervention

Jian Huang[1], Gaofa Wang[1], Yu Zhang[2]*

[1]Gynecology Department, Wudangshan Branch, TaiHe Hospital, Hubei University of Medicine, Shiyan, Hubei, China
[2]Health Management Center, Wudangshan Branch, TaiHe Hospital, Hubei University of Medicine, Shiyan, Hubei, China

**Corresponding author: Yu Zhang, zhangyu07052023@163.com*

Copyright: © 2025 Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), permitting distribution and reproduction in any medium, provided the original work is cited.

Abstract: Polycystic ovary syndrome (PCOS) is a lifelong disorder affecting reproductive, metabolic, and psychological health. A healthy lifestyle and effective weight management strategies should underpin the treatment of PCOS. This case report documents the successful management of a Chinese patient with PCOS who was overweight and presented with oligomenorrhea and persistent adiposity. The patient was diagnosed using the Rotterdam criteria. The intervention was a 2-month program involving caloric restriction (1,350 kcal/day whole-food diet), progressive exercise titration (150–180 min/week of aerobic and resistance training), mindfulness practice, and metformin initiation after confirmed insulin resistance (HOMA-IR 3.67) resulted in clinically significant body composition improvements: fat mass was reduced by 5.0 kg, visceral adipose area was reduced by 44.7 cm², skeletal muscle was increased by 1.4 kg, and regular menstrual cycles (32 day interval) were restored following 5% weight loss—consistent with evidence linking this threshold to improved ovarian function. The combination of a structured lifestyle modification program with targeted pharmacotherapy offers a viable clinical approach for metabolic PCOS phenotypes, although further validation is required to ascertain long-term efficacy.

Keywords: Lifestyle; Obesity-type polycystic ovary syndrome; Case study

Online publication: September 4, 2025

1. Introduction

Polycystic ovary syndrome (PCOS) is a complex endocrine disorder affecting 11%–13% of women worldwide [1]. Its clinical characteristics include hyperandrogenemia, oligomenorrhea, polycystic ovarian morphology, and associated metabolic and psychological sequelae [2, 3]. The fundamental etiology of PCOS remains incompletely understood. The prevailing treatment strategies at present primarily concentrate on the management of

symptoms, encompassing the regulation of menstrual cycles, the control of hyperandrogenism, the reduction of cardiovascular-metabolic risk, and the management of fertility [4]. Therapeutic interventions for PCOS are frequently implemented as temporary measures. Due to limited understanding of its pathogenesis and underlying mechanisms, these approaches are often associated with notable adverse effects and high recurrence rates [5].

2. Case report

2.1. General information

A 22-year-old unmarried female patient presented with a multi-year history of irregular menstruation and a confirmed medical diagnosis of polycystic ovary syndrome (PCOS). On 6 May 2025, she initiated a lifestyle modification program at the Gynecology Department, Wudangshan Branch, TaiHe Hospital. The patient reported menstrual cycles lasting between 45 and 60 days, accompanied by premenstrual and menstrual lower abdominal pain, abdominal and breast distension, and anxiety symptoms. In the preceding twelve-month period, the subject's body mass had increased by 15 kilograms to 75 kilograms, a change attributable to the preparation for postgraduate entrance examinations. In early March 2025, she initiated a self-directed dietary and exercise regimen at home, achieving a weight reduction to 68.5 kg by mid-April. However, despite subsequent adjustments to diet and physical activity, the patient's weight plateaued at 68.5 kg, with persistent menstrual irregularities. The patient had previously undergone a 12-month course of Western medical treatment to regulate her menstrual cycle.

However, symptoms recurred after the discontinuation of medication, which led to her transfer to the institution for lifestyle modification therapy. Initial assessment revealed elevated inflammatory and hormonal markers, including hs-CRP at 3.79 mg/L and an elevated LH/FSH ratio of 2.91 (LH: 13.95 IU/L; FSH: 4.72 IU/L). Fasting blood glucose was measured at 5.46 mmol/L. InBody body composition analysis demonstrated adverse metabolic parameters: skeletal muscle mass 21.9 kg, body fat mass 28.2 kg (41.3% body fat), and notably elevated visceral adiposity (visceral fat area: 146.5 cm^2). Waist circumference measured 87.5 cm. The treatment plan comprised the following elements: The 2-month program provided personalized dietary guidance, exercise prescriptions, and supervised training sessions, mandating 3-month dietary records. Meditation and positive reinforcement strategies were incorporated alongside weekly anthropometric (waist circumference, WC) and menstrual cycle assessments to quantify intervention efficacy.

