



A Comprehensive Review of Polycystic Ovarian Disease (PCOD): Pathophysiology, Diagnosis, and Herbal Therapeutic Approaches

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Abstract

Polycystic Ovarian Disease (PCOD) is a multifaceted endocrine disorder affecting women of reproductive age, characterized by hormonal imbalances, ovarian dysfunction, and metabolic complications. The condition's increasing prevalence underscores the need for a comprehensive understanding of its pathophysiology, clinical manifestations, and effective treatment modalities.

This review examines the underlying mechanisms of PCOD, including insulin resistance, hyperandrogenism, and chronic inflammation, which contribute to its complex etiology. Conventional management strategies, such as hormonal therapy and lifestyle modifications, are discussed alongside emerging alternatives, including herbal and nutraceutical interventions.

Particular emphasis is placed on the role of herbal remedies like Ashwagandha (*Withania somnifera*), Shatavari (*Asparagus racemosus*), and Cinnamon (*Cinnamomum cassia*) in modulating hormonal levels, improving insulin sensitivity, and alleviating symptoms associated with PCOD. The safety, efficacy, and potential for integration of these natural therapies into conventional treatment regimens are critically analyzed.

Keywords: Polycystic Ovarian Disease

Introduction

A condition known as polycystic ovarian disease, or PCOD, is characterized by an imbalance in a woman's hormones. If left untreated, it can eventually cause major health issues like diabetes and heart disease [1-3].

Ignorance and a lack of awareness among young women can contribute significantly to the rise of PCOD cases in our world. PCOD left undiagnosed might result in infertility. PCOD affects 5% to 10% of women who are fertile (between the ages of 15 and 44) [1,5].

When women have trouble getting pregnant and see a doctor, they typically discover they have PCOD in their second or third decade of life. The study indicates that the age group most affected is 15 to 25 years old [6].

According to studies, one in five Indian women and one in four women in East India have PCOD. According to a different recent study, approximately 18% of Indian women, primarily those from the East, have PCOD. By using this knowledge, one can lower the percentage of women who have PCOD and, in turn, lower their rate of infertility. It is feasible to give the women a healthy future by providing them with appropriate patient counseling [8,9].

The majority of PCOD women develop several little cysts on their ovaries. It is known as polycystic ovarian disease for this reason. Although they cause hormone imbalance, the cysts are not dangerous. Prompt diagnosis and treatment can aid in managing symptoms and averting chronic issues. During ovulation in a typical menstrual cycle, a mature follicle that is also a cystic structure forms. A developed follicle with a diameter of 18 to 28 mm is prepared for ovulation [4]. The male distinction between polycystic

and normal ovaries is that, while polycystic ovaries have a large number of tiny antral follicles containing eggs, the follicles do not mature and grow normally, which prevents ovulation. Women who have polycystic ovaries experience irregular menstruation because their ovaries do not ovulate consistently [13,14].

The male hormones testosterone and androstenedione are frequently overproduced in women with polycystic ovaries, which raises blood testosterone levels and promotes the growth of facial and body hair [11].

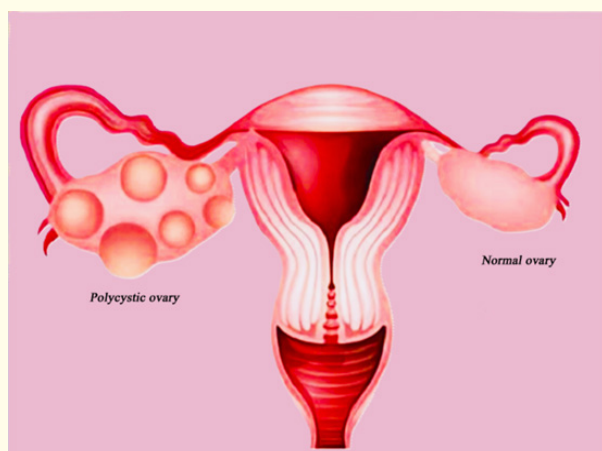


Figure 1: Polycystic Ovarian Disease.

Etiology

A preventive condition is polycystic ovarian disease, which conscious entities recognize. This disease is also influenced by pathophysiology. Additionally, the gene is connected to different phases of the androgenic pathway, or steroidogenesis. According to studies related to this, 70% is thought to be inherited. In addition, the environment plays a critical role in the elucidation of these genes as well as the emergence or progression of illnesses [15].

