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Herbal Medicine in the Management of PCOD: A Systematic Review

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1. ABSTRACT:

PCOD (Polycystic Ovarian Disease) and PCOS (Polycystic Ovary Syndrome) are endocrine disorders that affect the ovaries and hormonal health in women. It's also known as Stein-Leventhal syndrome. PCOD is a reproductive and metabolic disorder concerned with the ovaries. If it's not treated, over time it can lead to serious health problems, such as diabetes and heart disease. The PCOD can be largely increased in our world due to lack of awareness among the young women and ignorance. Undiagnosed PCOD can even lead to infertility. It's been found that PCOD occurs in the age between 15 to 44 which is considered as reproductive age. The studies reveal that India is one of five countries suffering from PCOD. Another recent study revealed that about 18% of women in India mostly from East, suffers from PCOD. With this knowledge, one can reduce the rates of women suffering from PCOD by reducing the infertility in them by various natural methods, improved lifestyle ways, etc. No exact cause of the disease has been found yet, but changes in lifestyle, changes in dietary needs, lack of exercise, and most importantly stress level, induces the disease. On the basis of the above factors there is needed to develop a polyherbal formulation to reduce the cost duration, and side effects of existing treatment. Nowadays herbal drugs are used to overcome PCOD and its complication, associated signs and symptoms like obesity, irregular menstrual cycle, and hirsutism etc.

Keyword: PCOD, Hyperandrogenic, Infertility, Polyherbal Drugs

2. Introduction:

WHAT IS PCOD?:

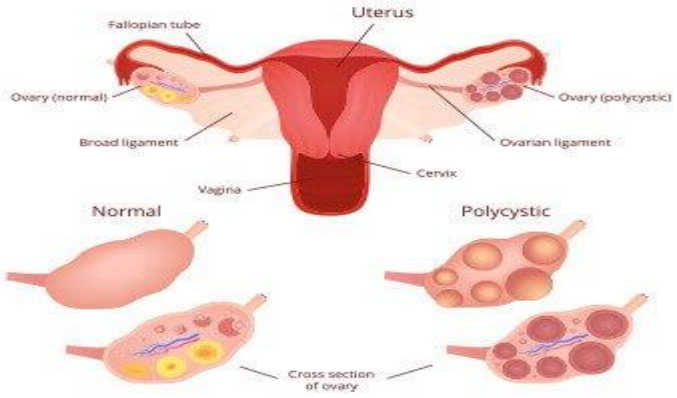

Figure 1: Polycystic Ovaries

Polycystic ovary disorder (PCOD) is characterized by a hormonal imbalance resulting from the ovaries producing an excess of hormones. Individuals with PCOD experience elevated levels of androgens, which disrupt the balance of reproductive hormones. Consequently, those affected often face irregular menstrual cycles, missed periods, unpredictable ovulation, excessive facial hair growth, and obesity. Ultrasound examinations may reveal small follicle cysts—fluid-filled sacs containing immature eggs—due to anovulation. Biochemically, PCOD is associated with elevated levels of luteinizing hormone (LH) and a reversed LH/FSH ratio, which can lead to increased testosterone and prolactin levels **[3].** Insulin resistance is a significant underlying factor contributing to the metabolic complications of this syndrome, which include risks for obesity, dyslipidemia, glucose intolerance, and long-term cardiovascular disorders. Additionally, depression and anxiety are recognized as risk factors for cardiovascular issues. Various symptoms of this syndrome, such as hirsutism, acne, obesity, menstrual irregularities, and challenges with conception, can adversely affect overall health **[4].** PCOD is identified by the presence of more than 12 follicles measuring 2-9 mm in diameter in each ovary and/or an increased ovarian volume exceeding 10 ml. The pathophysiology of the ovaries in PCOD involves alterations in folliculogenesis and the function of theca and granulosa cells. A significant

advancement in the understanding of PCOD was established during the Rotterdam PCOD consensus workshop, which outlined three essential criteria for diagnosis after ruling out other causes of androgen excess:

1. Oligo and/or anovulation.
2. Clinical signs of hyperandrogenism and/or anovulation.
3. Polycystic ovarian morphology on ultrasound, defined as the presence of 10 or more follicles in each ovary measuring 2-8 mm in diameter and/or increased ovarian volume (> 10 ml). [3]

