Management of polycystic ovarian syndrome by herbal medicines

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Abstract: Polycystic ovarian syndrome (PCOS) is one of the most common endocrine disorders among women. This disease includes a variety of clinical manifestations, such as lipid disorders, menstrual disorders, obesity, infertility, acne, hair loss, and insulin resistance to type II diabetes. According to the WHO in 2012, globally, 116 million women suffer from PCOS, and in India, one in five women is affected by PCOS. PCOS is treated using a number of techniques, including laparoscopy and different allopathic medications like nafarelin, troglitazone, clomiphene, metformin, and spironolactone. But long-term use of these medications may result in serious side effects, such as irregular menstruation, nausea, vomiting, and gastrointestinal problems; weight gain; and increased insulin resistance. They are contraindicated in patients with cardiovascular problems, obese individuals, women of reproductive age, and nursing moms. Therefore, PCOS can be treated with allopathic, natural or herbal medication, along with lifestyle modifications. They play a big part in recovery, prevention, and treatment. They are less likely to have negative effects than allopathic medications, and regular usage of herbs is safe and more efficacious in treating PCOS.

Keywords: Polycystic ovarian syndrome, Endocrine abnormality, Infertility, Herbal medicines, hormones

INTRODUCTION

Polycystic ovarian syndrome, or PCOS, is one of the most common endocrine disorders among women. Despite the quick advancement of research, this complicated illness continues to pose one of the biggest challenges for scientists, doctors, healthcare professionals. Large ovaries and a thickened stroma are typical features of PCOS-affected women. Despite having a great number of follicles, some people do not ovulate because of follicular atresia and poor growth. The disease presents with a variety of clinical manifestations, such as lipid disorders, oxidative stress, menstrual disorders, obesity and infertility, acne, hair loss, insulin resistance leading to type II diabetes, and systemic inflammation, in addition to long-term complications [1]. In 2012, the World Health Organization (WHO) reported that over 116 million women globally suffered from PCOS. One in five Indian women is affected by PCOS. 1.55 million incident cases of PCOS in women between the ages of 15 and 49 were recorded worldwide in 2017, which represents a 4.47% (2.86–6.37%) rise in the incidence from 2007 to According to a comprehensive survey carried out throughout India in 2020, around 16% of female participants between the ages of 20 and 29 have PCOS [2]. In order to do this, the current study aimed to look at how natural substances and medicinal plants may be used to treat polycystic ovaries.

Types of PCOS

PCOS can present in various forms, often categorized based on dominant symptoms and underlying causes. Four main types of pcos are:

1. Insulin-Resistant PCOS
2. Inflammatory PCOS
3. Post-Pill PCOS
4. Adrenal PCOS

ETIOLOGY

PCOS can be described as an oligogenic disorder in which the interaction of a number of genetic and environmental factors determines the heterogeneous, clinical, and biochemical phenotype. [3] A family history of PCOS is very prevalent, despite the fact that the genetic cause of PCOS is still unknown. It is unclear how the familial history of PCOS is related to the condition [4] Poor food choices and inactivity can increase environmental variables associated with PCOS, such as obesity; pollutants and infectious agents may also be involved. 8 Certain lifestyle changes, including losing weight and exercising, can occasionally reverse the metabolic and reproductive symptoms of PCOS[5].
PATHOPHYSIOLOGY

The diagnostic criteria for PCOS state that the condition affects 8% to 20% of women worldwide who are of reproductive age each year [7]. Changes in adipose cell activity, inflammatory variables, neuroendocrine function, metabolism, insulin generation, insulin sensitivity, steroidogenesis, ovarian folliculogenesis, and sympathetic nerve function all have an impact on the pathophysiology of this illness [8]. The four main factors causing pathophysiological changes in PCOS are excessive carbohydrate consumption, hyperinsulinemia, hyperandrogenemia, and chronic low-grade inflammation [9].

