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Review Article

An Overview of PCOD & PCOS Treatment Strategies

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ABSTRACT

PCOD and PCOS are prevalent endocrine diseases that afflict women of reproductive age. PCOD, also known as PCOS, has a significant impact on women's health and can result in a variety of symptoms. Infertility, irregular menstruation periods, and other symptoms are caused by PCOD, which is characterized by the development of ovarian cysts and the production of immature eggs. When used as natural therapies, some herbs may help with various aspects of PCOS; however, further research is required to fully understand their safety and mechanisms. Even medical specialists are unfamiliar with the comorbidities of this pathological disease, and most women are unaware of it. Because of the significant side effects of the allopathic system, most patients fall behind in their treatment. Herbal, allopathic, and unani approaches to treating and managing polycystic ovarian syndrome have been shown to have positive results since they target a variety of the condition's problems, whether they be metabolic or genetic. These days, natural medicines—especially those derived from plants—are the least dangerous, most accessible, and most efficient ways to cure illnesses.

INTRODUCTION

Polycystic Ovary Syndrome (PCOS) or Polycystic Ovarian Disease (PCOD)

The most prevalent and underdiagnosed endocrine disorders in women of reproductive age are polycystic ovarian syndrome (PCOS) and polycystic ovarian disease (PCOD) (Goodman et al., 2015). The current situation indicates that Indian women are susceptible to this illness. Although this is not a common symptom, the disease is named after the cysts that form in women's ovaries (Dunaif et al., 2013) (Khan et al., 2019). PCOD is primarily a medical disease in which the women`s ovary produces partially developed eggs or immature eggs. Compared to PCOD, PCOS is a more serious medical disorder since it causes women's ovaries to release more

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male hormones, increasing the risk of ovarian cancer or excessive cyst formation (Tyagi et al., 2022). 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.

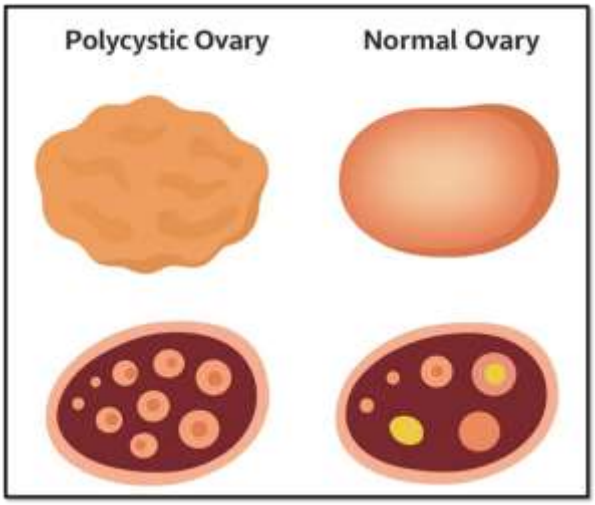

Figure 1: Cells Showing Poly Cystic Ovary and Normal Ovaries

Differences between PCOD & PCOS

PCOD	PCOS
a) Polycystic Ovarian Disease is the name given to it. b) It is a disorder where the ovaries have less cysts. c) It's reversible. d) It is not too bad. e) Hormone imbalance is the cause of this condition.	a) Polycystic Ovarian Syndrome is the name given to it. b) It is a disorder when the ovaries have more than ten cysts. c) Hard to turn back. d) It may result in problems with fertility. e) In comparison to PCOD, it is more severe.

