A Comprehensive Review on Tailoring an Herbal Approach for Treatment of Poly Cystic Ovarian Syndrome

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Abstract

The review gives a brief about polycystic ovarian syndrome (PCOS) and the symptoms related to the disease. Around 2.2 to 26% of cases of PCOS are present globally. The disorder generally occurs in the reproductive age group of women. The review has a mention of few herbs which can be used to correct the diseased condition. The various herbs have a positive effect on the diseased condition and can be used to cure symptoms like hypothyroidism, hyperplasia, obesity, diabetes, Menorrhagia, sleep disturbances, cardiovascular problems, hyperlipidemia, hirsutism, infertility, irregular menstrual cycle, etc. The herbs included in the review include Bauhinia variegata useful in hormone imbalance, Phyllanthus emblica, Terminalia bellica, Terminalia chebula, and Commiphora wightii are used to regulate the hormones. Cinnamon cassia acts as an anti-oxidant, Tribulus terrestris improves reproductive dysfunction, Hypericum perforatum regulates depression, Commiphora myrrha prevents menorrhagia, Nigella sativa controls cholesterol, Saraca asoca has estrogenic action, Asparagus racemosus promotes folliculogenesis, Tinospora cordifolia regulates menstrual flow, Ocimum sanctum as an anti-oxidant. The plants taken had a positive effect on women with PCOS without causing any side effects. The natural herbs used for the treatment of PCOS did not have any side effects and treated the diseased condition naturally. This review aims to understand the natural plants available for the treatment of the disease naturally. The herbs can be used individually or can be used in combination.

Keywords: Poly cystic ovarian syndrome, Herbal medicine, Herbs, Natural plants

Introduction

One of the most prevalent disorders that affect both the metabolic and reproductive systems is polycystic ovary syndrome (PCOS). The main symptoms of PCOS are hyperandrogenism, persistent an ovulation and irregular menstrual periods 1, 2. There is no one effective treatment for this illness since its pathophysiology is still unclear, despite the fact that it likely has epigenetic roots3, 4. For PCOS, various pharmaceutical therapies have been suggested. Although they have drawbacks including side effects, low patient compliance with long-term pharmaceutical therapies, low efficacy, and occasionally contraindications, complementary treatments can be a good substitute5-8. A complex but frequent condition known as polycystic ovarian syndrome typically affects females in the reproductive age group. Nearly 70% of women who struggle with ovulation due to this condition develop sub fertility. The polycystic ovarian syndrome hinders the ovaries from functioning normally because the ovaries have cysts on them. Obesity or increased weight, high blood pressure, diabetes, dysfunctional lipid profiles, dandruff on the scalp or oily skin, dark patches on the neck and underarms, chronic pelvic pain, acne, increased levels of male hormones causing hair thinning and baldness in the male pattern, excessive hair growth on the body and face, and, in the case of women, menstruation are some of the underlying symptoms of this disorder9. Improper metabolism of estrogen, androgen, and the generation of regulated amounts of androgen are the main underlying causes of PCOS in females10. Women have been reported to have low-grade inflammation and insulin resistance. PCOS is negatively impacted by some circumstances, including dietary modifications, lifestyle adjustments, and exposure to some environmental contaminants. It may cause major health concerns if left untreated. Additionally, it directly affects fertility11. The most popular PCOS treatment options available today are oral contraceptives. They work by lowering blood levels of free androgens and preventing the release of gonadotropins12. Letrozole, an aromatase inhibitor, and clomiphene citrate, a non-steroidal selective estrogen receptor modulator (SERM), are frequently used to induce ovulation. Although there is accumulating evidence that Letrozole has superior efficacy and safety for the mother and fetus13, 14, clomiphene citrate is still the first-line medication. Insulin resistance, a crucial component of the Rotterdam criteria, is treated with metformin in PCOS patients. Overall, treating insulin resistance and hyperandrogenism enhances metabolic, reproductive, and hormonal processes15-16. In recent years, the usage of complementary therapies has grown, and currently, 40% of individuals benefit from them15, 16. A neuroendocrine characteristic of PCOS includes increased luteinizing hormone secretion frequency, luteinizing hormone serum concentration rise, luteinizing hormone amplitude increase, and ratio of LH/FSH increase17. The development of PCOS is also brought
on by the interaction of numerous environmental and genetic variables. It is typically found in obese, less active or exercise-challenged women with a family history of PCOS. Ovarian cysts are among the symptoms that are employed in the therapy of the disorder, along with the absence of ovulation and excessive testosterone levels. The presence of any cysts can be determined using ultrasound techniques. The diagnosis of the illness can also be made using a number of additional factors, such as hyperthyroidism, hyperplasia, and increased blood prolactin levels. According to recent studies, there is currently little to no cure for PCOS. The only way to address the condition is to slightly alter your lifestyle, such as through exercise and weight loss. The regularity of the menstrual cycle can be maintained with the use of birth control pills, as can skin issues like acne and excessive hair growth. Additionally, a variety of methods can be employed to cure acne and remove body hair. Lifestyle modification is the current treatment for PCOS corresponding to pharmacological interventions. To overcome this condition, modifications are to be made in the lifestyle such as proper exercise, diet, and also loss of weight. Agents that lower insulin, certain anti-androgens, and progestin-estrogen in combination comes under the category of pharmacological intervention. This category of treatment causes various problems and side-effects as they are expensive. The side effects can be gain of weight, irregular menstrual cycle, gastrointestinal problems, and also insulin resistance. Therefore, at present, lifestyle modification and diet alterations are the major concern for the above-mentioned gynecological diseases. Also, more and more patients are opting for herbal treatment. This review defines the few natural herbs used for the treatment and their role in the treatment of complications related to PCOS as described in Table 1.