Given that PCOD is a complex and heterogeneous endocrine disorder in females, there is a pressing need for the development of innovative treatment approaches**.**

3.Symptoms:

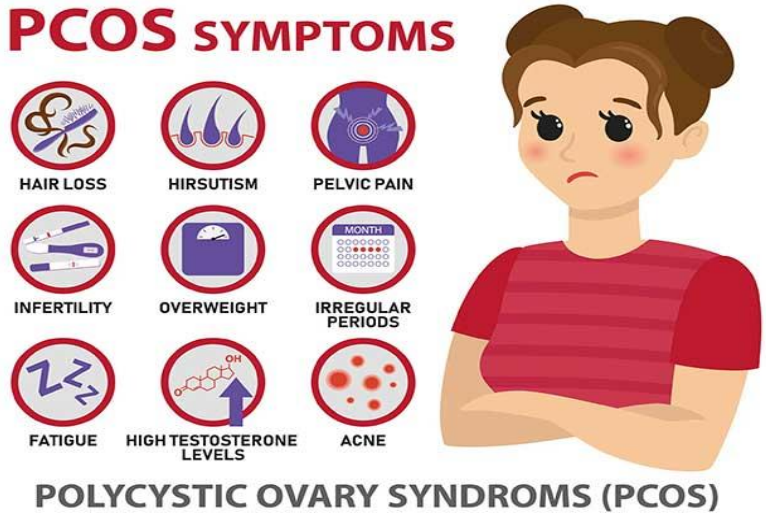

Figure 2: Symptoms of PCOD

Some women begin to notice symptoms around the onset of their first menstrual cycle, while others may only learn they have Polycystic Ovarian Disease (PCOD) after experiencing significant weight gain or difficulties with conception. PCOD is a syndrome characterized by a collection of symptoms that impact the ovaries and the process of ovulation.

The three primary characteristics include:

1. Presence of cysts in the ovaries.
2. Elevated levels of male hormones.
3. Irregular or absent menstrual cycles.

In cases of PCOD, numerous small, fluid-filled sacs, known as follicles, develop within the ovaries, each containing an immature egg. The absence of regular ovulation disrupts the balance of hormones such as estrogen, progesterone, follicle-stimulating hormone (FSH), and luteinizing hormone (LH). Typically, estrogen and progesterone levels are lower than normal, while androgen levels are elevated. This increase in male hormones interferes with the menstrual cycle, resulting in fewer periods for women with PCOD.

Additional symptoms may include:

1. Irregular Menstrual Cycles: The lack of ovulation can prevent the monthly shedding of the uterine lining, leading some women with PCOD to experience fewer than eight periods annually.

2. Heavy Menstrual Flow: Prolonged buildup of the uterine lining can result in heavier menstrual bleeding when periods do occur.

3. Excessive Hair Growth: Over 75% of women with PCOD experience hirsutism, which is characterized by increased hair growth on the face and body, including areas such as the back, abdomen, and chest.

4. Acne: Elevated male hormone levels can lead to increased oiliness of the skin, resulting in breakouts on the face, abdomen, and chest.

5. Skin Darkening: Dark patches may develop in skin folds, such as those on the neck, groin, and beneath the breasts.

6. Headaches: Hormonal fluctuations can trigger headaches in some women. PCOD can impact the body in various ways, as elevated androgen levels can influence fertility and overall health. **[6]**

High insulin levels can stimulate the production of male androgen hormones, leading to symptoms such as excessive hair growth, acne, irregular menstrual cycles, and obesity. Weight gain associated with this condition is often linked to male hormones and tends to accumulate in the abdominal area, similar to patterns observed in men. Abdominal fat is particularly concerning.

Root cause of PCOD:

1.Genetic Disorder.
2.Strong stimulation and secretions of adrenal in childhood.
3. Increased insulin levels.