CLINICAL MANIFESTATIONS

The clinical manifestations of Polycystic Ovary Syndrome (PCOS) encompass a wide range of symptoms due to the disorder's impact on various bodily systems. Key clinical manifestations include:

- **Menstrual Irregularities:**
  - Oligomenorrhea: Infrequent menstrual periods (fewer than eight periods a year)
  - Amenorrhea: Absence of menstrual periods for an extended period
  - Heavy or prolonged menstrual bleeding

- **Hyperandrogenism:**
  - Hirsutism: Excessive hair growth on the face, chest, back, or other areas where men typically grow hair
  - Acne: Persistent or severe acne on the face, chest, and back
  - Androgenic alopecia: Thinning hair or male-pattern baldness

- **Polycystic Ovaries:**
  - Ovaries that are enlarged and contain numerous small cysts (follicles) detected via ultrasound

- **Metabolic Issues:**
  - Insulin resistance: Reduced sensitivity to insulin, leading to higher insulin levels
  - Weight gain or obesity: Particularly around the abdomen
  - Increased risk of type 2 diabetes
  - Dyslipidemia: Abnormal levels of cholesterol and triglycerides

- **Reproductive Issues:**
  - Infertility: Difficulty conceiving due to irregular ovulation or anovulation (lack of ovulation)
  - Pregnancy complications: Increased risk of miscarriage, gestational diabetes, and preeclampsia
Skin Changes
- Acanthosis nigricans: Dark, thickened, velvety patches of skin, often found in body folds and creases

Psychological and Emotional Symptoms
- Mood disorders: Increased risk of depression, anxiety, and other mood disturbances
- Low self-esteem: Often related to physical symptoms like hirsutism, acne, and weight gain

Other Symptoms
- Sleep apnea: A higher likelihood of obstructive sleep apnea, especially in obese women
- Fatigue: Persistent tiredness and low energy level

DIAGNOSIS
The diagnosis of PCOS typically involves a combination of clinical, laboratory, and ultrasound findings. The most widely accepted criteria for diagnosing PCOS are the Rotterdam criteria, which require at least two of the following three features: Irregular Menstrual Cycles: This can include oligomenorrhea (infrequent menstrual periods) or amenorrhea (absence of menstrual periods). Hyperandrogenism: This refers to elevated levels of male hormones (androgens) in the body, which can manifest as hirsutism (excessive hair growth in a male pattern), acne, or alopecia (scalp hair loss). Hyperandrogenism can be confirmed through clinical signs or blood tests showing elevated levels of androgens. Polycystic Ovaries: This is determined by ultrasound and is characterized by the presence of 12 or more follicles in each ovary measuring 2-9 mm in diameter and/or increased ovarian volume (>10 mL). Additional tests that might be conducted to support the diagnosis or rule out other conditions include: Blood Tests: To check levels of hormones such as LH, FSH, testosterone, and prolactin. Glucose Tolerance Test: To check for insulin resistance or diabetes. Lipid Profile: To assess cholesterol and triglyceride levels.

TREATMENT
PCOS is treated using a number of techniques, including laparoscopy and the use of allopathic medications. For example, laparoscopy involves a surgical treatment to remove ovarian cysts [10,11,12]. Currently, PCOS is treated with medications such as nafarelin, troglitazone, clomiphene, metformin, and spironolactone. Long-term use of these medications, however, may result in serious side effects, such as irregular menstruation, nausea, vomiting, and gastrointestinal problems; weight gain; increased insulin resistance; poor compliance; ineffectiveness; and an increased number of contraindications. Due to its adverse effects, patients with cardiovascular problems, obese individuals, women of reproductive age, and nursing moms [13] are more vulnerable while using these medications. Therefore, it is imperative to find and create medications derived from plants that are far more effective than the current allopathic medications. A significant turning point has occurred recently with the adoption of herbal remedies by medical practitioners to treat PCOS [14]. Extracts of whole plants or any portion of a plant that has a significant therapeutic impact and fewer adverse effects than conventional therapy are used to make herbal medications [15]. They play a big part in recovery, prevention, and treatment. Herbal medications are intricate treatments that may exhibit both antagonistic and synergistic interactions between constituents [16]. They are less likely to have negative effects than allopathic medications and are crucial for the treatment of PCOS [17]. Regular usage of herbs is safe and more efficacious in treating PCOS and suppressing the events that contribute to the development of cysts in PCOS [18]. Currently, herbal remedies are playing a prominent role in treating various chronic disorders, including PCOS. The use of herbal medicines and modifications to the diet may help in treating PCOS more effectively.