2.2. Treatment

2.2.1. Diet prescription

The daily dietary targets comprised of: 125 g cereals (≥ 66.7% whole grain), 75 g tubers, 15 g legumes; 500 g vegetables (≥ 50% dark leafy greens); 200 g low-glycemic-index fruits; 30 g red meat, 30 g poultry, 70 g aquatic products; 50 g boiled eggs; 25 g soy products; 250 g low-fat dairy; 12 g cooking oil; 10 g unsalted nuts; salt < 5 g (all weights uncooked).

The daily dietary diversity targets: ≥ 12 food types (weekly ≥ 25), with increased fiber intake and hydration (2,500–3,000 mL/day, +500 mL post-exercise). Meal sequencing prioritized vegetables → protein → carbohydrates, utilizing cooking methods (steaming, stewing, stir-frying) over frying/grilling. Progressive seasoning reduction was mandated alongside strict smoking/alcohol avoidance.

Dietary prescriptions emphasized: (1) Low-glycemic-index gluten-free carbohydrates (≥ 3 varieties daily); (2) Dual-source animal protein intake (poultry/red meat + aquatic products, preferentially lean cuts); (3) Non-starchy

vegetables; (4) n-3 enriched oils; (5) Low-sugar fruits; (6) Natural herb-based seasonings; (7) Additive-free nuts.

2.2.2. Exercise prescription

(1) The subject is required to engage in 40 minutes of aerobic exercise per day, at a frequency of five times per week. The exercise should be performed at a heart rate of between 130 and 140 beats per minute.
(2) The subject should engage in strength training two to three times per week.
(3) It is hypothesized that progressive intensity/volume escalation will improve insulin sensitivity.

2.2.3. Core behavioral prescriptions

(1) Sleep hygiene compliance (≥ 7 hours/night; circadian realignment via earlier bedtime targeting 22:30 sleep onset).
(2) Active positive autosuggestion therapy to enhance adherence.
(3) Daily 20-minute meditation sessions.

2.2.4. Pharmacological intervention

The addition of metformin XR 500 mg was made post-breakfast, based on the results of oral glucose tolerance tests (OGTTs) and pancreatic function assessments.

2.3. Follow-up visitations

2.3.1. Second follow-up (May 19, 2025)

The bioelectrical impedance analysis (BIA) revealed: Body weight: 68 kg; skeletal muscle mass increased to 22.1 kilograms(kg); body fat mass decreased to 27.2 kg; body fat percentage (BFP) reduced to 40.3%; visceral fat area (VFA) measured 137.9 cm^2; waist circumference (WC) decreased to 86.2 cm. Sleep quality and bowel movements showed improvement compared to previous records. The original intervention protocol was maintained.

2.3.2. Third follow-up (May 27, 2025)

BIA indicated: Body weight: 67.5 kg; skeletal muscle mass slightly decreased to 22.0 kg; body fat mass measured 27.4 kg; BFP reduced to 40.4%; VFA was 136.9 cm^2; WC further decreased to 85.2 cm. Continued improvement in sleep and bowel habits was noted. As body composition changes were not statistically significant, dietary modifications were implemented by increasing high-quality protein intake, and resistance training intensity was adjusted accordingly.

2.3.3. Fourth follow-up (June 3, 2025)

BIA demonstrated: The subject's body weight was recorded at 67.1 kg. A 22.2 kg increase in skeletal muscle mass was observed, while body fat mass decreased to 26.5 kg. BFP declined to 39.5%, and VFA reduced to 132.1 cm^2. WC reached 84 cm. The patient reported the commencement of menstruation on 28 May.

2.3.4. Fifth follow-up (June 10, 2025)

BIA revealed the following data: body weight 67.0 kg, skeletal muscle mass 22.2 kg, body fat mass 26.3 kg, and BFP reduced to 39.2%. Additionally, VFA was measured at 130.8 cm^2, and WC decreased to 83.1 cm. The patient reported an 8-day menstrual cycle and self-reported alleviation of abdominal pain. In consideration of

the pre-admission weight loss plateau phase, the ongoing stable weight reduction indicated the necessity for the continuation of lifestyle modification.

2.3.5. Sixth follow-up (June 17, 2025)

BIA demonstrated the following: body weight 66.7 kg, skeletal muscle mass 22.3 kg, body fat mass 25.6 kg, and BFP 38.4%. Additionally, VFA was measured at 127.4 cm^2, and WC was reduced to 82 cm. The patient reported an improvement in mood and a sense of relaxation. The subject was able to maintain the prescribed lifestyle modifications.