Common Symptoms of PCOD or PCOS

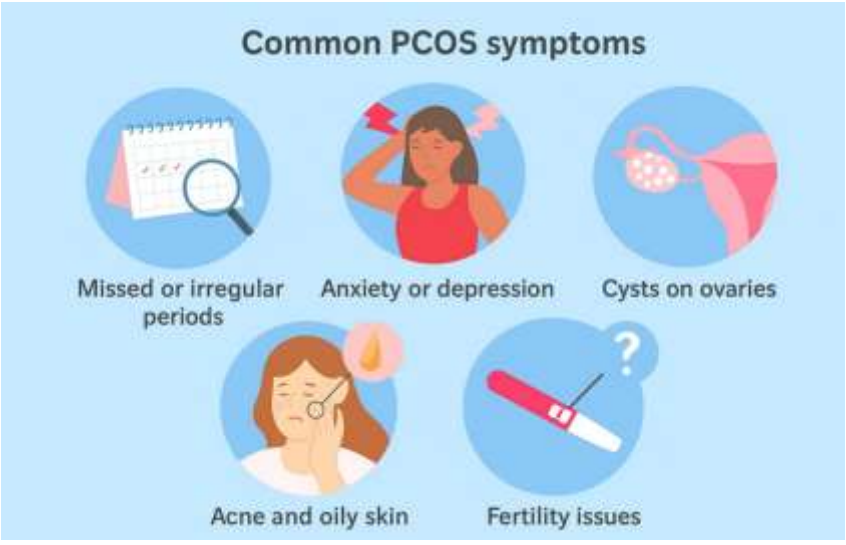

Figure 2. Symptoms of PCOD or PCOS

Types of PCOS

The following describes the four forms of PCOS:

- **Insulin-resistant PCOS**

Increased insulin levels induce the pancreas to release more insulin into the body, which results in the most common type of PCOS. The body is then told to produce more androgen by this excess insulin. Blood glucose accumulation from the delayed reaction can change the body's sugar metabolism (Galan et al., 2024).

- **Inflammatory PCOS**

PCOS is caused by inflammation in the body, which can be exacerbated by stress or diets high in inflammatory chemicals. Because of the inflammation, a person with inflamatory PCOS is unable to ovulate, which upsets their hormone balance and causes them to produce more testosterone (Admin et al., 2022Post-Pill PCOS). PCOS arises when people stop using oral contraceptives. When you stop taking these drugs, your body will make more testosterone. If you stop taking these drugs, your ovaries may produce more androgen than usual. Such high androgen levels cause PCOS symptoms such acne, irregular periods, and excessive hair growth (Zeng et al., 2022).

- **Adrenal PCOS**

PCOS is the result of our body's reaction to stress. A female hormone may be disrupted by adrenal PCOS, making it more difficult for PCOS-afflicted women to conceive and perhaps leading to infertility. Furthermore, an excess of male hormones brought on by this condition may cause undesirable side effects like excessive body and facial hair. (2010) Pellett et al.

History

Following their 1935 description by American gynecologists Irving F. Stein, Sr. and Michael L. Leventhal, the condition was first known as Stein–Leventhal syndrome (Emedicine et al., 2022, 2023). Since Stein and Leventhal first recognized PCOS as an endocrine disorder in the US, it has gained recognition as one of the main causes of oligo ovulatory infertility in women (Barry et al., 2014). Changes associated with ovarian cysts were first reported in 1844 (Kovascs et al., 2013).

Pathogenesis of PCOD

Polycystic ovaries occur when one or more of the following factors (often in combination with inherited predisposition) cause the ovaries to produce excessive levels of androgenic hormones, particularly testosterone (Strauss et al., 2003). The anterior pituitary gland secretes too much luteinizing hormone (LH). through women whose ovaries are sensitive to this stimuli, who have high blood levels of insulin (hyperinsulinemia). The majority of obese and/or insulin-resistant women have insulin resistance, which is a significant risk factor for insulin resistance (Mortada et al., 2015). Insulin resistance is also a common finding among women with PCOS who have normal weight (Teede, Nafiye et al., 2010). Hyperinsulinemia causes an increase in the frequency of GnRH pulses (Kandarakis et al., 2012). Adipose (fat) tissue contains the enzyme aromatase, which converts testosterone into estradiol and androstenedione into estrone. The paradoxical dual levels of excess androgens, which produce virilization and hirsutism, and estrogens, which limit FSH through negative feedback, are caused by the extra adipose tissue found in obese women. (Rojas et al., 2014). Multiple (poly) ovarian cysts, a common finding on ultrasound xamination, gave rise to the syndrome's most common name. Actually, these so-called "cysts" are immature ovarian follicles. Because of the disrupted ovarian