Lifestyle Modification Exercise and calorie-restrictive diets are the most effective first-line treatments for PCOS in overweight and obese women and adolescents. Several studies have demonstrated that hirsutism can improve and regulate the menstrual cycle and ovulation. Low-carbohydrate diets have been adopted in the hopes of improving hyperinsulinism, but studies have found no change in outcomes.

MANAGEMENT OF POLYCYSTIC OVARIAN SYNDROME BY HERBAL MEDICINES

1. Aloe vera
Aloe vera is a perennial herbaceous plant belonging to the Liliaceae family, often referred to as Aloe arborescens. This plant contains vitamins A, C, and E. It also possesses antioxidant properties that are brought about by lowering the degree of lipid peroxidation. Aloe vera is rich in minerals, vitamins, enzymes, tannins, and a range of polysaccharides,
in addition to salicylic acid. The major ingredients of aloe vera gel are polysaccharides (derived from pectins, cellulose, hemicellulose, glucosmannan, skymann, and mannose) and water. Aloe, asmodin, barbaloin, and polyenomascarhides such as sterols and organic acids are among the active components found in the plant's gel and leaves [19]. Aloe vera gel's polysaccharide components have the power to both lessen and heal inflammation. These substances also possess antimicrobial and antibacterial properties [20]. Aloe vera causes the number of primary germ cells in the ovary to become normal, and as a result, it can have beneficial and supportive effects on ovarian tissue and folliculogenesis [21].

2. Zingiber officinalis, or ginger

The plant Zingiber officinalis, commonly known as ginger, is a member of the Zingiberaceae family. There are around 60–65 different components in ginger essential oil. Geraniol, gingerol, curcumin, α-curcumene, geranial, neral, borneol, linalool, afarnesene, sabine, camphene, gamma-terpinene, and terpinen-4-ol are the main phytochemicals that are active. Ginger's resin component includes the following ingredients: ascorbic acid, β-carotene, p-coumaric acid, zingerol, zingiberene, zingiberene, and caffeic acid [22,23]. Ginger also has phenolics and flavonoids, both of which are good for PCOS. Strong antioxidants include shogaol, gingerol, zingerone, and a small quantity of oily resin ginger; these substances have all been shown to have an anti-prostaglandin action by reducing the synthesis of arachidonic acid and blocking the synthesis of prostaglandin [24]. Ginger will increase the fertility index, the testosterone level in serum, the testes, and the seminal vesicle weight. In men, it will also enhance sperm motility and count. Ginger flavonoids and phenolic chemicals, with their unique pharmacological and physiological properties, may help to maintain the proper ratio of progesterone to estrogen. They could also control the blood levels of sex hormones [25]. Ginger may be utilized to treat PCOS because its phytoestrogen component balances the ratio of estrogen to progesterone [26].

3. Camellia sinensis (green tea)

Camellia sinensis, also known as green tea belonging to theaceae family, is one popular natural cure for weight reduction. Green tea improved the ovarian shape, decreased and controlled the gonadotropin level. Additionally, it enhanced ovarian morphology and decreased ovarian cysts [27].

4. Cinnamon

Cinnamon, also called Cinnamomum zeylanicum, belongs to the Lauraceae family. One of the most significant and ancient herbal remedies utilized in traditional medicine. This plant has several medicinal qualities in its various components, especially its skin. This plant's volatile oil is primarily responsible for its therapeutic benefits. The primary components of this essential oil, including safrole, eugenol, and cinnamonaldehyde, exhibit properties similar to those of insulin [28]. Cinnamon extract increases insulin receptor phosphorylation, glucose absorption, glycogen synthesis, and insulin sensitivity [29]. Cinnamon lowers blood sugar and fat [30] and inhibits the body's organic materials from oxidizing and producing free radicals because of its potent antioxidant qualities [31]. Furthermore, cinnamon has been shown to reduce blood sugar and blood lipids, which can help with menstrual cycle regulation, gynecological problems, and respiratory and digestive diseases [32].

