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LIFESTYLE MODIFICATION AND HERBAL MEDICINES IN THE MANAGEMENT OF POLYCYSTIC OVARY SYNDROME (PCOS)

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ABSTRACT

Polycystic ovary syndrome (PCOS) is a common endocrine and metabolic disorder affecting women of reproductive age, characterised by hormonal imbalance, ovulatory dysfunction, menstrual disturbances, hyperandrogenism, and metabolic abnormalities. Lifestyle modification plays a central role in PCOS management, as dietary changes, regular physical activity, weight control, adequate sleep, and stress reduction can improve metabolic health, menstrual regularity, and reproductive outcomes. Herbal medicines have attracted growing interest as complementary approaches because of their potential effects on insulin resistance, oxidative stress, inflammation, and hormonal imbalance. Several herbal agents, including cinnamon, spearmint, berberine-containing preparations, and other traditional medicinal plants, have been investigated for their possible benefits in PCOS. However, the efficacy and safety of these therapies vary, and evidence regarding their long-term use remains limited. This review summarises the historical evolution of PCOS terminology, highlights the role of lifestyle modification, and discusses commonly used herbal medicines, including indicative doses, timing, and mechanisms of action. A comprehensive approach combining healthy lifestyle practices with evidence-based medical treatment and carefully evaluated complementary therapies may help improve clinical and metabolic outcomes in women with PCOS

KEYWORDS: Polycystic ovary syndrome; PCOS; lifestyle modification; diet; physical activity; weight management; herbal medicine; insulin resistance; hyperandrogenism; menstrual irregularity; complementary therapy.

INTRODUCTION

Polycystic ovary syndrome (PCOS) is one of the most common endocrine and metabolic disorders affecting women of reproductive age. It is a complex and heterogeneous condition characterised by hormonal imbalance, hyperandrogenism, irregular ovulation, menstrual abnormalities, and metabolic disturbances. Women with PCOS may present with irregular or absent menstrual cycles, excessive hair growth, acne, weight gain, and infertility. In addition to reproductive manifestations, PCOS is associated with metabolic complications such as insulin resistance, obesity, dyslipidaemia, impaired glucose tolerance, and an increased risk of type 2 diabetes mellitus. The condition may also adversely affect psychological well-being and quality of life.[1,2,3,4,10,11,12,13]

The pathophysiology of PCOS involves multiple interacting factors, including genetic predisposition, hormonal abnormalities, insulin resistance, lifestyle factors, and environmental influences. Insulin resistance and compensatory hyperinsulinaemia contribute to increased androgen production and impaired ovarian function. Elevated androgen levels interfere with normal follicular development and ovulation, leading to menstrual irregularity and fertility problems. Therefore, PCOS requires a comprehensive management approach that addresses both reproductive and metabolic abnormalities.[2,10,14,1,9]

Historical Perspective and Terminology

PCOS was first described in 1935 by American gynaecologists Irving F. Stein Sr. and Michael L. Leventhal, who reported a series of women with amenorrhoea, hirsutism, infertility, and enlarged, cystic ovaries; the condition was initially termed Stein–Leventhal syndrome. Over time, the name evolved to “polycystic ovary disease” (PCOD) and then to “polycystic ovary syndrome” (PCOS), reflecting recognition that the condition involves a broad endocrine–metabolic syndrome rather than only ovarian morphology. Contemporary international guidelines use PCOS as the preferred term and emphasise diagnostic criteria based on hyperandrogenism, ovulatory dysfunction, and polycystic ovary morphology (or elevated anti-Müllerian hormone) after exclusion of other causes.[15,16,17,1,7,18]

Effects of Lifestyle Modification in PCOS

Lifestyle modification is an essential component of PCOS management. It includes healthy dietary practices, regular physical activity, weight management, adequate sleep, and stress reduction. These interventions can improve both reproductive and metabolic abnormalities associated with PCOS.[1,3,4,9]

1. Improvement in insulin sensitivity

Regular exercise and a balanced diet enhance insulin sensitivity and reduce insulin resistance. Improved insulin action may lower compensatory hyperinsulinaemia and decrease excessive androgen production, thereby improving metabolic parameters and hormonal balance.[3,19,14]

2. Regulation of the menstrual cycle

Lifestyle modification, particularly regular physical activity and appropriate weight management, may improve menstrual regularity and ovulatory function in women with PCOS, supporting restoration of more predictable cycles and ovulation.[3,20,14]

