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A REVIEW ON POLYCYSTIC OVARIAN SYNDROME

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ABSTRACT

Polycystic ovarian syndrome (PCOS) is a prevalent hormonal disorder in women of reproductive age, characterized by intricate pathophysiology that includes genetic, environmental, and factors that span generations. This condition is linked to several clinical symptoms, such as menstrual disturbances, excessive hair growth. Hormonal irregularities, inconsistent menstrual cycles, and ovarian cysts characterize PCOS, a common condition. hormonal disorder impacting women during their reproductive years. Drugs, herbal treatments, and modifications to daily habits are often utilized together to control PCOS. In contrast to conventional medications, herbal treatments could have reduced side effects and offer a more holistic and complete method for addressing PCOS. The aim of this research was to develop a polyherbal syrup for treating PCOS and evaluate its effectiveness in doing so. encourage menstrual consistency and hormonal stability. Furthermore, the formulation and evaluation of a polyherbal. The optimal syrup formulation included the plant extract (cinnamon, ginger, aloe vera, curcumin, pomegranate, honey, neem, tulsi, ashwagandha, sodium benzoate, sucrose, citric acid, sodium citrate) Regulate hormonal imbalance (especially androgens, insulin, and estrogen) Support ovarian function: - Reduce inflammation and oxidative stress, improve menstrual regularity and fertility, promote metabolic balance (reducing obesity and insulin resistance). This cross-sectional study was based on a questionnaire carried out in the Department of Obstetrics and Obstetrics and Gynaecology in a Tertiary Care Facility among nursing students. A semi-structured, pre-tested, pre-designed 15 items survey including 3 elements: awareness of risk factors, clinical

symptoms, and indicators. Complications of PCOS were utilized for gathering online data, and the findings were examined to assess the impact of a structured teaching program on knowledge related to polycystic ovarian syndrome. Ayurvedic healing provides a comprehensive strategy for handling PCOS, employing diverse herbal treatments that target hormonal and metabolic disruptions. This assessment emphasizes the importance of comprehending. The complex characteristics of PCOS and the possible advantages of combining conventional therapies with traditional management approaches.

KEYWORDS

- SA: Saraca Asoka
- BA: Berberis aristata
- Hirsutism
- Menstrual regularity
- TFG: Trigonella foenum graceum
- Polyherbal Formulation

INTRODUCTION

Polycystic ovary syndrome (PCOS) ranks among the most frequent hormonal disorders that impact 1 in 10 women of reproductive age, and the cause of this syndrome is unknown.[1]

In 1935, Stein Leventhal and his colleague published the initial account of polycystic ovarian syndrome. It is associated with polycystic ovary syndrome, ongoing oligo-anovulation, and polycystic ovaries morphological changes, along with disorders and metabolic disturbances like insulin insensitivity and compensatory increased insulin levels. These modifications might influence androgen. output and fertility age.[2] symptoms of polycystic ovary syndrome (PCOS), an endocrine disorder, encompasses infertility, amenorrhea, hirsutism, menstrual irregularities, and anovulation. The most common condition impacting women of reproductive age as well as those who Are PCOS is not menopause yet. PCOS directly affects fertility, but without treatment, significant health repercussions exist. The defining features are hyperandrogenism and polycystic ovaries.