When a person is exposed to specific environmental circumstances and has a genetic propensity to menstruation, they may develop symptoms of polycystic ovarian disease. The two most prevalent environmental factors are insulin resistance and obesity. Alternative, there is conjecture that there may be a fetal androgen risk as well [17,50].

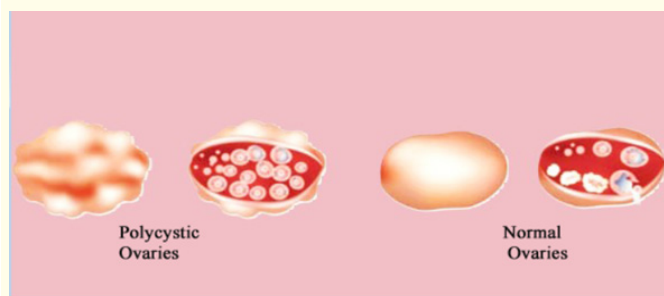


Figure 2: Cell showing Polycystic and Normal Ovarian.

Synonyms

- Polycystic Ovary Disease
- Sclerocystic Ovarian Hyperandrogenism
- Hyperandrogenic Chronic Anovulation (HCA)
- Stein Leventhal Syndrom.

Symptoms of polycystic ovarian disease

Ovarian Disease: A large number of women have PCOD and are totally unaware of it. To receive an early diagnosis of the illness, it is critical to pay attention to these signs. The following are symptoms of PCOD [10,19].

Inconsistent periods

This is the most common symptom of PCOD. And irregular or light periods are the first sign of the condition. Keep a tight eye on your monthly cycle to identify PCOD [21,24].

Excessive hair on the face and body

An excessive amount of facial hair development is a defining feature of hirsutism, a condition in PCOD. The ovaries release a lot of androgens, the male hormone, which causes women to grow their hair excessively [12].

Mood swings

PCOD is typified by erratic menstruation and an imbalance of hormones in the body. Mood swings stem from an imbalance in hormones [16,44].

Acne

Acne PCOD causes hormone disruption, which leads to a number of facial problems, including acne. The most prevalent sign of PCOD is acne. For some women, severe cystic acne is a result of PCOD [7].

Rapid weight gain

The body creates a lot of male hormones and insulin when PCOD is present; this makes women gain weight more quickly. Lower abdominal fat buildup is a common symptom of PCOD [43,47].

Excessive oiliness

An imbalance in hormones also affects the skin. It produces too much sebum, which is why acne occurs.

Excessive bleeding

Extrauterine wall thickening results from irregular periods. Every menstrual cycle, this results in increased bleeding [39].

Thinning and substantial hair loss

Most women with PCOD experience substantial hair loss; for certain ladies, hair loss may be total. Hormone imbalance within the body is the reason for this.

Diabetes

Because their insulin levels are higher, women with PCOD are more prone to developing diabetes [48].

Darkening of the skin

Darkening of the skin around the neck or in the intimate areas is a common indication of PCOD.

PCOD with pregnancy

Many women with PCOD are successful in becoming pregnant and bringing their babies to term despite the hormonal imbalances and higher risk of miscarriages. In order to induce ovulation, patients may need to undergo treatment, medication, and routine hormone testing because of their expertise in treating high-risk pregnancies and infertility [19].

The gynecologists at the hospital enable women with polycystic ovarian disease to conceive and give birth [25]. It's crucial to speak with your doctor if you have polycystic ovarian disease and intend to become pregnant so that you can control your hormones and be healthy appropriately [20].

Mental health in PCOD

Anxiety and despair are more prevalent in people with PCOD. The condition PCOD necessitates proactive, ongoing care. A significant part of long-term treatment protocol maintenance is the function of a support system [33].

Women who have PCOD frequently experience poor self-esteem and problems with their bodies because of things like excessive body hair, weight growth in the belly region, skin darkening and pigmentation around the neck, etc. Friends and family must continue to support the lady in order for her to maintain good mental health, even when these symptoms can be remedied [34].

Because of this condition of hormonal imbalance, the lady is more vulnerable to stress and anxiety. Depression can also result from PCOD miscarriages and reproductive problems. In such cases, getting therapy and assistance can be crucial [37].