5. Fennel

Foeniculum vulgare, a member of the Apiaceae family, is commonly referred to as fennel. It has a 4-5 percent volatile oil content. Fennel has been shown to have a wide range of chemical components with a variety of medicinal uses. Trans-anethole, α-pinene estragole, fenchone, 1,8-cineole, β-carotene, myristicin, fumaric acid, benzoeic acid, fumaric acid, p-coumaric acid, vanillic acid, kaempferol, rutin, and vanillin are some of the ingredients. Anethole, phenolic esters, 18–22% fenchone, fixed oils, proteins,[33] and vitamins including α-tocopherol, ascorbic acid, β-tocopherol, γ-tocopherol, and δ-tocopherol are all present in fennel [34]. The vitamins included in fennel have strong antioxidant properties and shield cells from oxidative harm. In addition to encouraging menstruation and making childbirth easier, anethole also causes the ovarian follicle to become estrogenic. Each of these could be helpful in PCOS treatment. Fennel's other pharmacological qualities can help with hirsutism, neurological conditions, and helminthic infections. Moreover, it possesses hepatoprotective, anti-diabetic, and tumor suppression qualities [35, 36, 37].

6. Flax

Flax, scientifically known as Linum usitatissimum, is a member of the Linaceae family [37]. In the diet, flaxseed is high in fat, protein, and fiber. Average contents of flaxseed include 30–40% fat, 20–25% protein, 20–28% fiber, 4–8% moisture, 3–4% ash, and minerals, vitamins A, B, D, and E [38]. Flaxseed oil is high in lignans, mucilage, omega-3 fatty acids, and linolenic acid [39]. About 40–60% of flaxseed oil contains α-linolenic acid, an omega-3 unsaturated fatty acid, which acts as an anti-cancer agent [39]. Flaxseed is rich in lignans, which have antioxidant and hypolipidemic effects, and possesses antifungal, antibacterial, and antiviral activities [40,41,42]. Studies have demonstrated that
lignans, which are abundant in flax seed, reduce testosterone levels in individuals who have prostate cancer. Polycystic ovaries cause an increase in androgen in the body, which is linked to obesity, hirsutism, and menstruation problems.

7. Cucurbita pepo L. (pumpkin seeds)

Pumpkin seeds, or Cucurbita pepo, are members of the Cucurbitaceae family. It has been shown to be very beneficial in curing the symptoms of polycystic ovarian syndrome. It has omega-3 fatty acids, which help control elevated cholesterol and hyperinsulinemia. Additionally, it has been discovered to be an extremely rich source of beta-sitosterol, which lowers testosterone levels. It is also helpful in treating other PCOS symptoms such as obesity, hirsutism, and acne [43].

8. Licorice

Licorice, scientifically known as Glycyrrhiza glabra L., is a member of the Fabaceae family and is used in traditional medicine to treat gastritis, coughing, wound healing, and discomfort. This plant is significant because its roots contain a variety of medicinal substances, such as gums, starches, sterols, flavonoids, and essential oils. Triglycerides and cholesterol can be reduced by phytoestrogens or steroids. Glycerin, 50 times sweeter than sucrose, is the primary active component of licorice root. Studies have demonstrated that glycerin inhibits the enzyme 11beta-hydroxysteroid dehydrogenase type 2 (11betaHSD2), which has a mineralocorticoid-like action. Glucocorticoids elevate blood levels by blocking their metabolism. Moreover, glucocorticoids increase the release of insulin, which lowers blood sugar [44]. Several studies showed that licorice extract will lead to a reduction in intraovarian androgen concentration when taken orally. As a result, less androgen is synthesized from estrogen, which has a positive feedback effect on LH secretion [45].

CONCLUSION

Polycystic ovary syndrome (PCOS) is an endocrine disorder in women with a variety of complications, including infertility, cardiovascular issues, and long-term health issues that can last a lifetime. Several studies have demonstrated that women have been using herbal remedies like aloe vera and green tea more often during the past few decades. Even though they take time to cure PCOS, they have fewer adverse effects. Herbs ability to enhance the immune system and regulate the menstrual cycle without altering hormone levels is thought to be the reason behind their effectiveness in treating PCOS.

REFERENCES


