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LIFESTYLE INDUCED POLYCYSTIC OVARIAN SYNDROME

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ABSTRACT

Polycystic ovarian syndrome (PCOS) is a complex metabolic disease affecting 8–13% of women of reproductive age. It is linked to both metabolic and reproductive dysfunction and it is worsened by obesity. Lifestyle factors such as poor nutrition and lack of exercise contribute significantly to PCOS, increasing the risk of serious health issues including Diabetes, Heart disease, Infertility, Depression, High Blood pressure, and even Gynaecological cancer. Women with PCOS often have high levels of male hormones (E.g., Testosterone), which can cause symptoms like Acne and Unwanted hair growth. Polycystic ovaries can be seen on ultrasound imaging. Obesity further complicates PCOS, impacting weight management and making the condition more difficult to control. While Metformin is sometimes used for managing insulin resistance in PCOS, lifestyle modifications should be prioritized. A healthy diet and regular exercise can significantly improve symptoms and help manage the condition. Encouraging these changes is crucial before considering medications. Healthcare professionals should expand their knowledge on how lifestyle adjustments can complement traditional treatments for PCOS. Women with PCOS may not always require metformin, and encouraging healthier lifestyle choices is often the most effective approach to managing the condition.

KEYWORDS: Polycystic ovarian syndrome, Lifestyle modification, Insulin resistance, Infertility.

INTRODUCTION

Polycystic Ovarian Syndrome (PCOS) is one of the most prevalent yet under-recognized endocrine disorders affecting women of reproductive age, with an estimated 8-13% of women globally experiencing its impact. Despite its widespread occurrence, PCOS remains a condition shrouded in misunderstanding leading to delayed diagnoses and inadequate treatment. The disorder is characterized by a combination of hormonal imbalances, metabolic dysfunction, and reproductive issues, which can significantly affect a women's quality of life.

Women with PCOS often face a variety of challenges, including irregular menstrual cycles, fertility issues, and symptoms such as acne, excess body hair, and weight gain. Beyond these immediate symptoms, the condition is also associated with a heightened risk for more serious long-term health problems, including Type 2 diabetes, Cardiovascular disease, and Endometrial Cancer. Given the multifaceted nature of PCOS, managing the disorder requires a comprehensive approach that not only addresses the symptoms but also targets the underlying metabolic and hormonal imbalances.

Although medical treatments, such as medications for managing insulin resistance or hormonal imbalances, are commonly used, a growing body of evidence suggests that lifestyle modifications such as dietary changes, regular physical activity, and stress management are crucial in managing and mitigating the impact of PCOS. By adopting healthier lifestyle habits, women can significantly reduce the severity of symptoms and improve their overall well-being.

This article aims to provide an in-depth understanding of PCOS, exploring its causes, symptoms, and associated health risks, while highlighting the importance of a holistic approach that integrates lifestyle changes alongside medical treatment. Empowering women with the knowledge to manage PCOS effectively is vital not only for improving immediate symptoms but also for reducing the long-term health risks associated with the condition.

Signs and Symptoms

- **Irregular or Absent Periods:** Women with PCOS often experience infrequent, irregular, or prolonged menstrual cycles due to disrupted ovulation.[1]
- **Excess Hair Growth (Hirsutism)**: Elevated androgen levels can lead to excessive hair growth on the face, chest, and back.[2]

- **Acne and Oily Skin:** Hormonal imbalances may cause persistent acne and increased skin oiliness.[3]
- **Weight Gain:** Many women with PCOS experience weight gain or find it difficult to lose weight, often linked to insulin resistance.[4]
- **Thinning Hair or Hair Loss:** PCOS can cause thinning hair on the scalp or male-pattern baldness due to higher androgen levels.[5]
- **Darkening of Skin:** Patches of dark, velvety skin, known as acanthosis nigricans, may appear in body creases like the neck or groin.[6]
- **Polycystic Ovaries:** Enlarged ovaries containing numerous small cysts can be detected via ultrasound.[7]
- **Infertility:** PCOS is a leading cause of infertility due to irregular ovulation or absence of ovulation.[8]
- **Mood Changes:** Depression and anxiety are common among women with PCOS, potentially due to hormonal imbalances and the stress of dealing with symptoms.[9]
- **Fatigue and Sleep Issues:** Many women report fatigue and may experience sleep apnea, especially if overweight.[10]

Etiology

Factors	Causes
Genetic and Epigenetic Factors[11]	Familial patterns and gene variants linked to insulin resistance and ovarian function suggest a genetic basis; environmental factors influence epigenetic expression.
Environmental and Lifestyle Factors[12]	Poor diet, inactivity, and obesity in youth raise PCOS risk; lifestyle changes like exercise and weight control improve outcomes.
Obesity and Metabolic Dysregulation[13]	Obesity worsens insulin resistance and androgen excess, increasing risks for diabetes and heart disease in PCOS patients.