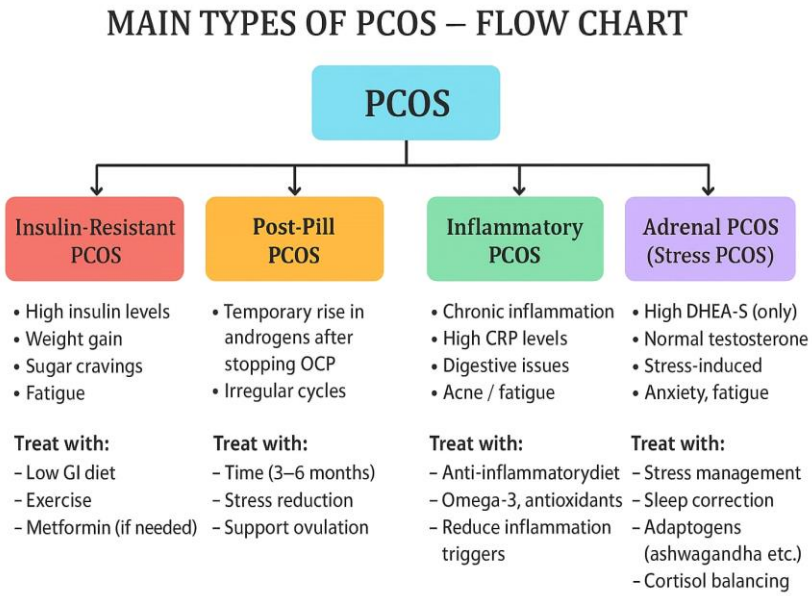
In PCOS, the pituitary gland produces an excessive level of luteinizing hormone, which disrupts the normal menstrual cycle. This can lead to anovulation because the follicle fails to mature, preventing ovulation from occurring.[3] PCOS is a condition characterized by a complicated etiopathogenesis. through the integration of genetic, reproductive, and metabolic

elements. No individual prognostic factor can significantly clarify the mechanisms and prevalence of PCOS.

Chemical treatment of disease through medication based on research results in numerous side effects, hence the natural treatments was favoured to restore the regular pattern of the menstrual cycle by regulating the hormones and additionally, they are identified to rectify the imbalance of doshas present as a result of ovulation. Additionally, there are plants containing phytoestrogens that may also be beneficial in the therapy of illness. The plants regulating the insulin levels. and herbs that lower lipids can similarly be included in the treatment for PCOS.[4]

Types

PCOS is a hormone-related disorder and affects irregular periods. PCOS is categorized into four types.

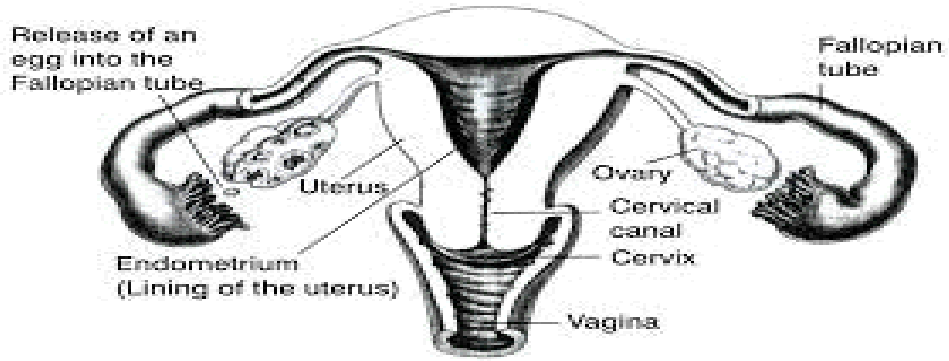


Anatomy and physiology of ovary

The ovary is an essential reproductive organ in women, participating in hormone synthesis. and the maturation of oocytes (egg cells). The human ovary consists of three primary sections:

A) outer cortex, B) the inner medulla, and c) the hilum (rete ovarian). Ovarian connection to the mesovarium, referred to as the hilum, also includes nerves, blood vessels, and hilum cells. In the ovarian cortex, stromal tissue contains ovarian follicles that surround oocytes. in the inner layer, while the tunica albuginea constitutes the outer layer. On the box-like surface the

ovarian cortex epithelium is where 90% of ovarian cancers originate. In reply to activation of the LH receptor, stromal interstitial cells (originating from mesenchyme) produce androgenic hormones.[5]



Normal anatomy of the reproductive organs.

Anatomy of Ovary

Location: The ovaries are paired organs situated in the pelvic cavity, one on either side of the uterus. Structure: Cortex: The external area has ovarian follicles at various developmental stages, housing immature oocytes. Medulla: The inner area consists of connective tissue, blood vessels, and nerves. Surface Epithelium: A cellular layer covering the ovary that plays a role in protection and may also contribute to ovarian function. Primordial Follicles: Enclose undeveloped oocytes surrounded by a single layer of granulosa cells. Primary and Secondary Follicles: Stages of development in which the oocyte increases in size and the granulosa cells multiply. Graafian Follicle: A developed follicle that discharges an oocyte during ovulation.[6]

