

Polycystic Ovarian Syndrome



Polycystic Ovary Syndrome (PCOS) is a hormonal disorder common among women of reproductive age. It is characterized by a combination of symptoms that can include irregular menstrual periods, excess hair growth, acne, and obesity. The condition is named for the appearance of multiple small cysts on the ovaries, as seen during an ultrasound examination. Although the exact cause of PCOS is unknown, it is associated with imbalances in hormones such as insulin and androgen, which can affect ovulation and lead to infertility. PCOS is also linked with an increased risk of developing health issues like type 2 diabetes, high blood pressure, and heart disease.

Understanding PCOS and Diet

Dietary interventions have been shown to help manage both symptoms and comorbidities associated with PCOS.

Key Dietary Recommendations

Focus on Fiber: Fiber plays a crucial role in managing PCOS, offering multiple health benefits that address the core issues associated with this condition. High-fiber foods, such as fruits, vegetables, whole grains, and legumes, contribute to improved insulin sensitivity and glycemic control, key factors in the management of PCOS. Fiber aids in slowing down the digestion and absorption of sugars, preventing spikes in blood glucose and insulin levels, which are particularly beneficial for individuals with insulin resistance, a common feature of PCOS. Additionally, fiber supports weight management, a critical aspect of PCOS care, by promoting feelings of fullness and reducing overall calorie intake.

Beyond these metabolic benefits, fiber-rich diets also foster a healthy gut microbiome. The production of short-chain fatty acids from fiber fermentation in the gut has anti-inflammatory effects and may play a role in preventing the development of PCOS and its associated insulin resistance. Thus, incorporating a high-fiber diet can be a powerful strategy in the holistic management of PCOS, addressing both metabolic and reproductive health concerns.

Focus on Food with Omega-3 Fatty Acids: Omega-3 fatty acids, found in whole plant-based foods like flax seeds, chia seeds, and walnuts, have been shown to lower bioavailable androgens, triglycerides, blood pressure, glucose, and insulin resistance. PCOS leads to hormonal imbalances by disrupting the regulation of the hypothalamic-pituitary-ovarian (HPO) axis and the hypothalamic-pituitary-adrenal (HPA) axis. This disruption causes elevated levels of luteinizing hormone (LH) and follicle-stimulating hormone (FSH), leading to the production of excess androgens. Similarly, disturbances in the HPA axis increase cortisol levels, which in turn disrupts the balance of sex hormones, raises insulin levels, and leads to metabolic dysfunction. These imbalances contribute to excess androgens, insulin resistance, elevated blood glucose, obesity, high blood pressure, and increased triglycerides. Incorporating omega-3 rich foods into the diet can play a crucial role in mitigating these effects, offering a dietary approach to managing PCOS symptoms and promoting overall hormonal balance.

PCOS Comorbidities - The Impact of Plant-Based Diets and Exercise

Obesity: Obesity is both a risk factor and comorbidity associated with PCOS. It is recommended that those who suffer from PCOS aim to lose 5-15% of their current body weight. Weight loss aids to help regulate menstrual cycles and can also reduce the risk of other comorbidities. Adopting a plant-based diet offers significant benefits in addressing obesity. This nutrient-dense dietary approach is naturally lower in calories and higher in fiber compared to animal-based diets. The high fiber content enhances satiety, helping to reduce overall calorie intake, which is essential for weight management. Furthermore, plant-based diets are rich in antioxidants and phytochemicals that can improve metabolic health by reducing inflammation and improving insulin sensitivity.

For better weight loss results, it's important to combine a plant-based diet with regular exercise. Guidelines for PCOS suggest at least 150 min of physical activity per week.

Insulin Resistance: Insulin resistance is a complex condition in which your body does not respond as it should to insulin, a hormone your pancreas makes that's essential for regulating blood sugar levels. Insulin resistance is a common feature of PCOS. Those with PCOS experience hyperandrogenism which alters insulin mediated glucose metabolism. Research indicates that plant-based diets can significantly improve insulin sensitivity and reduce HbA1c levels, thereby aiding in better glycemic control.

Regular physical activity has been proven to decrease insulin resistance, with studies demonstrating that both aerobic and resistance training can significantly improve glucose metabolism in individuals with and without PCOS. Exercise promotes the uptake of glucose into muscle cells without the need for insulin, thereby lowering blood sugar levels and improving overall metabolic health.