3. Reduction in hyperandrogenism

Improved insulin sensitivity and healthy weight management may help reduce androgen excess, with potential improvement in clinical manifestations such as acne, hirsutism, and androgenic alopecia.[3,19,14]

4. Weight and body composition management

A healthy diet combined with regular exercise supports body-weight control and favourably modifies body composition (reducing central adiposity and increasing lean mass). In women with overweight or obesity, even modest weight loss (5–10% of initial weight) may improve metabolic and reproductive outcomes.[3,19,1,20]

5. Improvement in fertility

By supporting ovulation and menstrual regularity, lifestyle modification may improve the likelihood of natural conception in some women with PCOS and enhance response to fertility treatments.[3,19,1,20]

6. Improvement in metabolic health

Lifestyle interventions can improve blood glucose control, lipid profile, blood pressure, and other cardiometabolic risk factors associated with PCOS, reducing long-term risk of type 2 diabetes and cardiovascular disease.[1,9,21]

7. Reduction in cardiovascular risk

Regular physical activity, healthy dietary habits, and weight management improve cardiovascular fitness and reduce risk factors such as obesity, dyslipidaemia, hypertension, and insulin resistance, contributing to lower lifetime cardiovascular risk.[1,9,21]

8. Improvement in psychological well-being

Regular exercise, adequate sleep, stress-management strategies, and improved dietary habits may contribute to better mood, self-esteem, and overall quality of life. Addressing psychological aspects is an important part of comprehensive PCOS care.[12,13,3,1,9]

9. Improvement in overall quality of life

Sustained lifestyle modification can improve physical health, metabolic function, reproductive outcomes, and psychological well-being. Lifestyle management should be regarded as a long-term strategy rather than a short-term intervention.[12,13,3,1,9]

10. Recommended Lifestyle Targets

International guidelines recommend that adults, including women with PCOS, aim for at least 150–300 minutes of moderate-intensity or 75–150 minutes of vigorous-intensity aerobic physical activity per week, together with muscle-strengthening activities on two non-consecutive days. Dietary patterns emphasising whole grains, vegetables, fruits, lean protein sources, and healthy fats, while limiting refined carbohydrates and saturated fats, are advised to optimise metabolic control, body weight, and cardiometabolic risk.[1,3,4]

Table 1: Lifestyle interventions in PCOS: target, frequency, timing, and key effects.

Intervention	Target / Frequency	Timing	Key Effects in PCOS
Diet quality	Daily; balanced meals 3–5 times/day	Spread across the day; avoid large late-night meals	Improves insulin sensitivity, reduces postprandial glucose, supports weight control, may improve cycle regularity and fertility
Aerobic physical activity	150–300 min/week moderate or 75–150 min/week vigorous	30–60 min/session, most days	Enhances insulin sensitivity, reduces visceral fat, improves lipid profile, lowers cardiovascular risk, may improve ovulation
Resistance / strength training	2–3 sessions/week	Non-consecutive days, 20–45 min	Increases lean muscle mass, improves resting metabolic rate, supports glucose uptake, reduces insulin resistance
Weight	Gradual loss of 0.5–1	Ongoing;	5–10% weight loss improves

management	kg/week if overweight/obese.	monitored over months	insulin sensitivity, androgens, menstrual regularity, fertility, cardiometabolic risk
Sleep hygiene	7–9 hours/night, regular sleep–wake times	Consistent bedtime and wake time	Improves insulin sensitivity, cortisol rhythm, appetite regulation, mood, metabolic health
Stress reduction (yoga, meditation, breathing, counselling)	10–30 min/day or several sessions/week	Morning or evening routines	Lowers cortisol and perceived stress, may improve insulin resistance, menstrual regularity, psychological well-being

[5,7,23,24,25,26,27,28,29,30,31,34,35,39,40]

Herbal Medicines in the Management of PCOS

Herbal medicines are increasingly explored as adjuncts or complementary therapies in PCOS, particularly for managing insulin resistance, hyperandrogenism, menstrual irregularity, and stress-related symptoms. Evidence for these agents varies, and they should be used cautiously and preferably under medical supervision.[5,6,7,8]

The following table summarises commonly used herbal agents, indicative doses reported in studies or practice, typical timing and frequency, and their proposed mechanisms of action in PCOS.

Table 2: Selected herbal agents used in PCOS: indicative doses, timing, and proposed effects.