Polycystic ovarian disease diet

Treatment for PCOD symptoms and problems Management requires careful consideration of diet. Dietary changes that lead to weight loss can be beneficial [18].

- Cut down on HbA1c and blood sugar to lessen your chance of developing diabetes.
- Reduce insulin to raise cholesterol.
- A diet low in carbohydrates is very beneficial for weight loss and BMR reduction.
- Fresh meals, such as fruits and vegetables, have a low glycemic index (GI) and can aid in managing diabetes and losing weight.
- Eat less packaged and processed food to reduce your chance of developing hypertension.

Preventing and treating hormonal problems and diseases requires maintaining excellent health. Adhering to a healthy diet and receiving an early diagnosis are the best forms of treatment for polycystic ovary disease [22].

Complication due to PCOD:

- **Infertility:** PCOD lowers ovulation frequency in the body, which leads to infertility [23].
- **Diabetes:** Diabetes is brought on by insulin resistance in the body, which is brought on by polycystic ovarian disease [27].

- **Heart disease:** polycystic ovarian disease raises blood pressure levels in the body, making a person more susceptible to cardiac issues [26].
- **Endometrial cancer:** The body suffers thickening of the endometrium, the uterine lining, due to delayed ovulation. The likelihood of developing endometrial cancer rises as a result [28].
- **Depression:** A hormonal imbalance in the body is a common cause of depression in women [30].

Cardiovascular disease risk in PCOD

- Endothelium malfunction (no vasodilation, impaired).
- Coagulation and fibrinolysis disorders.
- Inhibitor of plasminogen activator type-1.
- Activator of plasminogen.
- Levels of fibrinogen.
- The contraction is being activated.
- High blood pressure.
- The dyslipidemia.

Causes of PCOD

Some evident factors are responsible for the PCOD problem in females, including:

- **Insulin resistance:** Insulin resistance affects around 70% of women who have PCOD. Insulin is a hormone, naturally produced by the pancreas, that helps regulate the body's metabolism and blood sugar levels [36,38]. The increased level of insulin results in PCOD. Excess insulin levels in the body can increase androgen production (a male hormone that is very low in women), which causes difficulty in ovulation [31].
- **Hyperandrogenism:** having high levels of androgen (the male hormone) in the body. Excess androgen hormones can result in such things as acne, skin issues, and hirsutism [36].
- **Low-grade inflammation:** Females with PCOD can result from low-grade inflammation in the body. Inflammation in the body's tissues can also result from a number of autoimmune disease types. This causes the body to produce more male hormone, which ultimately causes PCOD [42].
- **Genetics:** A genetic abnormality in PCOD can affect signal transduction pathways that control steroidogenesis, the action of steroid hormones, the regulation of gonadotropins, the action and secretion of insulin, energy homeostasis, chronic inflammation, and other processes. Some genes, such as CYP21, CYP19, and CYP18, exhibit altered expression [29].

- **Obesity:** PCOD and obesity interact; around 60 to 70% of PCOD patients tend to be obese. Adipose tissue, or fat, is considered an endocrine and immunomodulatory organ. It secretes proteins like cytokines and hormones like leptin and adiponectin that disrupt the liver and muscle insulin transduction pathways, leading to insulin resistance and hyperinsulinaemia.
- **Unhealthy lifestyle:-** Leading a sedentary lifestyle is the most common cause of PCOD. The menstrual cycle is affected by unhealthy lifestyle choices, including eating out, sleeping through the night, not exercising, etc [40].
- **Nutritional deficiencies:** PCOD may result from eating incorrect or inadequate deficiencies that can affect the menstrual cycle and overall health, leading to PCOD [46].

Diagnosis

In order to determine the causes of PCOD, your doctor will first inquire about your symptoms, including irregular periods, acne, weight gain, and undesirable facial, chin, and back hair growth. In addition, your doctor might inquire about your eating and drinking habits as well as your medical history [32,49].

In addition to your symptoms, your physician could suggest the following several tests to identify PCOD:

A pelvic exam

Involves your doctor visually and manually testing your reproductive organs for indications of excess male hormones (such as enlarged clitoris) and determining whether your ovaries are big or swollen [48].