**Table 1 Herbs used in the treatment of associated PCOS complications**

<table>
<thead>
<tr>
<th>Herb used for Treatment</th>
<th>Symptom/Complication associated with PCOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tribulus terrestris</td>
<td>Reproductive dysfunction</td>
</tr>
<tr>
<td>Cinnamon cassia</td>
<td>Anti-oxidant</td>
</tr>
<tr>
<td>Ocimum sanctum</td>
<td>Hormonal imbalance</td>
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<tr>
<td>Bauhinia variegata</td>
<td>Regulation of hormones</td>
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<tr>
<td>Phyllanthus emblica,</td>
<td></td>
</tr>
<tr>
<td>Terminalia bellirica,</td>
<td></td>
</tr>
<tr>
<td>Terminalia chebula, and</td>
<td></td>
</tr>
<tr>
<td>Commiphora wightii</td>
<td></td>
</tr>
<tr>
<td>Hypericum perforatum</td>
<td>Depression &amp; Mood swings</td>
</tr>
<tr>
<td>Commiphora myrrha</td>
<td>Menorrhagia</td>
</tr>
<tr>
<td>Nigella sativa</td>
<td>Cholesterol</td>
</tr>
<tr>
<td>Saraca asoca</td>
<td>Estrogenic action</td>
</tr>
<tr>
<td>Tinospora cordifolia</td>
<td>Regulation of menstrual flow</td>
</tr>
<tr>
<td>Asparagus racemosus</td>
<td>Folliculogenesis</td>
</tr>
</tbody>
</table>

**Herbs in the treatment of PCOS**

**Hypericum Perforatum**

The plant known as St. John’s wart, Hypericum perforatum, is a member of the Hypericaceae family. Many nations employ St. John’s wart as a medicinal plant. Tipton weed, Goat weed, and Enola weed are some of the other names for St. John’s wart. The herb was advised by Greek physicians to cure menstrual disturbances. There are various situations in which the patient’s psychological discomfort or psychology could influence the course of treatment or reduce the likelihood of successful outcomes. Any factor that contributes to negative stress or sadness has no beneficial effects on ovarian function or treatment. Patients today have more faith in and desire in using natural herbs for therapy and the safe, effective, and natural method of healing. In order to achieve a synergistic impact or to assist the treatment for better results, patients with ovarian dysfunctions and PCOS are now utilizing alternative medicine. In general, women who are of reproductive age utilize St. John’s wart extracts, which are widely recognized as synthetic medications that modulate serotonin. Mild depression and mood fluctuations are frequent side effects of PCOS; such mild to moderate depression is treated with St. John’s wart.