4. Contraceptive pills.
5. Hormonal imbalance.
6. Stress, anxiety, improper food diet, and poor lifestyle.
7. Excessive androgen or male hormone production and secretion. **[14]**

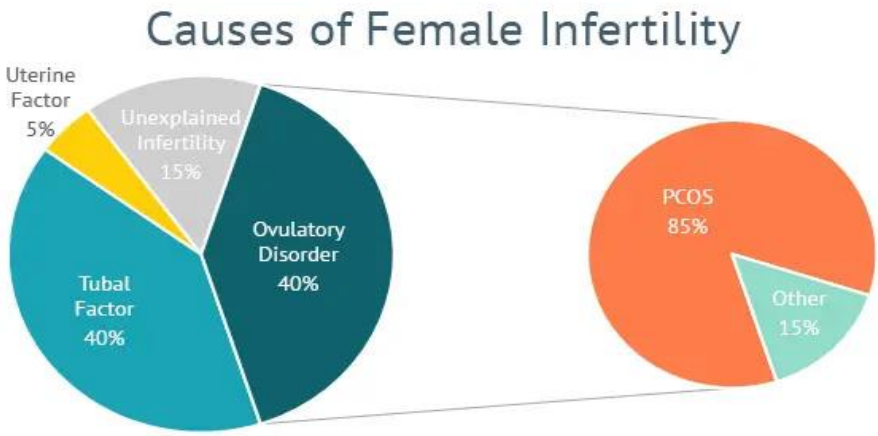

Figure 3: Causes of PCOD

4.Organs Affected by PCOD:

Ovary: These are the female reproductive organs located on either side of the uterus.
Adrenal Gland: This gland is situated above the kidneys. Pancreas: This gland is responsible for producing insulin in the body.
Pituitary Gland: Located just beneath the brain, this gland regulates hormonal functions.
In cases of PCOD, there is an increased production of androgens by the ovaries, which inhibits the maturation of ovarian follicles. Consequently, women with PCOD may face difficulties in conception due to the lack of available ova. The ovaries can become enlarged, measuring 2 to 5 times their normal size, and may contain numerous cysts.

Histological Features:

Whole ovarian hypertrophy
Thickened capsules (>100 μ)
Increased number of subcapsular follicle cysts
Scarcity of corporea-lutea or albicantia
Hyperplasia and fibrosis of the ovarian stroma
Premature luteinization of the theca cells **[14]**

5.Importance of Investigation:

Diagnosis of PCOD is extremely important because it in turn, identifies the risk for potential metabolic and CVS diseases. Although women who present with characteristics of PCOD symptoms seem healthy, they have a lot of complications like hyperinsulinemia, abnormal lipid and lipoprotein levels, and altered fibrinolysis. In this field, more research is needed. We believe that because the risk associated with PCOD are severe, women with ovarian morphologic findings required PCOD status is expected to lead to many long-term consequences in women.

A study carried by the department of endocrinology and metabolism, AIIMS, shows that about 20-25% of childbearing-aged women are suffering from PCOD. While 60% of women with PCOD are obese, 35-50% have a fatty liver. About 70% have insulin resistance, 60-70 have high levels of androgen and 40-60 have glucose intolerance. In comparative studies of allopathy, Ayurveda, and homeopathy, the allopathy does not cure, PCOD but helps in managing and controlling effects and requires more money and duration, while Ayurveda and homeopathy can be considered the best cures and promising treatments with no side effects. So there is more need for study as well as awareness of PCOD. On the basis of above factors, there is a need to develop a polyhedral formulation to reduce the cost, duration, and side effects of existing treatment**. [14]**