Pathophysiology of ovary

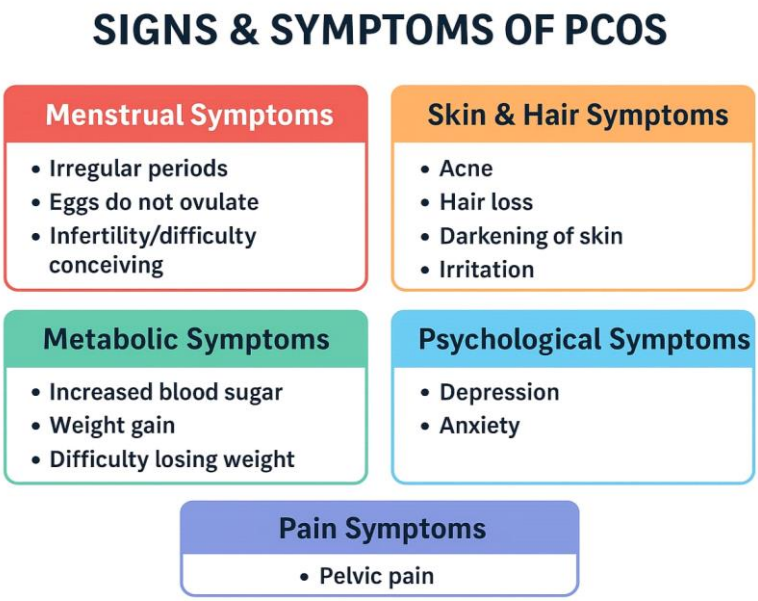
The endocrine system consists of various glands that release hormones that collaborate to support the upkeep of standard bodily processes, including metabolism, reproduction, and development and advancement, to mention a couple.[7] Ovulatory dysfunction is marked by an interruption in regular ovulation. Women identified with PCOS were observed to possess reduced FSH levels and elevated LH levels an interruption in regular[8] Organs involved in pcos

OVARY: The ovary is the female reproductive gland found on either side of the uterus.

ADRENAL GLAND: The glands responsible for adrenaline production are situated directly above each kidney.

PANCREAS: The pancreas is a gland that produces insulin within our body.

PITUITARY GLAND: The pituitary gland, situated directly beneath the brain, is accountable for hormonal regulation.[9]



Causes

Research indicates that the factors contributing to PCOS include genetic factors, obesity, and insulin. defiance, early life intense adrenal gland activation, endocrine disruption, accumulation of toxins, uterine and inflammation of the ovaries, stress.[10]

- Elevated insulin levels
- Hormonal discrepancy
- Tension
- inherited tendency.[11]

Risk factors of pcos

1. Hereditary influence

Family background of PCOS (mother or sister diagnosed with PCOS)

Genetic alterations influencing insulin and hormone control

2. Insulin Resistance

Body cells exhibit reduced sensitivity to insulin.

Results in elevated insulin levels, which boost androgen (male hormone) production.

3. Excess Weight / Overweight

Excessive fat in the body, particularly in the abdominal area, increases insulin resistance.

Raises the likelihood of hormonal disruptions and irregular menstrual cycles.

4. Hormonal Disruption

Increased levels of androgens (male hormones).

Imbalance in FSH (Follicle-stimulating hormone) and LH (Luteinizing hormone).

Elevated estrogen and lowered progesterone levels.

5. Factors Influencing Lifestyle

Insufficient physical activity

Unhealthy diet (elevated sugar, processed carbohydrates, junk food)

Tension and inconsistent sleep routines

6. Ecological & Hormonal Elements

Contact with chemicals that disrupt the endocrine system (such as BPA, phthalates) = Ongoing stress impacting cortisol levels and hormonal equilibrium.

7. Premature Puberty

Early onset Increase of menstruation (menarche occurring before age 11) raises the risk.[12]

Histological characteristics of pcos encompass

In the size of whole ovary

The capsule follicle thickens to more 100 μ.

Increased number of subcapsular than follicle cysts.