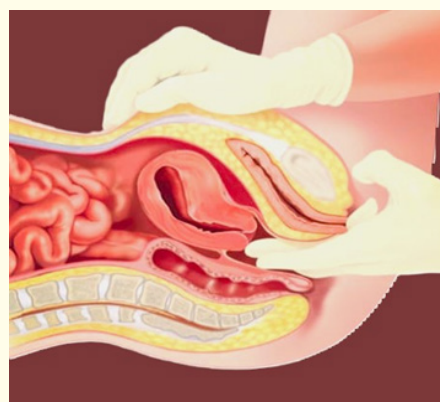


Figure 3: Pelvic exam.

Ultrasound

This test determines the size of the ovaries and detects the presence of cysts. The test may also major the uterine lining's thickness. A transducer, or instrument, is inserted into your vagina for this purpose. This equipment checks your ovaries for cysts using sound waves and a computer screen [49].

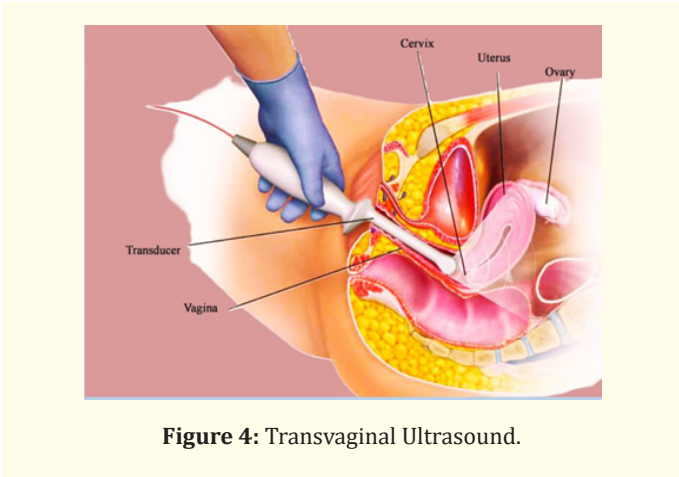


Figure 4: Transvaginal Ultrasound.

Bloodtest

The amount of androgens (male hormones) in your blood may be measured. Additionally, your blood pressure and cholesterol levels may be tested by your physician [35].

Mechanism of action for PCOD

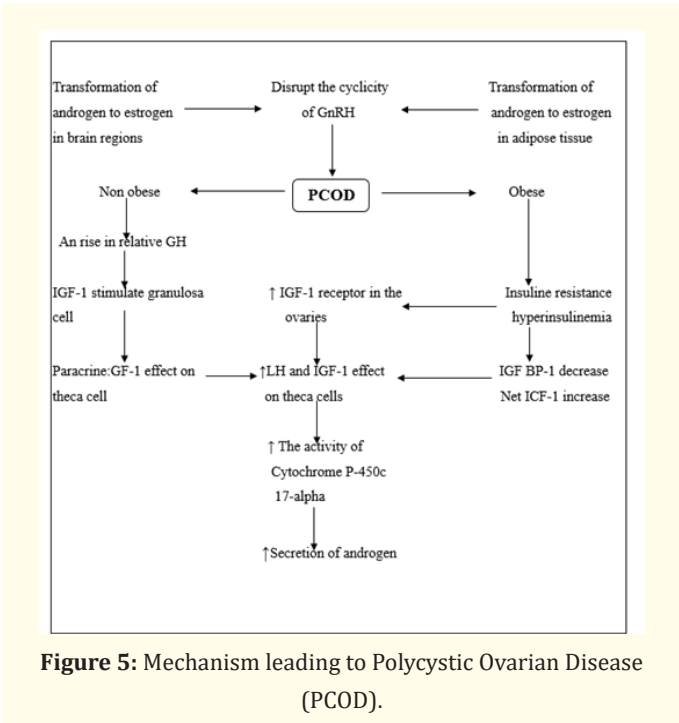


Figure 5: Mechanism leading to Polycystic Ovarian Disease (PCOD).

Treatment's

Home cures for PCOD

A balanced diet that is high in whole foods, fruits, vegetables, lean proteins, and whole grains is the key to a diet [46,50].

Refined carbs, surgery, snacks, and processed foods sold should be avoided.

A low-glycemic-index diet may be of assistance in controlling insulin levels.