function, the follicles' development from primordial follicles has ceased (or "arrested") at an early stage. When viewed by ultrasound examination, the follicles may be arranged in a "string of pearls" pattern along the ovarian periphery (Ali et al., 2016). Risk factors for the ailment include being overweight, not exercising, and having a family member with the illness (Eunice et al., 2021). Out of the three, two the diagnosis is made using ovarian cysts, increased androgen levels, and ovulation results (NICH et al. al., 2018). PCOS is a disorder where women's ovaries generate a lot of eggs and more than the point at which these develop into ovarian cysts, as seen in Figure 1.5 below. The primary cause of PCOS is Ovarian dysfunction, hormonal imbalance, metabolic, genetic, and environmental variables, among others. irregular menstruation, heavy periods, pelvic pain, infertility, acne, acne scars, and patches of thicker, Women with PCOS may experience symptoms such as velvetier skin. This condition's primary characteristics are hyperandrogenism, insulin resistance, ovulation, and neuroendocrine disorders (Crespo et al., 2018). According to Murri et al. (2013), PCOS seems to be linked to a greater level of oxidative stress. Additionally, a substantial amount of data suggests that the ovaries of women with PCOS have abnormal follicular microenvironments. Unquestionably, a poor lifestyle—which includes eating poorly, which also increases the risk of metabolic disease—is the primary cause of PCOS pathogenesis. (Azziz and others, 2016) Furthermore, smoking and high-fat and/or high-protein diets, particularly those that contain foods cooked at high temperatures and low moisture content, might cause endogenous or exogenous AGE formation. Figure 1.2 below illustrates the female reproductive system's differences between a normal ovary and an ovary affected by polycystic ovarian syndrome (PCOS):

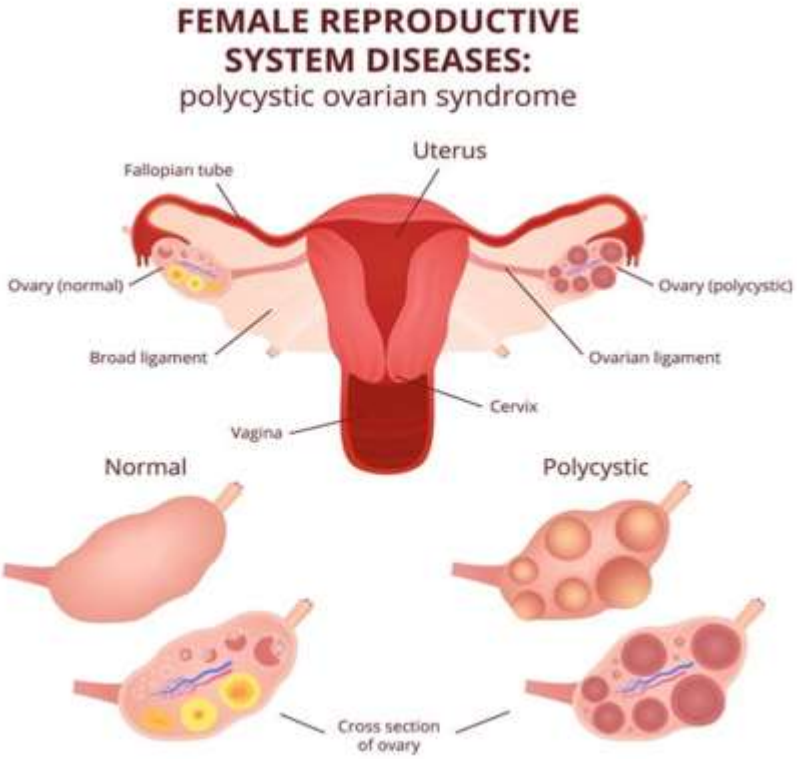

Figure 3. Differences between Polycystic Ovary and Normal Ovary

Diagnosis

Although ovarian cysts and polycystic ovaries (PCO) are common causes of PCOS, PCOS is not necessarily associated with them; various diagnostic methods are available than pelvic ultrasonography (Emedicine et al., 2020). Even when the illness manifests with a wide range of symptoms, the diagnosis is very straightforward when using the Rotterdam criteria (Lujan et al., 2008). diagnostic methods like blood tests, Polycystic ovarian syndrome (PCOS) cannot be diagnosed with culture or biopsy. In addition to irregular or infrequent periods, high levels of androgenic hormones, and related symptoms, PCOS can be detected by ultrasound scanning. PCOS may be identified if an ultrasound shows at least two biochemical or clinical signs of hyperandrenism, ovulatory dysfunction, or polycystic ovaries. (Sadeghi and others, 2022).