**Commiphora Wightii**

A therapeutic flowering plant known by many common names, including Guggulu, Guggul, and Gugal, Commiphora wightii is a member of the Burseraceae family. Although it can also be found in Central Asia, guggul is most frequently found in Northern India. Guggul extract, also known as guggulipid, is a frequent ingredient in Ayurvedic and herbal remedies. Guggul contains a variety of therapeutic essential oils, gum extracts, and resinous compounds. The study demonstrated that Guggul reduces the DHEA-induced PCOS in the ovarian follicles, which is a key factor in minimizing morphological abnormalities. As a result, the hormonal fluctuations return to normal. The study also showed that the DHEA-induced PCOS profile, which includes the hormones FSH, LH, progesterone, estrogen and testosterone, experienced a sharp rise in hormone levels. Elevated glucose levels were also observed. For the purpose of raising awareness, promoting the use of guggul as a nutritional/dietary supplement, and determining the safety of use in humans, the National Institute of Health Environmental Sciences nominated the Gum Guggul to extract for examination of the Toxicological parameters and characterization. Gum Guggul has been shown to provide advantages for female reproductive organs and hormonal balance.

**Tribulus Terrestris**

The medicinal plant is a member of the Zygophyllaceae family and belongs to the genus Tribulus; there are about 20 species in this family. Tribulus terrestris, Tribulus cistoides, and Tribulus alatus are the three principal species found in India. The medicinal herb utilized in both Ayurveda and Western medicine is gokhru, one of the three species. Gokhru is utilized industrially for the creation of feed-based additives and medicinal formulations due to its saponin concentration.

The herb contains a variety of compounds, including glycosides, flavonoids, alkaloids, etc.; these compounds are rich in biological significance when taken as a dry extract of the therapeutic plant. According to recent study investigations, the medicinal herb is thought to have an impact and enhance female sexual dysfunction and reproduction. Gokhru is seen as a potential alternative therapy for polycystic ovarian disease. Using a strong Gokhru extract, ovarian activity can be restarted after cysts in the ovaries have been eliminated. It is thought that the medicinal extract affects PCOS-affected women’s folliculogenesis. The mechanism, however, is still not understood. Herbal medicines are used more frequently than synthetic ones since they have fewer side effects, are more affordable, and are beneficial to the health. They can also be taken for a longer period of time. Gokhru is thought to be an ovarian stimulant and a fertility

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tropic with an impact on women with PCOS. As a result, it is a preferred herb for PCOS.  

**Asparagus Racemosus**

In conventional Ayurvedic medicine, shatavari is a herb used for medicinal purposes that is a member of the Asparagus family. Women utilize the remedy plant for infertility, menstrual cycle control, ovarian follicle formation, and healthy functioning. The plant is thought to contain phytoestrogen, a type of natural plant-based estrogen that helps women’s reproductive systems recover. In cases of hyperinsulinemia, it also aids in the body’s regulation of insulin. There was a shatavari effect in young women with PCOS. According to a study, the plant is thought to boost the hormone that stimulates the formation of new follicles, increasing folliculogenesis. According to numerous studies, the weight of the ovaries may also grow. It is also regarded as the herb of choice for issues related to menstruation. Shatavari has a number of ingredients that aid in the treatment of issues associated to menstruation, such as menorrhagia, or painful menstrual bleeding, irregular flow, etc. The principal component of shatavari is saponin, aids in maintaining uterine mobility and is hence helpful in reducing unpleasant premenopausal bleeding. Infertility is one of the issues that women deal with. Because it promotes folliculogenesis, the herb is useful in the treatment of infertility issues. It gets the womb ready and lowers the likelihood of miscarriages. The roots of shatavari are frequently utilized during abortions to assist the uterine muscles grow stronger.

**Nigella Sativa**

A plant of significant therapeutic value that can be found all throughout the nation is Nigella sativa, also known as Kalaunji or black cumin and belonging to the Ranunculaceae family. All traditional medical systems, such as Ayurveda, Unani, Siddha, etc., use herbs. The Kalaunji plant plays a significant part in the oil and seed portion and is utilized in practically all types of medicine. Many illnesses and medical disorders are treated with kalaunji. According to Islamic Literature, it is well known to be a curative drug. According to numerous researches, black cumin is thought to be actively employed in the treatment and management of polycystic ovarian syndrome in female patients. Women with PCOS are thought to have a higher risk of developing cholesterol. Kalaunji was therefore seen to have impacted nearly all the metrics, according to the investigations. However, high-density lipoprotein and cholesterol were the main effects. While raising the body’s LDL levels, black cumin modulates cholesterol and HDL levels. It has a favorable impact on the lipid profile because of choleretic activity, as was seen in the case of Kalaunji. Additionally, it’s thought that Kalaunji’s decrease of appetite results in a hypolipidemic profile.