- **Frequent exercise:** Take part in regular physical activities including cycling, swimming, jogging, or brisk walking. Exercise can help control weight, lower stress levels, and enhance insulin sensitivity.
- **Stress management:** reduce stress, which can affect hormone balance, by engaging in relaxation practices including yoga, meditation, deep breathing, and mindfulness.
- **Hydration:** Make sure you are getting enough water throughout the day.
- **Herbal teas:** Some herbal teas, including spearmint tea, have the potential to lower levels of androgen and excessive hair growth.
- **Spices:** have the potential to enhance insulin sensitivity. Sprinkle some cinnamon on your meals or drinks.
- **Increased fiber intake:** Eat more fiber to aid in digestion and blood sugar regulation. Include fiber fruits and vegetables, whole grains, and legumes.
- **Regular sleep:** To support hormone regulation and general well-being, make quality sleep a priority.

Plan your lifestyle

Women with sedentary lifestyles need to make regular workout plans in order to combat PCOD.

Hormonal treatment

To control the periodic cycle, cyclical hormone treatment and other drugs are recommended for those diagnosed with PCOD.

Skin treatment

With thorough skin treatment, one can get rid of skin allergies, acne, patches, darker spots, etc.

Infertility

Infertility is a common symptom among women with PCOD. Women who have infertility are given treatment to help them overcome these circumstances and become pregnant in the future.

Ayurveda treatment

Without undergoing surgery or making the conditions worse by taking oral contraceptive pills, Ayurveda has found a way to permanently reverse PCOD with 100% natural Ayurvedic herbs [41].

By eliminating ovarian cysts and purifying AMA, Ayurveda addresses the underlying causes of PCOD [45].

Additionally, ayurveda increases immunity and fortifies the metabolism. The ability of medicinal herbs to regulate ovulation helps to improve the function of the ovary. A normal pathway for ovulation is established, and the overall hormonal imbalance is rectified [47].

Medication and surgical treatment

Treatment options for Polycystic Ovarian Disease symptoms include a variety of medications. Rarely, your doctor might also advise surgery. Among the PCOD therapy regimens are the following: [49,50].

- **Progestin:** Synthetic progestogens like progestin are frequently prescribed to treat amenorrhea or irregular periods [41].
- **Birth control pills:** Some birth control tablets help lower the body's levels of androgen by containing estrogen and rogestone. In doing so, innovation is lessened [42].
- **Letrozole and Clomiphene:** These two drugs aid in the induction of ovulation [43].
- **Metformin:** Metformin helps people lose weight and lessens insulin resistance [44].
- **Immature follicular aspiration:** This process aids in ovulation by reducing the quantity of mature follicles [46].
- **Laparoscopic ovariandrilling:** Laparoscopic ovarian drilling is a minimally invasive surgical procedure that decreased the amount of testosterone secreted by the ovaries [48].

Drug available in market

Capsule

Nveda PCOD care

- **Dosage:** Take 2 capsule twice daily after meals or as directed by a physician.
- **Storage:** Keep in a cool and dry place.
- **Age:** Adult.



Figure 6

Omni ayurveda



Figure 7

- **Dosage:** 2 capsule from each bottle per day after meal.
- **Storage:** Category, Normal
- **Age:** Adult

Saptamveda

(Natural shatavari capsule)



Figure 8

- **Dosage:** Take 1-2 capsule with meal, or as directed by physician.
- **Storage:** Store in a cool, dry place. Protect from light, heat and moisture.
- **Age:** Adult

Leucam



Figure 9

- **Dosage:** 1-2 capsules twice a day or as directed by the physician.
- **Storage:** Cool and dark place.
- **Age:** Adult

Zenius PCOD care



Figure 10

- **Dosage:** Take 1 capsule twice a day with warm water or milk or as directed by the physician.
- **Storage:** Store in a cool and dry place away from direct sunlight.
- **Age:** Adult

Tablets

Gyanoveda (Ayurvedic tablet)



Figure 11

- **Dosage:** 8 tablet per day.
- **Storage:** Cool and dry place.
- **Age:** Adult

Ovahope

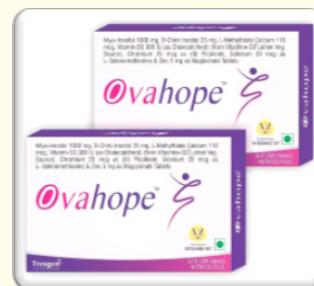


Figure 12

- **Dosage:** 1-2 tablet per day.
- **Storage:** Store in a cool and dry place below 30°C protect from direct sunlight.
- **Age:** Adult

Zeroharm narie

- **Dose:** Two tablets per day, one before breakfast and one before bed time or as directed by your health professional.
- **Storage:** store in a cool and dry place.