Reduced occurrence of corpora lutea or albicans

Increase in cell numbers and scarring of the supportive tissue in the ovary

Early luteinization of theca cells.[13]

Thickened Albuginea Tunica: The outer layer of the ovary (tunica albuginea) is dense and fibrous. This dense layer may inhibit the regular breaking of follicles, causing anovulation.

Cystic Follicles: Many undeveloped or atretic follicles are observed under the cortex. These cysts typically measure 2–9 mm across.

The follicles are bordered by granulosa cells and encircled by hyperplastic theca interna cells.

Hypertrophy and Hyperplasia of Theca Cells: The theca interna layer, which produces hormones, exhibits hypertrophy and hyperplasia. This is linked to heightened androgen (male

hormone) production. Few or no corpus luteum are observed, suggesting absence of ovulation. This indicates persistent anovulation in PCOS.

Diagnosis of PCOS:-The identification of peripubertal onset menstruation issues involves both clinical and Biochemical hyperandrogenism is usually diagnosed. A notably divisive factor is the identification of polycystic ovaries through ultrasound examination. Smaller than 10 mm in size, cysts on the periphery (10 or more) in an enlarged ovary showing a significant increase in the central stroma.

Characterize polycystic ovaries[14]

1. **Hormonal tests**

LH, FSH, LH/FSH ratio
Total & free testosterone
Prolactin
TSH DHEA-S
17-hydroxyprogesterone

2. Metabolic evalution

Fasting glucose and insulin
Lipid profile

3. Ultasonnd

Transvaginal or pelvic ultrasound to evaluate ovarian morphology.[15]

Treatment of PCOS Management of Polycystic Ovary Syndrome (PCOS)

The management of PCOS aims at addressing specific symptoms including irregular menstruation, infertility, acne, and excessive hair growth, while also aiming to prevent longterm issues like diabetes and cardiovascular diseases.

Nutrition: Reduced-calorie, low-glycaemic index eating plan (aids in enhancing insulin sensitivity).

Incorporate fruits, vegetables, lean proteins, and whole grains.

Exercise: Consistent exercise (a minimum of 150 minutes weekly) aids in weight reduction and hormone balance.

Control of Body Weight

A weight loss of 5–10% can revive ovulation and alleviate symptoms.

Irregular Menstruation Combined: Oral Contraceptives (COCs): Control menstrual cycles and decrease androgen levels. Ethinyl estradiol combined with cyproterone acetate or drospirenone. Progesterone Treatment: Utilized for withdrawal bleeding every 1 to 2 months (e.g., medroxyprogesterone acetate).

- **Insulin Resistance / Metabolic Problems Metformin (500–2000 mg daily)**

Enhances insulin sensitivity and could aid in regaining ovulation.

Beneficial for women who are overweight or obese.

- **Induction of Ovulation (for infertility) Letrozole (initial treatment)**

Aromatase blocker; triggers ovulation.

Clomiphene citrate: Utilized when letrozole is unavailable or not effective.

Gonadotropin injections (FSH/LH): For cases that are resistant and require expert oversight.

- **Hyperandrogenism (Acne, Excess Hair Growth) Antiandrogen medications**

Spironolactone, cyproterone acetate, finasteride – diminish hair growth.

It is essential to use dependable birth control because of the teratogenic danger.[16]

Herbal medicine from ayurveda for treatment of PCOS

1. Cinnamon = Improve insulin sensitivity
2. Ginger = Antioxidant and Anti inflammatory
3. Neem = Anti androgenic effect
4. Honey = metabolic role and hormonal balance
5. Tulsi = Adaptogenic effect and fertility support
6. curcumin = hormonal regulation and insulin sensitization
7. Ashw**.**agandha = Regular of hormones, reduction of stress
8. Aloe Vera = Improve insulin sensitivity and hormonal balance
9. pomegranate = Antioxidant, improve ovarian health

1. Cinnamon

Botanical Name: Cinnamomum verum

Family: Lauraceae.

Research carried out both in vitro and in vivo indicates that cinnamon extract reduces insulin levels. resistance by enhancing phosphatidylinositol 3-kinase activity in the insulin signalling route, which subsequently enhances the impact of insulin.

2. Ginger

Botanical name of Ginger: Zingiber officinale Roscoe.

Family: Zingiberaceae.