**Cinnamon Cassia**

The bark of the Dalchini tree has been used all over the world as both traditional and modern medicine with a variety of uses in addition to as a spice for cooking. Cinnamon trees may be found all over the world, and the Dalchini has at least 250 species that have been documented to date. Insulin resistance and signs of hyperinsulinemia have been identified in women with PCOS. Women were shown to have greater levels of insulin resistance than controls. Hyperandrogenism and insulin resistance are the main causes of irregular menstruation and anovulation in women. Synthetic medications like metformin have helped to address the problem to some extent. They do, however, have gastrointestinal side effects. Therefore, pre-clinical and clinical studies on the natural herb Dalchini revealed a sensitizing effect. The herb’s polyphenols have the ability to increase insulin-dependent glucose metabolism, which changes how glucose is transported. According to the study, Dalchini can be used to treat PCOS in women since it reduces irregularities in the menstrual cycle and offers efficient treatment without side effects. When compared to a placebo group, the study also reveals that the herb’s extract can be utilized to treat irregular menstrual cycles and ovulation. According to the study, cinnamon extract acts as an antioxidant and enhances lipid profile. As a result, PCOS-affected women experience fewer side effects and risk factors.

**Bauhinia Variegata**

In the tropical and temperate areas of India, there is a tree known as Bauhinia Variegata or Kanchanar, which has been used for many centuries in the Ayurveda. Kanchanar Guggul is the form of kanchanar that is used to treat PCOS. It works well to cure a variety of ailments, including PCOS, uterine cysts, various joint issues, and hormone imbalances. Guggul is known as “Guggulu” in Sanskrit, and it signifies “to protect from diseases.” The purpose of guggul is to boost the lymphatic system’s performance as well as the body’s ability to rid itself of pollutants. Varuna, black pepper, long pepper, a kwath of Triphala, pure Guggul resin, cardamom, and cinnamon are among the herbs included in Kanchanar guggul.

**Triphala: Emblica officinalis, Terminalia belerica, Terminalia chebula**

The term “triphala” refers to a combination or mixture of the three fruits Amla, Haritaki, and Baheda. Triphala is used to treat PCOS because it has anti-inflammatory properties in addition to being an antioxidant and a natural source of vitamin C. Triphala also has cleansing and purifying properties that aid in the treatment of PCOS. The radicals that Triphala scavenges are superoxide and diphenylpicrylhydrazyl. As a result, it has anti-inflammatory properties. Free radical scavenging is a characteristic of phenolic compounds, which are found in Triphala extracts. By affecting hormone regulation, these chemicals primarily serve to alleviate the issue of menstrual irregularities. According to Ayurveda, “Tridoshic Rasayana” is a therapeutic agent that affects the three constitutional energies of vata, pitta, and kapha. It has balancing and rejuvenating effects on these energies. Triphala is thought to be a combination of Vatta, Pitta, and Kapha according to Ayurveda, making it well-balanced and detoxifying. In an old Ayurvedic source, triphala is referred to as a Tridoshic Rasayana, a medicinal substance with rejuvenating and balancing effects on the three humors, or constitutional elements, of Vata, Pitta, and Kapha. Amla is chilly in nature, but Harad, Baheda, and Ama have warm energies. Because it combines all three, triphala is balanced and effective as a remedy for internal cleaning and detoxification.

**Saraca Asoka**

Leguminosae is the family that the Ashoka tree belongs to. The tree’s dry bark contains tannins, catechol, and other substances that contain calcium. The Asoka tree includes a number of important ions, such as phosphate, sodium, calcium, and magnesium. Treatment for PCOS, irregular menstruation patterns, uncontrolled profuse bleeding, uterine spasms, mild to severe discomfort, and dysmenorrhea are the main uses of Ashoka bark. Asoka is regarded as one of the best uterine tonics because it combats irregular menstrual cycles and miscarriage situations. Antimorrhagia or excessive bleeding is treated with the herb. Women with PCOS and other uterine disorders use both the flower and the bark parts of the plant. Uterine hemorrhage can also be treated using Asoka’s stem. Additionally, the oxytocin activity of the herb is said to have thickened the endometrium, the innermost layer of the uterus, helping to prevent uterine diseases. The Ashoka is

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thought to behave similarly to estrogen, promoting healthy uterine function and reducing excessive bleeding. In cases of severe menstrual bleeding, it helps in reducing blood loss. Additionally, it induces the uterine muscles to contract. Additionally, uterine fibroid and menorrhagia in PCOS cases are mentioned in the studies.48.