Figure 13

PCOD seven cure

- **Dosage:** 1 tablet daily or as directed by physician.
- **Storage:** Keep in cool and dry place way from sunlight.

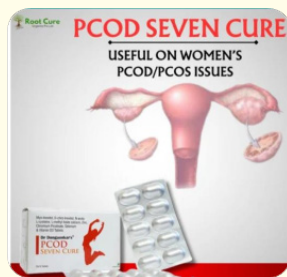


Figure 14

Inaari (Restoring nature)



Figure 15

- **Dose:** Consume 1 tablet daily with water after lunch and dinner.
- **Storage:** Cool and dry place.
- **Age:** Adult

Drink

Just vedic (Drink)

- **Dosage:** 1 spoon(2mg) daily after meals.



Figure 16

Her care juice



Figure 17

- **Dosage:** 30 ml juice mixed with 100 ml water and mix well. Drink twice a day.
- **Storage:** Store in a cool dry place away from direct sunlight.

Powder

Oziva protein powder for women (Powder – chocolate)

- **Storage:** Store in a cool, dry and hygienic condition, away from sunlight. Avoid consuming if the product is damaged or leaked. Keep out of reach of children.
- **Dosage:** Take 1 heaped scoop (15g) in 150 ml milk.



Figure 18

Tea
Buy Oraah PCOD tea

- **Storage:** Store in clean and dry place. Don't accept if the box is torn.
- **Dosage:** 2.5g/1-2 tbsp in 150 ml water.



Figure 19

Wholly being (Cyst control tea)



Figure 20

- **Storage:** Keep in cool, dry place.
- **Dosage:** 200 mg/7 oz Freshly boiled water.
- Brew 1 tea bag for 3-5 mins.
- Add sweetener as per taste.

She balance tea



Figure: 21

- **Dosage:** Made with 2g of tea in 100 ml of boiled water.
- **Storage:** Store in a cool, dry place.

S. No.	Authors	Title	Publication
01.	Ramamoorthys, Senthil Kumar T, Md. Mansoorroomis, Premnath B.	Enhancing intricate details of ultrasound PCOD scan images using tailored anisotropic diffusion filter (TADF).	2021
02.	V Soumya	Polycystic Ovary Disease (PCOD)-An insight into Rodent Model, Diagnosis and treatments	2021
03.	Ramesh Selvaraj, Srikanth Jeyabalan, Soumya Vasu, Venkatesh Palaniyappan, Sharfudeen Settu	PCOD	2021/07/01
04.	Nayana Kale, Deepal Taank, Harshada Kadam, Gauri Kaphare, Swati Talele, Anil Jadhav	PCOD: Overview a journey from Ayurveda to Allopathy	2021/01/01
05.	CS Anjali, Minnu George, Prothibha Das, S Sopji.	PCOD in female reproductive age	2019/10/27
06.	Akriti shrestha, Anamika Dixit, Aamena Zaidi	Assessment of lifestyle and diet modification pf patients suffering from Polycystic Ovarian Disease (PCOD) in North India	2019
07.	Walter Futterweit	Polycystic Ovarian Disease	2012/12/06
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Table 1: Non patent for Polycystic Ovarian Disease.

Conclusion

In conclusion, Polycystic Ovarian Disease (PCOD) is a complex and multifactorial disorder that affects millions of women worldwide. Our research has shown that insert key findings here, e.g., “a significant association between insulin resistance and PCOD,” “the effectiveness of herbal supplements in reducing symptoms of PCOD,” etc.

These findings highlight the importance of insert implications here, e.g., “early diagnosis and treatment,” “lifestyle modifications,” etc. In managing PCOD. Furthermore, our study underscores the need for further research into the underlying mechanisms of PCOD and the development of effective therapeutic strategies.

Overall, our research contributes to the growing body of knowledge on PCOD and emphasizes the importance of a comprehensive approach to diagnosis, treatment, and management of this complex condition. By working together, we can improve the lives of women affected by PCOD and reduce the burden of this disease on individuals, families, and society as a whole.

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