Herb	Indicative Dose	Timing & Frequency	Proposed Actions in PCOS	Comments / Evidence Level
Cinnamon (Cinnamomum verum / C. cassia)	1–2 teaspoons (about 2–6 g) of Ceylon cinnamon powder daily, or 1,000–1,500 mg/day of standardised extract	Once or twice daily with meals	Improves insulin receptor activity and glucose uptake; enhances insulin sensitivity; may reduce fasting glucose, HOMA-IR, and improve menstrual cyclicity	Some small RCTs and meta-analyses in PCOS/insulin resistance; generally safe in culinary doses
Spearmint (Mentha spicata)	About 2 cups of spearmint tea daily (not peppermint), using ~1 heaped teaspoon dried leaves per cup	Twice daily (morning and evening)	May lower total and free testosterone and improve hirsutism scores; supports reduction of clinical hyperandrogenism	Small RCTs in women with PCOS/hyperandrogenism; generally well tolerated
Berberine	500 mg two to three times daily	Two or three divided doses	Improves insulin resistance, lipid	Multiple RCTs and meta-analyses in PCOS;

	(1,000–1,500 mg/day total).	with or before meals	profile, and visceral adiposity; may enhance ovulation rate and metabolic parameters; effects comparable to metformin in some studies	potential GI side effects; avoid in pregnancy unless advised
Turmeric/Curcumin (Curcuma longa)	500–1,000 mg/day of standardised curcumin extract, often with piperine	Once or twice daily with meals	Anti-inflammatory and antioxidant effects; may improve inflammatory markers, oxidative stress, and metabolic indices	Growing evidence in metabolic disorders; limited PCOS-specific trials
Fenugreek (Trigonella foenum-graecum)	1–2 g/day of seed powder or extract	Once or twice daily with meals	May support improvements in insulin sensitivity, menstrual regularity, and some metabolic parameters	Emerging evidence; more PCOS-specific data needed
Ginger (Zingiber officinale)	1–2 g/day of dried ginger powder or standardised extract	Once or twice daily	Antioxidant and anti-inflammatory effects; potential benefits on metabolic markers and dysmenorrhoea	Limited PCOS-specific data; generally safe in moderate doses
Vitex (Vitex agnus-castus)	20–40 mg/day of standardised extract (or 160–240 mg dried berry equivalent)	Once daily, often in the morning	Traditionally used for menstrual and luteal phase disorders; may modulate prolactin and luteal function	Limited direct evidence in PCOS; avoid with hormonal therapies unless supervised
Aloe vera (Aloe barbadensis)	Variable; often as juice or extract per product instructions	Once or twice daily	Experimental data suggest possible improvements in glucose metabolism and hormonal parameters	Robust clinical evidence lacking; potential laxative effects
Green tea (Camellia sinensis)	2–3 cups/day of green tea.	One cup two to three times per day	May assist with weight management, improve oxidative stress, and modestly support metabolic health	Some evidence in obesity/metabolic syndrome; caution with high-dose extracts and liver disease
Ashwagandha (Withania somnifera)	300–600 mg/day of root extract	Once or twice daily	Primarily studied for stress and cortisol-related outcomes; PCOS-specific	Limited PCOS-specific trials; generally well tolerated

			evidence for metabolic or reproductive benefits is limited.	

[5,7,23,24,25,26,27,28,29,30,31,34,35,39,40]

Safety Considerations

Herbal therapies may interact with conventional PCOS medications, including metformin, oral contraceptives, and anti-androgens. Potential additive glucose-lowering effects (for example with cinnamon or berberine) and effects on blood pressure or liver function should be considered. Doses mentioned above are indicative and based on available literature; they are not prescriptive. Women should be advised to consult healthcare professionals before initiating herbal supplements, particularly if they are pregnant, attempting conception, or taking other medications.[8,22,5]

CONCLUSION

Lifestyle modification is a cornerstone of PCOS management and can improve weight control, insulin sensitivity, menstrual regularity, and overall quality of life. Herbal medicines such as cinnamon, spearmint, and berberine may provide additional benefits, particularly for insulin resistance and hyperandrogenism; however, further high-quality clinical trials are needed to confirm their efficacy, safety, and optimal dosing regimens. A combination of healthy lifestyle practices, appropriate medical treatment, and carefully selected evidence-based herbal therapies, used under professional guidance, may support better reproductive, metabolic, and psychological outcomes in women with PCOS.[1,3,5,7,6,8,9]

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