Etiology Of PCOD

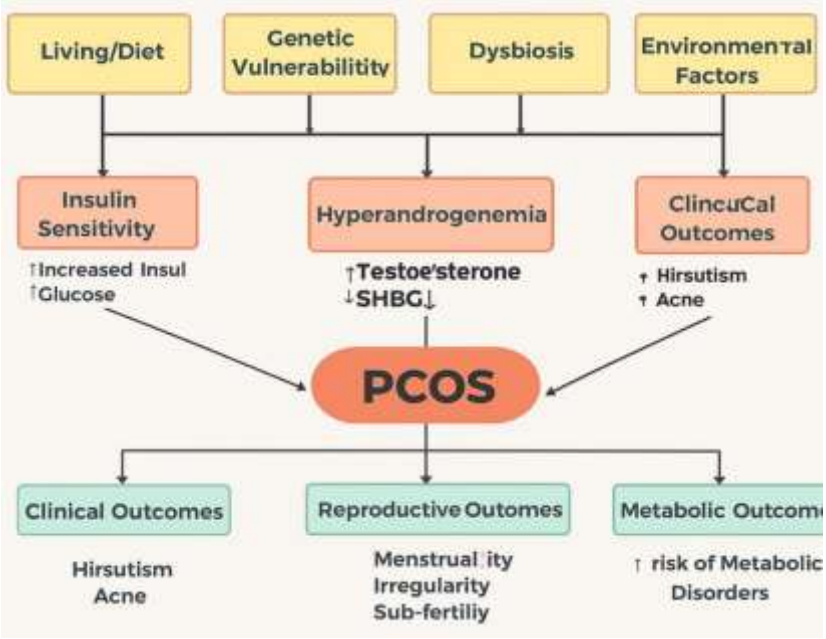

Figure 4. Etiology of PCOS

Treatment of PCOS;

There is no treatment for PCOS (Eunice et al., 2021). Lifestyle modifications including exercising and losing weight may be part of the treatment (Mortada et al., 2015). PCOS is also treated with medicinal medicines. According to NIH et al. (2015), birth control pills may help lessen acne, excessive hair growth, and irregular periods. Numerous plants have shown therapeutic efficacy against PCOS, such as fennel (Foeniculum vulgare), liquorice (Glycyrrhiza glabra), chaste berries (Linum), turmeric (Curcuma longa), and Vitex negundo (Chinese chaste tree) (Goswami et al., 2012). For obese PCOS patients, losing weight offers various benefits. Insulin, testosterone, and luteinizing hormone (LH) all decrease as a result of weight loss. Additionally, by controlling ovulation, it increases the likelihood of pregnancy. (Guzick and others, 2004) Scientific studies have demonstrated the safety and effectiveness of employing herbs as part of alternative medicine for a range of ailments (Rashidi et al., 2012). A small change in lifestyle reduces the risk of PCOS (Norman et al., 2002). It is evident that no medication can completely cure PCOS (Hoeger et al., 2008). It is well recognized that modifying one's lifestyle to incorporate yoga,

exercise, and a nutritious diet will reduce the severity and symptoms of the illness. PCOS treatment and ovulatory cycles benefit from improved hormonal balance. (Verma and others, 2015)

Herbal Treatment;

Sr No.	Herbal medicines	Scientific Name	Part used	Applications
1	Liquorice	Glycyrrhiza glabra (Leguminosae)	Roots, Rhizome	Cough, various bacterial or
2	Chaste berries	Linum (verbenaceae)	Ripe fruit, Chaster	Control menstrual cycles, treat
3	Turmeric	Curcuma longa (zingiberaceae)	Root Rhizome	Respiratory infections, liver disease
4	Fennel	Foeniculum Vulgare (Aplaceae)	Edible Shoots leaves	Loss of appe-tite, bloating
5	Cinnamon	Cinnamomum Zeylanicum (Lauraceae)	Perennial herbaceou plant	Antioxidants, anticancer, antidiabetic
6	Aloe vera	Aloe Arboresces (Liliaceae)	Plant, genus panax	Antioxidant and anti-inflammation

All-natural Therapy

Allopathic drugs like metformin, clomiphene citrate, tamoxifen, and troglitazone are currently the most widely used and successful treatments for PCOS.