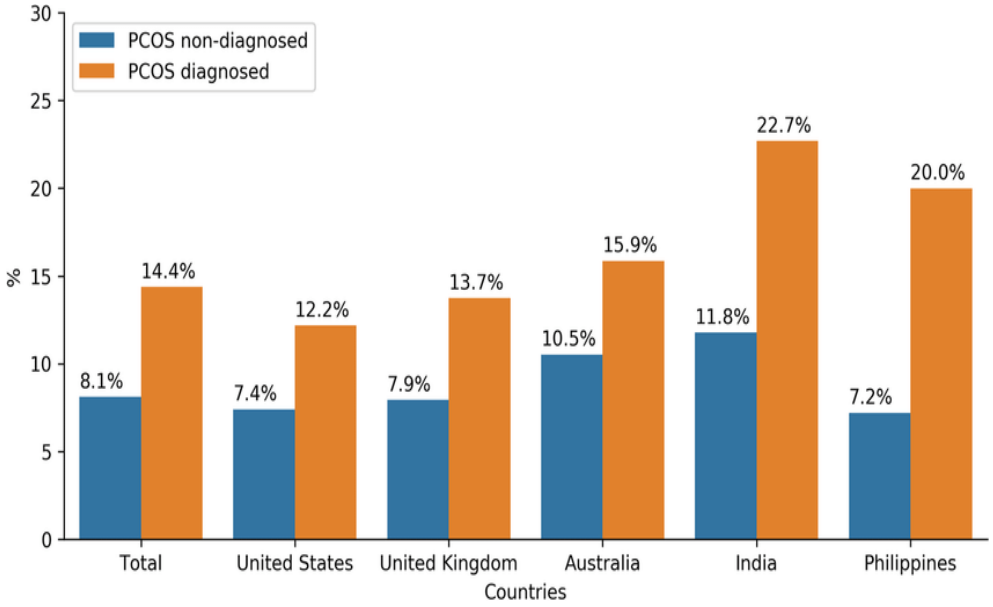

Figure 4: Ratio of PCOD in each countrie's

6.Diagnosis And Detection:

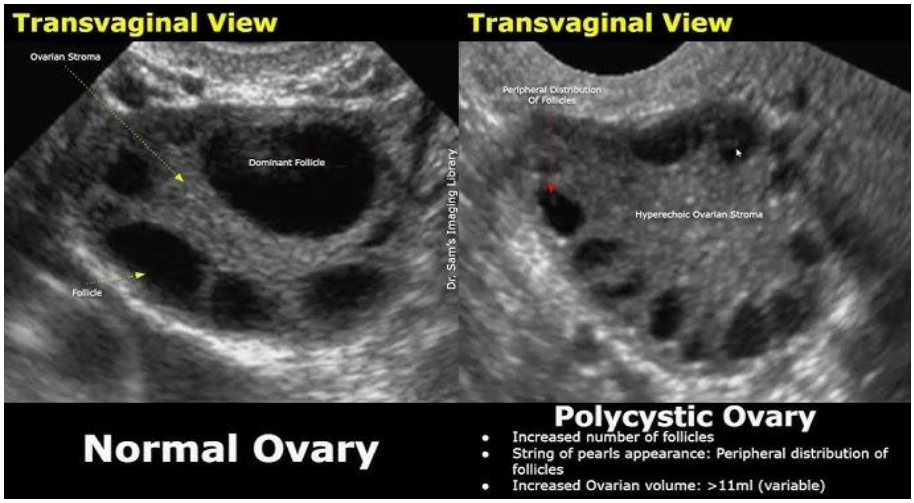

Figure 5: Ultrasound of Ovary with cysts

There is no definitive test available to diagnose polycystic ovary disorder (PCOD) specifically. Typically, your healthcare provider will begin by discussing your symptoms, medications, and any other existing medical conditions. They may inquire about your menstrual cycles and any fluctuations in weight. A physical examination will involve looking for indicators such as excessive hair growth, signs of insulin resistance, and acne. Following this initial assessment, your healthcare provider may suggest the following:

Pelvic examination: This procedure allows your provider to examine your reproductive organs for any masses, growths, or other abnormalities.

Blood tests: These tests can assess hormone levels and help rule out other potential causes of menstrual irregularities or androgen excess that may resemble PCOS. Additional blood tests may include fasting cholesterol and triglyceride levels. A glucose tolerance test may also be conducted to evaluate how your body responds to sugar (glucose).

Ultrasound: An ultrasound can be used to assess the condition of your ovaries and the thickness of the uterine lining. A transducer, which is a wand-like device, is inserted into the vagina. This device emits sound waves that are converted into images displayed on a computer screen.

7.Management Strategies:

The management of PCOD should aim to normalize the menstrual cycle, achieve ovulation, eliminate hirsutism and acne, reduce weight as well as manage hyperglycemia, and hyperlipidemia to lower the risk of cardiovascular disease. Acharya Dalhana mentioned that due to regular menses, as impurities are excreted from a woman's body constantly, there are fewer chances of her suffering from Prameha. As one of the causes of PCOD is hyperinsulinemia, we can use Pramehghna drugs. Weight loss leads to increased circulating androgen and glucose levels but is also beneficial in ovulation and thus combats the infertility rate in obese females with PCOD.