Regulation by Hormones Research has shown that ginger supplementation can influence essential reproductive hormones in PCOS: Research on Wistar rats demonstrated that ginger extract markedly lowered serum concentrations of luteinizing hormone (LH), follicle stimulating hormone (FSH), oestradiol, and testosterone, while enhancing progesterone levels, thus promoting hormonal equilibrium. A different study discovered that taking ginger extract for 12 weeks lowered LH, testosterone, and insulin levels in women suffering from PCOS.[17]

3. Neem

Botanical name: Azadirachta indica A. Juss.

Family: Meliaceae

Anti androgenic effect: PCOS is linked to elevated levels of androgens (male hormones). Neem aids in decreasing excess androgen production, leading to improvements in symptoms such as acne, hirsutism (unwanted hair growth), and irregular menstrual cycles.

4. Honey

Family: Apidae

a) Antioxidant Effectiveness

Honey possesses flavonoids, phenolic acids, and enzymes that diminish oxidative stress.[18]

b) Enhances Insulin Sensitivity

PCOS is frequently associated with insulin resistance Consistent consumption of natural honey (particularly raw or wild honey) has been demonstrated to boost glucose metabolism and improve insulin sensitivity, lowering hyperinsulinemia.[19]

5. Tulsi

Botanical name :Ocimum sanctum

Family: Lamiaceae

The absence of ovulation inhibits the utilization of androgens. This explains why women experience difficulties conceiving, excessive hair growth on the face, and outbreaks of acne. Tulsi has the ability to reduce insulin production and control androgens. It is also an excellent antioxidant. Consume a minimum of ten leaves empty stomach at dawn. Consume cooked tulsi water each time.

6. Curcumin

Botanical Name: Curcuma longa

Family: Zingiberaceae

Curcumin possesses antioxidant properties and decreases hyperglycemia, hyperandrogenism, and insulin resistance in different PCOS scenarios. In female Wistar rats with PCOS induced Curcumin demonstrated beneficial effects when combined with letrozole. The results are contrasted with clomiphene. citrate, the most widely used drug for triggering ovulation in PCOS individuals.[20]

7. Ashwagandha

Botanical name: - Withania somnifera (L.) Duna

Family: Solanaceae

Reduce stress and cortisol levels:

PCOS is frequently associated with increased stress and higher cortisol levels, which can exacerbate hormonal imbalances

Regulates Hormones

Ashwagandha aids in balancing reproductive hormones including LH, FSH, estrogen, and progesterone. It aids thyroid function, which in turn influences the balance of ovarian hormones.[21]

8. Aloe Vera

Botanical Name: Aloe barbadensis

Family: Liliaceae.

Effects that Reduce Inflammation and Combat Oxidation Includes polysaccharides, vitamins (A, C, E), and flavonoids that function as antioxidants. Decreases oxidative stress and inflammation in ovarian tissue, enhancing follicular health and ovulation.

9. Pomegranate

Botanical Name: Punica granatum

Family: Punicaceae

The research indicates that pomegranate extract might possess a protective effect against Hormonal irregularities linked to polycystic ovary syndrome. Research has shown that the phytosterols and phenolic compounds in the extract may assist in alleviating the symptoms of PCOS. The research indicates that taking the extract diminishes issues associated with PCOS Effects that Combat Inflammation and Oxidative Stress High in ellagic acid, punicalagin, and anthocyanins which offer powerful antioxidant properties.

CONCLUSION

Polycystic Ovarian Syndrome (PCOS) is a multifactorial endocrine disorder that affects a significant proportion of women in their reproductive years, leading to hormonal imbalance, menstrual irregularities, infertility, and metabolic disturbances. Conventional treatments, though effective, are often associated with side effects and limited long-term efficacy. Hence, the use of natural and herbal formulations provides a promising alternative for managing this complex condition in a holistic and safer manner.

The formulated polyherbal syrup containing Cinnamon, Ginger, Neem, Tulsi, Ashwagandha, Aloe vera, Curcumin, Pomegranate, and Honey, along with suitable excipients, demonstrates potential therapeutic benefits in regulating hormonal imbalance, improving insulin sensitivity, enhancing ovarian function, and reducing oxidative stress and inflammation. Each of these herbal.

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