Diagnosis

PCOS is a condition that cannot be diagnosed using standard tests such as blood tests, cultures, or biopsies, as no single definitive test exists for its diagnosis.[14] Instead, a differential diagnosis approach is used, which involves ruling out other conditions with similar symptoms, such as hyperprolactinemia, thyroid disorders, Cushing's syndrome, and adrenal hyperplasia, through relevant investigations.[15] The diagnosis of PCOS is typically based on the presence of clinical and biochemical signs of hyperandrogenism (such as

excessive facial or body hair, scalp hair thinning, acne, or elevated testosterone levels), irregular or absent menstrual cycles (after excluding other potential causes), and the presence of polycystic ovaries on ultrasound.[16]

MANAGEMENT

Lifestyle modification - The PCOS guidelines highlight the importance of adopting healthy lifestyle behavior for all women with PCOS to support weight management and overall health.[17] Lifestyle modifications have also been shown to regulate ovulation and menstrual cycles, leading to improved pregnancy success rates in individuals with PCOS.[18] Additionally, studies comparing the impact of lifestyle changes alone with a combination of metformin and lifestyle modifications indicate that lifestyle interventions are effective in reducing insulin resistance and increasing serum levels of sex-hormone-binding globulins, often demonstrating greater benefits than metformin alone.[19]

Diet-The 2018 PCOS guidelines highlight that there is insufficient evidence to suggest that any specific dietary approach offers greater health benefits for individuals with PCOS.[20] Research suggests that reducing carbohydrate intake to less than 45% of daily caloric intake may help in lowering body mass index (BMI) and serum total cholesterol levels among individuals with PCOS.[21] However, long-term success of lifestyle interventions, including dietary modifications, in achieving sustained weight loss and metabolic improvements remains a challenge. This is consistent with findings from clinical trials on anti-obesity treatments, which also report difficulties in maintaining weight loss and metabolic benefits over time.[22] Additionally, exercise plays a crucial role in glucose uptake and insulin sensitivity, contributing to improved metabolic health in individuals with PCOS.[23]

Exercise- Skeletal muscles play a key role in glucose uptake during physical activity by facilitating the movement of glucose transporter type 4 (GLUT4) to the cell membrane, thereby enhancing glucose absorption. GLUT4, a crucial protein within the glucose transporter family, is regulated by insulin and aids in transporting glucose across the plasma membrane.[24]

Pharmacological treatment

The medical management of PCOS focuses on addressing metabolic abnormalities, an ovulation, hirsutism, and irregular menstrual cycles. Insulin-sensitizing medications are commonly used to enhance insulin sensitivity, leading to decreased androgen levels and

improvements in ovulation rates and glucose metabolism.[25] First-line treatments for hirsutism include spironolactone, metformin, and eflornithine. Additionally, due to their minimal androgenic effects, contraceptive pills often combined with progestins, norgestimate, desogestrel, or drospirenone are frequently prescribed for managing hirsutism.[26] Treatment plans should be tailored to the individual needs of the patient while also aiming to minimize long-term complications.[27]

Pathophysiology of PCOS

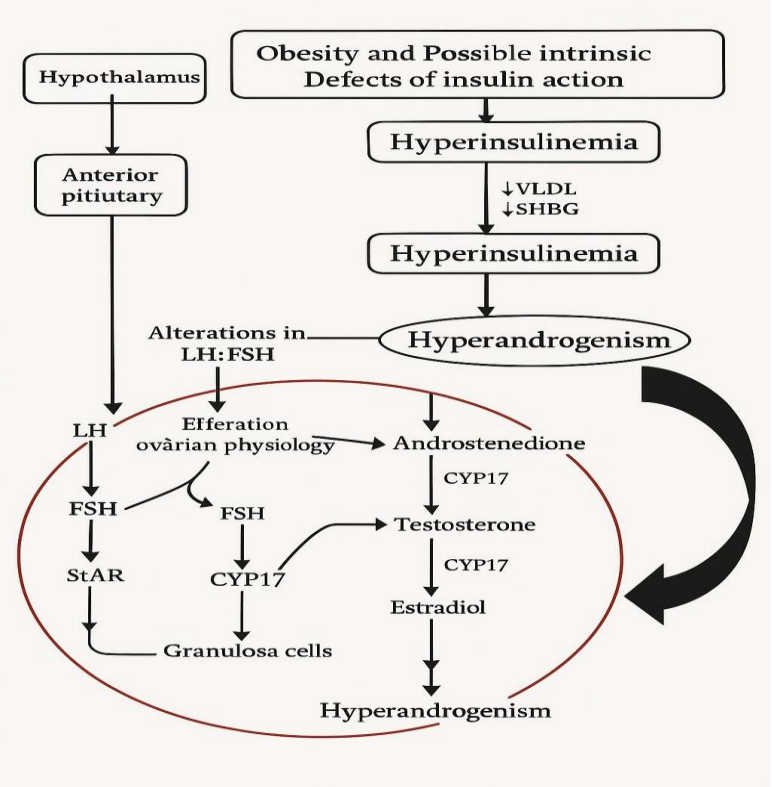

Figure 1: Pathophysiology of pcos.