2.3.6. Seventh follow-up (June 24, 2025)

The BIA indicated the following data: body weight 66.7 kg, skeletal muscle mass 22.4 kg, body fat mass 25.6 kg, and a BFP of 38.3%. Additionally, the VFA was measured at 125.7 cm^2, and the WC remained consistent. It was hypothesized that minimal body composition changes would be indicative of insulin resistance. The oral glucose tolerance test and pancreatic function tests yielded the following results: fasting blood glucose 5.61 mmol/L, fasting insulin 8.2 μIU/mL, and Homeostasis Model Assessment of Insulin Resistance (HOMA-IR) significantly elevated to 3.67, confirming insulin resistance. The results of the vitamin assays indicated deficiencies in vitamins B, C, and D. Consequently, metformin extended-release 500 mg was administered daily after breakfast, and multivitamin supplementation was initiated with morning meals.

2.3.7. Eighth follow-up (July 1, 2025)

The BIA yielded the following results: body weight 66.3 kg, skeletal muscle mass 22.8 kg, body fat mass 24.4 kg, BFP reduced to 36.8%, VFA 117.7 cm^2, and WC decreased to 81.4 cm. The patient reported the commencement of menstruation on 30 June, accompanied by normal flow, colour, consistency, and the absence of dysmenorrhea. The current therapeutic regimen was continued.

2.3.8. Ninth follow-up (July 11, 2025)

The final BIA revealed the following data: body weight 65.5 kg, skeletal muscle mass 23.3 kg, body fat mass 23.3 kg, and BFP 35.5%. Additionally, the VFA was measured at 101.8 cm^2, and the WC was recorded as 80.2 cm. The patient reported a menstrual bleeding episode lasting seven days. Following the conclusion of the in-person guidance process, the discharge examinations revealed the following results: high-sensitivity C-reactive protein 1.47 mg/L, fasting blood glucose 4.86 mmol/L, fasting insulin 4.9 μIU/mL, with a significant reduction in HOMA-IR to 1.91. The luteinizing hormone (LH)/follicle-stimulating hormone (FSH) ratio was found to be 2.001 (LH 13.49, FSH 6.65). The patient was advised to adhere to the prescribed lifestyle modification regimen. Subsequent weekly telemedicine contacts indicated continued gradual reductions in self-measured body weight and waist circumference.

3. Discussion and analysis

This case study demonstrates the efficacy of lifestyle modification in the management of patients diagnosed with PCOS. The subject was a patient suffering from PCOS who was experiencing difficulties in reducing her body fat percentage. At the time of initial diagnosis, the patient exhibited symptoms including irregular menstruation and

difficulty in weight loss, accompanied by a self-reported high stress level. The intervention was comprised of a nutritionally balanced, natural food-based diet, with a total daily caloric intake of approximately 1,350 kcal, which was meticulously designed using the food exchange portion method. The patient was instructed on the principles for selecting appropriate ingredients. Furthermore, an exercise prescription was implemented, requiring the patient to complete the equivalent of 150 minutes of moderate-to-vigorous aerobic exercise per week, with two days per week dedicated to muscle-strengthening activities.

During the third follow-up, no significant improvement in body composition was observed in the patient during the third follow-up. Consequently, the duration of aerobic exercise was increased to 180 minutes per week. In consideration of the patient's experience of a weight loss "plateau" during their self-managed, home-based exercise regime, the therapeutic approach was adapted. The emphasis was shifted from the initial objective of establishing definitive fat loss targets to a more supportive and companionship-focused intervention. The patient demonstrated consistent adherence to a daily 20-minute pre-sleep meditation routine. By the fourth follow-up, menstruation had resumed, with normal menstrual flow, colour, texture, and absence of dysmenorrhea.

At the seventh follow-up, the BIA revealed no significant changes in body composition. Furthermore, the WC remained stable. It is noteworthy that 50–75% of overweight or obese patients diagnosed with PCOS have been observed to manifest insulin resistance, thus necessitating the prescription of an OGTT and pancreatic β-cell function assessment [6]. The fasting blood glucose level was 5.61 mmol/L, the fasting insulin level was 8.2 μIU/mL, and the homeostasis model assessment of insulin resistance (HOMA-IR) level was markedly elevated to 3.67, thus confirming the presence of insulin resistance [7]. Metformin extended-release (500 mg orally upon waking) was initiated, in conjunction with supplementation of vitamins B, C, and D. By the eighth follow-up, the patient reported the resumption of menstruation, occurring approximately 32 days after the previous cycle. Following the implementation of lifestyle modifications, the patient's menstrual cycles exhibited increased regularity.