- Clomiphene

Citrate of clomiphene (CC) It includes a more cost-effective and less hazardous initial treatment regimen for PCOS patients that induces ovulatory cycles. Because CC is an antagonist of the estrogen receptor, it has a direct impact on the estrogen-signaling pathway's negative feedback loop, which increases FSH. This is a non-steroidal fertility drug. High dosages of 150–200 mg have been demonstrated to be beneficial in

- Anastrozole

Both letrozole and anastrozole are effective selective aromatase inhibitors that induce ovulation. When compared to CC, their action appears to be stronger and more reversible, with a half-life of 5-7 days. Letrozole is the focus of more study than anastrozole. As a supportive reproductive medication, CC was linked to a variety of side effects, the intricacy of the gonadotropin regimen, and its poor effectiveness. Letrozole is proven to aid PCOS sufferers in becoming parents to healthy children. Letrozole increases FSH and gonadotropin-releasing hormone (GnRH) by blocking the hypothalamus-pituitary axis's capacity to create estrogen. There are also suggestions that people with PCOS have lower levels of aromatase, which inhibits the

growth of follicles required for ovulatory cycles. Elnashar and colleagues (2006)

- Glucocorticoids

Glucocorticoids Prednisone and dexamethasone cause ovulation. The majority of PCOS patients show a significant increase in the frequency of conception, and Elnashar et al. claim that adding dexamethasone (high dose, short course) to CC in CC-resistant PCOS with normal DHEAS stimulates ovulation and is linked to no undesirable antiestrogenic effect on the endometrium [46]. It is helpful to give these patients with elevated adrenal androgen a low dosage of dexamethasone (0.25–0.5 mg) prior to bedtime. In one study, more than 230 PCOS patients who did not ovulate after five days were given 200 mg of CC. After an extra 2 mg of dexamethasone was administered from days 5 to 14, it was discovered that the drug's potential to negatively impact insulin sensitivity was the reason for the higher ovulation rate and, in turn, the total conception rate. It is therefore not used very often. (Faslul and others, 2012)

Unani Treatment;

Although the main component of this regimen is plant-based, it also includes minerals and animal-derived drugs. It witnesses the healing of innumerable human illnesses. Except for the idea of cellular and hormonal imbalance, the causes and traits of PCOS and infertility in obese women are comparable to those of Unani medicine. knowing that Uqr is treated in the Unani medical system because to its abnormally huge body mass, which is unrelated to contemporary science (Harrison et al., 2011).

- Giloe

Giloe is a powerful herb that combats inflammatory illnesses. It is believed that persistent tissue inflammation is a major contributing factor to both insulin imbalance and multiple ovarian cysts. It naturally raises metabolism and permits nutrition of the body's tissues. Insulin resistance is also lessened by it. (Jungbauer and others, 2014)

- Satawar

Satawar alters the monthly cycles, supports female reproductive health, and encourages the healthy formation of ovarian follicles. Satawar helps determine the natural plant-based estrogen that is causing the hyperinsulinemia. (Pachiappan and colleagues, 2017)

CONCLUSION

In conclusion, women of reproductive age are affected by the common endocrine illnesses PCOD and PCOS. PCOD or PCOS has a substantial impact on women's health and can lead to a range of symptoms and outcomes. PCOD is defined by the formation of ovarian cysts and the production of immature eggs, which leads to infertility, irregular menstrual cycles, and other symptoms. Certain herbs used as natural remedies may help with many aspects of PCOS, but further study is needed to completely comprehend their mechanisms and safety. Even medical professionals are not well-versed in the comorbidities linked to this pathological state, and the majority of women are not aware of it. Most people fall behind in their treatment because of the harsh side effects of the allopathic system. A comprehensive evaluation is necessary to diagnose PCOS and PCOD, and lifestyle modifications like stress reduction, regular exercise, and dietary changes are the cornerstones of treatment. For the treatment and management of some disorders, early diagnosis is helpful.

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