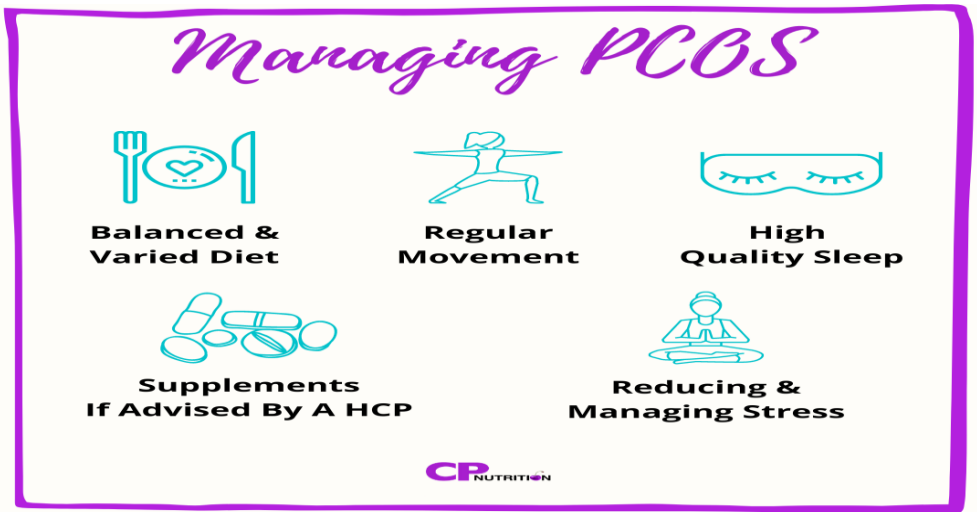

Figure 6: Management ways for PCOD

Nidana Parivarjana:

Nidana Parivarjana (avoid the disease-causing factors), for which women should follow the principles of Swasthaya Rakshana like Dincharya (daily regimen), Ritucharya (seasonal regimen), Sadvritta, Achara Rasayana, Hitahara, Samyaka Nidra (proper sleep of 6-8 hours at night), and Vyayama (physical activity) for prevention of disease. Results of the study reported that there are subtle variations in diets; monounsaturated-enriched diets result in greater weight loss; low glycemic diets decrease insulin resistance, fibrinogen, total and high lipoprotein density, and improve menstrual irregularities.

Exercise:

Many studies have reported that regular exercise improves menstrual irregularity and insulin resistance. In PCOD, physical activity and exercise for 30-45 minutes showed improvement in body mass index, waist circumference, and metabolic parameters such as insulin resistance, total cholesterol, and lipid profile. Thereby reducing the metabolic syndrome and other risk factors contributing to PCOD. **[9]**

8.Ayurvedic solutions for PCOD:

Ayurvedic treatment is applying a multi- prolonged approach towards:
1. Restoring hormonal balance.
2. Addressing obesity and managing high cholesterol levels.
3. Treating insulin resistance.

1] LIQUORICE:

Figure 7: Liquorice

Biological source: Glycyrrhiza glabra
Family: Glycyrrhiza glabra
Research on licorice's impact on androgen metabolism involved nine healthy women aged 22 to 26 during the luteal phase of their menstrual cycle. Participants received 3.5 g of a commercial licorice preparation (containing 7.6% W/W glycyrrhizic acid) daily for two cycles. Licorice has been shown to lower serum testosterone levels, likely by inhibiting 17-hydroxysteroid dehydrogenase and 17-20 lyase. It may serve as an adjuvant treatment for hirsutism and polycystic ovary syndrome.

2] ALOE-VERA:

Figure 8: Aloe-vera

Biological source: Aloe barbadensis
Family: Liliaceae.
Aloe vera gel has demonstrated a protective effect against the symptoms of PCOD by restoring the ovarian steroid levels, and modifying essential steroidogenic functions, attributed to the phyto-chemicals present in the extract.

3] FLAX SEEDS:

Figure 9: Flax seeds

Biological source: Linum usitatissimum.
Family: Linaceae.
Flaxseed supplementation (30 grams per day) has been shown to influence hormonal levels in a woman with PCOD. It also aids in reducing the hirsutism by lowering the excess androgen levels.