A body composition analysis conducted during the ninth follow-up visit revealed significant changes, including an increase in skeletal muscle mass of 1.4 kg, a reduction in body fat of 5.0 kg, a decrease in body fat percentage of 5.8%, and a reduction in visceral fat area of 44.7 cm^2. These results support previous research indicating that reducing weight by 5-10% can restore regular menstruation and improve ovulatory responses [8]. Other studies have also reported the beneficial effects of lifestyle modifications on patients with polycystic ovary syndrome (PCOS) [9]. These improvements may be associated with enhanced insulin sensitivity, reduced serum androgen levels, modulated adipokine levels, and suppressed chronic low-grade inflammation [9–13].

4. Conclusion

This single-case report demonstrates the significant improvement in symptoms achieved through personalized lifestyle modifications in a patient with PCOS. A lifestyle intervention focusing on balanced nutrition and exercise for weight management remains a cornerstone of PCOS management. However, PCOS is highly heterogeneous in terms of phenotypes, aetiologies, metabolic status, and genetics, so responses to identical interventions will likely differ among patients. Although baseline characteristics were reported and major variables were controlled for (e.g. medications), unmeasured confounding factors may still have influenced the outcomes. Although follow-up exceeded two months, the long-term sustainability of the effects and their impact on distant complications remain unevaluated. The development of comprehensive treatment plans could improve future outcomes.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Teede HJ, Tay CT, Laven JJE, et al., 2023, Recommendations From the 2023 International Evidence-Based Guideline for the Assessment and Management of Polycystic Ovary Syndrome. Journal of Clinical Endocrinology and Metabolism, 108(10): 2447–2469.

[2] Norman RJ, Dewailly D, Legro RS, et al., 2007, Polycystic Ovary Syndrome. Lancet, 370(9588): 685–697.

[3] Burghen GA, Givens JR, Kitabchi AE, 1980, Correlation of Hyperandrogenism With Hyperinsulinism in Polycystic Ovarian Disease. Journal of Clinical Endocrinology and Metabolism, 50(1): 113–116.

[4] Joham AE, Norman RJ, Stener-Victorin E, et al., 2022, Polycystic Ovary Syndrome. Lancet Diabetes & Endocrinology, 10(9): 668–680.

[5] Gibson-Helm M, Teede H, Dunaif A, et al., 2017, Delayed Diagnosis and a Lack of Information Associated With Dissatisfaction in Women With Polycystic Ovary Syndrome. Journal of Clinical Endocrinology and Metabolism, 102(2): 604–612.

[6] Kim JY, Tfayli H, Michaliszyn SF, et al., 2016, Distinguishing Characteristics of Metabolically Healthy Versus Metabolically Unhealthy Obese Adolescent Girls With Polycystic Ovary Syndrome. Fertility and Sterility, 105(6): 1603–1611.

[7] Tahapary DL, Pratisthita LB, Fitri NA, et al., 2022, Challenges in the Diagnosis of Insulin Resistance: Focusing on the Role of HOMA-IR and Triglyceride/Glucose Index. Diabetes & Metabolic Syndrome, 16(8): 102581.

[8] Domecq JP, Prutsky G, Mullan RJ, et al., 2013, Adverse Effects of the Common Treatments for Polycystic Ovary Syndrome: A Systematic Review and Meta-Analysis. Journal of Clinical Endocrinology and Metabolism, 98(12): 4646–4654.

[9] Harrison CL, Lombard CB, Moran LJ, et al., 2011, Exercise Therapy in Polycystic Ovary Syndrome: A Systematic Review. Human Reproduction Update, 17(2): 171–183.

[10] Moran LJ, Hutchison SK, Norman RJ, et al., 2011, Lifestyle Changes in Women With Polycystic Ovary Syndrome. Cochrane Database of Systematic Reviews, 2011(2): CD007506.

[11] Pasquali R, Gambineri A, Cavazza C, et al., 2011, Heterogeneity in the Responsiveness to Long-Term Lifestyle Intervention and Predictability in Obese Women With Polycystic Ovary Syndrome. European Journal of Endocrinology, 164(1): 53–60.

[12] Sadeghi HM, Adeli I, Calina D, et al., 2022, Polycystic Ovary Syndrome: A Comprehensive Review of Pathogenesis, Management, and Drug Repurposing. International Journal of Molecular Sciences, 23(2): 583.

[13] Abraham GS, Divakar PY, Valsala GA, 2021, Association of Metabolic and Inflammatory Markers With Polycystic Ovarian Syndrome (PCOS): An Update. Archives of Gynecology and Obstetrics, 303(3): 631–643.

Publisher's note

Bio-Byword Scientific Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.