Cardiovascular Disease: Epidemiologic studies have indicated that PCOS is associated with an increased prevalence of cardiovascular disease primarily due to the insulin resistance, obesity, inflammation, and dyslipidemia commonly associated with PCOS. A growing body of evidence suggests that adopting a plant-based diet can have a positive impact on these risk factors. Plant-based diets have been shown to improve insulin sensitivity, reduce body weight, lower blood pressure, and improve lipid profiles, thereby potentially mitigating the risk of CVD in individuals with PCOS. Furthermore, regular exercise, including both aerobic and resistance training, has been demonstrated to further enhance insulin sensitivity, promote weight loss, and improve cardiovascular health. Together, a plant-based diet and regular physical activity offer a synergistic approach to managing PCOS and reducing the risk of CVD, highlighting the importance of lifestyle interventions in the management of this condition.

Take Home Message

Polycystic Ovary Syndrome (PCOS) is a multifaceted hormonal disorder that not only impacts reproductive health but also significantly increases the risk of type 2 diabetes, high blood pressure, and cardiovascular diseases. Dietary interventions, particularly a focus on a plant-based diet rich in fiber, legumes, and omega-3 fatty acids, emerge as powerful tools in managing and alleviating PCOS symptoms and its comorbidities. Fiber from whole plants and legumes improves gut health and insulin sensitivity, while omega-3 fatty acids help in reducing hormonal imbalances and metabolic dysfunctions associated with PCOS. Moreover, the adoption of a plant-based diet, known for its low calorie yet nutrient-dense profile, alongside regular exercise, is recommended for effective weight management and reducing obesity, a key factor in PCOS. Exercise further complements dietary efforts by enhancing insulin sensitivity and promoting cardiovascular health. Together, these lifestyle modifications present a holistic approach to managing PCOS, underscoring the importance of diet and physical activity in improving overall health outcomes for those affected by this condition.

References

Zehravi M, Maqbool M, Ara I. Healthy Lifestyle and Dietary Approaches to Treating Polycystic Ovary Syndrome: A Review. *Open Health*. 2022;3(1):60-65.

Barrea L, Verde L, Camajani E, et al. Ketogenic Diet as Medical Prescription in Women with Polycystic Ovary Syndrome (PCOS). *Current Nutrition Reports*. 2023;12(3).

Calcaterra V, Verduci E, Cena H, et al. Polycystic Ovary Syndrome in Insulin-Resistant Adolescents with Obesity: The Role of Nutrition Therapy and Food Supplements as a Strategy to Protect Fertility. *Nutrients*. 2021;13(6):1848.

Bykowska-Derda A, Kaluzna M, Ruchała M, Ziemnicka K, Czapka-Matyasik M. The Significance of Plant-Based Foods and Intense Physical Activity on the Metabolic Health of Women with PCOS: A Priori Dietary-Lifestyle Patterns Approach. *Applied Sciences*. 2023;13(4):2118.

Zilae M, Mansoori A, Ahmad HS, Mohaghegh SM, Asadi M, Hormoznejad R. The effects of soy isoflavones on total testosterone and follicle-stimulating hormone levels in women with polycystic ovary syndrome: a systematic review and meta-analysis. *The European Journal of Contraception & Reproductive Health Care*. 2020;25(4):305-310.

Wang F, Zhang ZH, Xiao KZ, Wang ZC. Roles of Hypothalamic-Pituitary-Adrenal Axis and Hypothalamus-Pituitary-Ovary Axis in the Abnormal Endocrine Functions in Patients with Polycystic Ovary Syndrome. *Zhongguo Yi Xue Ke Xue Yuan Xue Bao Acta Academiae Medicinae Sinicae*. 2017;39(5):699-704.

Woodward A, Klonizakis M, Broom D. Exercise and Polycystic Ovary Syndrome. *Physical Exercise for Human Health*. 2020;1228:123-136.

Jurczewska J, Ostrowska J, Chełchowska M, Panczyk M, Rudnicka E, Kucharski M, Smolarczyk R, Szostak-Węgierek D. Physical Activity, Rather Than Diet, Is Linked to Lower Insulin Resistance in PCOS Women—A Case-Control Study. *Nutrients*. 2023; 15(9):2111.

Zhang J, Xu JH, Qu QQ, Zhong GQ. Risk of Cardiovascular and Cerebrovascular Events in Polycystic Ovarian Syndrome Women: A Meta-Analysis of Cohort Studies. *Front Cardiovasc Med*. 2020 Nov 12;7:552421.