4] FENNEL SEEDS:

Figure 10: Fennel seeds

Biological source: Foeniculum Vulgare
Family: Umbelliferae
Fennel seeds are frequently recommended as a natural remedy for the PCOD due to their phytoestrogen content. They assist in hormone regulation, possess anti-inflammatory properties and enhance insulin sensitivity.

5] CINNAMON:

Figure 11: Cinnamon

Biological source: Cinnamomum zeylanicum

Family: Lauraceae

Cinnamon is known to enhance the menstrual cycle and exhibits insulin sensitizing properties, making it advantageous for women experiencing PCOD. Research has demonstrated that Cinnamon extract can lower insulin resistance in both invitro and invivo studies by boosting the activity of phosphatidylinositol 3-kinase within the insulin signaling pathway, thereby enhancing insulin function.

6] GREEN TEA:

Figure 12: Green tea

The powerful antioxidants found in green tea, particularly catechins, play a crucial role in reducing the levels of hormones associated with ovarian cysts and their symptoms. Additionally, these antioxidants help regulate insulin levels. Regular consumption of green tea can also influence weight gain, which is often observed in PCOD, aiding the reduction of excess weight.

7] AMLA:

Figure 13: Amla

Biological source: Emblica officinalis

Family: Phyllanthaceae

Amla is recognized as an effective detoxifying agent and a reducer of cholesterol levels. It's properties as a free radical scavenger and it's anti-inflammatory effects contribute to restoring hormonal balance within the body.

8] SESAME SEEDS:

Figure 14: Sesame seed

Biological Source: Sesamum indicum

Family: Pedaliaceae

Sesame seeds are rich in nutrients that are beneficial for individuals with PCOD. They contain healthy fats that assist in regulating blood glucose levels and enhancing digestive health. Additionally, the presence of vitamin E and sesame lignan provides antioxidant and anti-inflammatory benefits, supporting overall reproductive health.

9] TULSI:

Figure 15: Tulsi

Biological Source: Ocimum sanctum

Family: Lamiaceae

Known as holy basil or tulsi, these herbs serves as a remedy for chemical and metabolic stress. Often referred to as the "queen of herbs," it aids in lowering blood sugar levels, preventing weight gain, and reducing cortisol levels. Additionally tulsi is beneficial in minimizing excessive facial hair growth, treating acne, addressing fertility issue.

10] PUMPKIN SEEDS:

Figure 16: Pumpkin seeds

Biological source: Cucurbita pepo

Family: Cucurbitaceae

Pumpkin seed are rich in healthy omega-3 fatty acids, which can assist in managing elevated cholesterol and insulin levels associated with PCOD. They also contain beta-sitosterol, which helps eliminate excess androgens, thereby treating hirsutism, acne, and obesity link to PCOD.

11] CURCUMIN:

Figure 17: Curcumin

Biological Source: Curcuma longa
Family: Zingiberaceae

Curcumin, found in turmeric, offers anti-inflammatory and antioxidant benefits, potentially enhancing insulin sensitivity, regulating blood sugar level and improving egg quality. It is commonly utilised for inducing ovulation in the context of PCOD.

9.CONCLUSION:

Polycystic Ovary Disorder (PCOD) is a complex hormonal disorder affecting millions of women worldwide. A principal conclusion of this report is that PCOD should be first considered a disorder of androgen excess or hyperandrogenism. This report aimed to yield criteria based on currently available data to guide research clinical diagnosis and future investigation. Conventional treatments often have limitations and side effects, making herbal drugs a promising alternative. To enhance recovery rates and acceptance, patients are now increasingly depending on herbal therapy as the best alternative to synthetic medication for the control and treatment of PCOD. Herbal extracts such as cinnamon, curcumin demonstrated potential in regulating menstrual cycles, improving insulin sensitivity, and reducing androgen levels. This review work helps to manage and control the symptoms related to PCOD and its complications. The current review provides a thorough review of beneficial herbs for PCOD and related issues. We have reviewed key medicinal herbs, their primary chemical constituents, and their specialized significance in problem management. We are certain that our evaluation will be of significant use to researchers working on herbal drug therapies to treat PCOD.

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