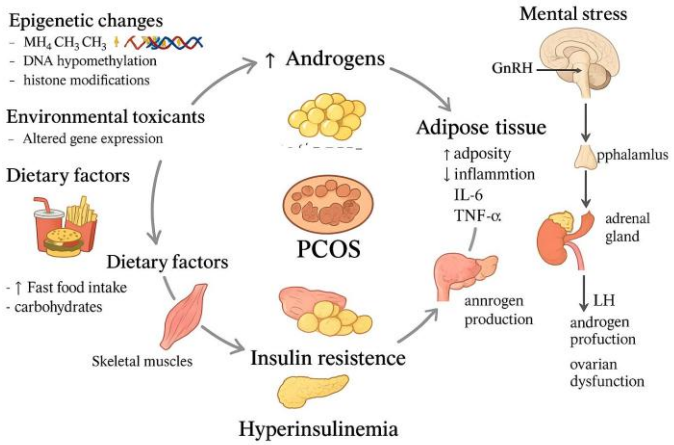

Figure 2: athophysiology of lifestyle induced pcos.

CONCLUSION

This review identified evidence supporting the effectiveness of lifestyle modifications in PCOS patients with obesity. Lifestyle modification as a first-line treatment of obese women with PCOS may effect outcomes, and accompanying moderate weight loss is also expected to improve the metabolic index. Lifestyle modification using combination therapy is a promising therapeutic approach that can be employed in the management of PCOS patients with obesity. Further investigation regarding pathophysiology and drugs acting on it should be done for improvising the abiding consequence on patients health. Improvising lifestyle could ease the PCOS related symptoms.

REFERENCE

1. Johns Hopkins Medicine. (n.d.). *Polycystic ovary syndrome (PCOS)*. Retrieved May 10,2025, from https://www.hopkinsmedicine.org/health/conditions-and-diseases/polycystic-ovary-syndrome-pcos
2. National Institute of Child Health and Human Development (NICHD). (2022, November). *Polycystic ovary syndrome (PCOS)*. Retrieved May 10, 2025, from https://www.nichd.nih.gov/health/topics/pcos/conditioninfo/symptoms
3. Cleveland Clinic. (2022, August). *Polycystic ovary syndrome (PCOS)*. Retrieved May 10, 2025, from https://my.clevelandclinic.org/health/diseases/8316-polycystic-ovary-syndrome-pcos
4. PCOS Awareness Association. (n.d.). *PCOS symptoms*. Retrieved May 10, 2025, from https://www.pcosaa.org/pcos-symptoms
5. Better Health Channel. (2023, May). *Polycystic ovarian syndrome (PCOS)*. Retrieved May10,2025,from https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/polycystic-ovarian-syndrome-pcos
6. National Institute of Child Health and Human Development (NICHD). (2022, November). *Polycystic ovary syndrome (PCOS) symptoms*. Retrieved May 10, 2025, from https://www.nichd.nih.gov/health/topics/pcos/conditioninfo/symptoms
7. Johns Hopkins Medicine. (n.d.). *Polycystic ovary syndrome (PCOS)*. Retrieved May 10 2025, from https://www.hopkinsmedicine.org/health/conditions-and-diseases/polycystic-ovary-syndrome-pcos