Ocimum Sanctum

The main medical applications of the sacred herbal plant Tulsi are the management of obesity and hypoglycemia.49. Because of its anti-androgenic qualities, it is used to treat polycystic ovarian syndrome. It controls obesity and reduces testosterone production.50. The body does not use the androgens since the appropriate ovulation process does not occur. Unused androgens are the cause of hirsutism and the acne issue. Tulsi’s function is to maintain and utilize androgen levels appropriately. Additionally, it has antioxidant properties.51.

Tinospora Cordifolia

The scientific name for the family member Guduchi is Tinospora cordifolia. A medicinal herb known as Menispermacae has a variety of therapeutic benefits, including hypoglycemia, anti-inflammatory, anti-stress, and ovarian balance. The pant uses the stem portion. Guduchi’s primary use is in the management of PCOS. The primary contributors to tissue inflammation are insulin disturbances and ovarian cysts. Guduchi is thought to have anti-inflammatory properties. It serves to naturally strengthen immunity. Women who have PCOS develop insulin resistance, which aids in overcoming that resistance. This plant also regulates menstruation flow.46. All body tissues are regenerated by guduchi, and it also aids in increasing immunity and metabolism.52.

Commiphora Molmol

Commiphora molmol, also known as Commiphora myrrha, is a member of the genus Commiphora, which is regarded as having the most species diversity among all the genera of flowering plants and is descended from the family Burseraceae. Myrrha is known as "murr" in Arabic, which means "bitter"; according to the Unani school of medicine, "murr" refers to an oleo gum resin that is extracted from the tree’s bark. Alkaloids, glycosides, volatile oil, saponins, terpenoids, steroids, bitter principle, and others are some of the main phytochemical components of Commiphora myrrha.53 Myrrha is mostly responsible for amenorrhea, or the absence of menstruation. To help the menstrual cycle, myrrh is coupled with iron-rich foods. Menorrhagia, which is characterized as a medical disease with copious and protracted bleeding throughout the menstrual period, is another function of myrrh in PCOS. Myrrh stops excessive blood loss during irregular and protracted bleeding. The resin may also act as an emmenagogue to increase blood flow when there is a uterine irregularity. Several uterine infections are treated with oleo gum resin. It functions as an astrigent as the pentaol of the uterus is one of the herb’s most crucial functions, and it also plays a part in brief and irregular periods. It encourages controlling menstrual bleeding.55.

Future aspects of PCOS using herbal treatment

The disorder known as polycystic ovarian syndrome has a number of long-term, chronic health issues. On the long-term impact of PCOS on a woman’s health, little research has been done to date. According to numerous studies, PCOS can cause women to have a variety of side effects, including mood fluctuations, weight gain, diabetes, heart disease, and miscarriage. Choosing the best treatments for women going through the postmenopausal stage is still a challenge. Numerous studies indicate that women with PCOS had higher bone mineral densities. To understand the health hazards associated with women’s aging, more research is needed. Identifying the relevant risk factors and genetic alterations both play a crucial role.56 A few herbs that can be used to cure polycystic ovarian syndrome naturally and without any negative side effects are listed in the review. The long-term use of synthetic medications is linked to a number of negative side effects; as a result, the symptoms of PCOS gradually start to disappear. It is advised to use natural products over the long term.57.

Conclusion

According to the review, continuous usage of synthetic medications may result in negative effects. On the other hand, herbal medications are secure and offer therapeutic activity without any negative side effects when used for a long period of time. A number of herbs can be taken singly or in combination to reduce PCOS risk factors. Additionally, it was shown that combining a few herbs results in a synergistic impact. It is more common to see the pharmacological action in combination than as a single component. A number of market concoctions combine a number of plants, and each herb enhances the pharmacological effects of the others. Consequently, choosing the right herbs and their interactions is equally crucial. There are several herbal products offered for PCOS, including well-known manufacturers like Himalaya, Patanjali, Dabur, Baidyanath, etc. All these marketed preparations have herbal drugs or a combination of herbal drugs.

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