8. Cleveland Clinic. (2022, August). *Polycystic ovary syndrome (PCOS) and infertility*. Retrieved May 10, 2025, from https://my.clevelandclinic.org/health/diseases/8316-polycystic-ovary-syndrome-pcos
9. World Health Organization (WHO). (2021, November). *Polycystic ovary syndrome (PCOS)*. Retrieved May 10, 2025, from https://www.who.int/news-room/fact-sheets/detail/polycystic-ovary-syndrome
10. Better Health Channel. (2023, May). *Polycystic ovarian syndrome (PCOS)*. Retrieved May 10, 2025, from https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/polycystic-ovarian-syndrome-pcos
11. Teede, H. J., Deeks, A. A., & Moran, L. J. Polycystic ovary syndrome: A complex condition with psychological, reproductive and metabolic manifestations that impact on quality of life. *Human Reproduction Update,* 2010; *16*(4): 522-538. https://doi.org/10.1093/humupd/dmq019
12. Lim, S. S., Davies, M. J., Norman, R. J., & Moran, L. J. The effect of lifestyle management on the reproductive and metabolic outcomes of women with polycystic ovary syndrome. *Human Reproduction Update,* 2013; *19*(5): 503-512. https://doi.org/10.1093/humupd/dmt022
13. Barber, T. M., Dimitri, P., & McCarthy, M. I. Obesity, insulin resistance, and polycystic ovary syndrome. *Clinical Endocrinology,* 2019; *71*(3): 290-300. https://doi.org/10.1111/cen.13862
14. Sheehan, M. T. Polycystic ovarian syndrome: Diagnosis and management. *Clinical Medicine & Research,* 2004; *2*(1): 13–27. https://doi.org/10.3121/cmr.2.1.13
15. Legro, R. S., Arslanian, S. A., Ehrmann, D. A., Hoeger, K. M., Murad, M. H., Pasquali, R., & Welt, C. K. Diagnosis and treatment of polycystic ovary syndrome: An Endocrine Society clinical practice guideline. *The Journal of Clinical Endocrinology & Metabolism,* 2013; *98*(12): 4565–4592. https://doi.org/10.1210/jc.2013-2350
16. Cleveland Clinic. (n.d.). *Polycystic ovary syndrome (PCOS)*. Retrieved March 12, 2025, from https://my.clevelandclinic.org/health/diseases/8316-polycystic-ovary-syndrome-pcos
17. Gu, Y., Zhou, G., Zhou, F., Wu, Q., Ma, C., Zhang, Y., & Luo, L. Life modifications and PCOS: Old story but new tales. *Frontiers in Endocrinology,* 2022; *13:* 808898. https://doi.org/10.3389/fendo.2022.808898

18. Kim, C. H., Chon, S. J., & Lee, S. H. Effects of lifestyle modification in polycystic ovary syndrome compared to metformin only or metformin addition: A systematic review and meta-analysis. *Scientific Reports*, 2020; *10*(1): 7802. https://doi.org/10.1038/s41598-020-64776-w
19. Cowan, S., Lim, S., Alycia, C., Pirotta, S., Thomson, R., Gibson-Helm, M., & Teede, H. Lifestyle management in polycystic ovary syndrome—Beyond diet and physical activity. *BMC Endocrine Disorders*, 2023; *23*(1): 14. https://doi.org/10.1186/s12902-022-01208-y
20. Zhang, X., Zheng, Y., Guo, Y., & Lai, Z. The effect of low carbohydrate diet on polycystic ovary syndrome: A meta-analysis of randomized controlled trials. *International Journal of Endocrinology*, 2019; *2019:* 4386401. https://doi.org/10.1155/2019/4386401
21. Coutinho, W., & Halpern, B. Pharmacotherapy for obesity: Moving towards efficacy improvement. *Diabetology & Metabolic Syndrome*, 2024; *16*(1): 6. https://doi.org/10.1186/s13098-023-01233-4
22. Butt, M. S., Saleem, J., Zakar, R., Aiman, S., Khan, M. Z., & Fischer, F. Benefits of physical activity on reproductive health functions among polycystic ovarian syndrome women: A systematic review. *BMC Public Health*, 2023; *23*(1): 882. https://doi.org/10.1186/s12889-023-15730-8
23. Richter, E. A., & Hargreaves, M. Exercise, GLUT4, and skeletal muscle glucose uptake. *Physiological Reviews*, 2013; *93*(3): 993–1017. https://doi.org/10.1152/physrev.00038.2012
24. Lin, X., Fan, F., Hao, Y., Li, L., Yang, X., Zhang, H., & Xia, Y. The association between physical activity and insulin level under different levels of lipid indices and serum uric acid. *Frontiers in Physiology*, 2022; *13:* 809669. https://doi.org/10.3389/fphys.2022.809669
25. Ding, H., Zhang, J., Zhang, F., Zhang, S., Chen, X., Liang, W., & Xie, Q. Resistance to the insulin and elevated level of androgen: A major cause of polycystic ovary syndrome. *Frontiers in Endocrinology*, 2021; *12:* 741764. https://doi.org/10.3389/fendo.2021.741764
26. Markovski, M., Hall, J., Jin, M., Laubscher, T., & Regier, L. Approach to the management of idiopathic hirsutism. *Canadian Family Physician*, 2012; *58*(2): 173–177. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3279274/

27. Che, Y., Yu, J., Li, Y. S., Zhu, Y. C., & Tao, T. Polycystic ovary syndrome: Challenges and possible solutions. *Journal of Clinical Medicine*, 2023; *12*(4): 1500. https://doi.org/10.3390/jcm12041500