



Mini Review

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# Lifestyle Medicine Encompassing Scientific Exercises & Right Diet-The Key to Prevent and Reverse Pcos/Pcod (Poly Cystic Ovarian Syndrome/Polycystic Ovarian Disease)

J C Balachandar (CEO)<sup>1\*</sup>, S Irshad Ahmed<sup>2</sup>, Amit Kumar Agrawal (IAS)<sup>3</sup> and M Jayachandran<sup>1,4</sup>

<sup>1,4</sup>(CEO) Dr. Bala's School of Fitness & Preventive Medicine, India

<sup>2</sup>Department of General Surgery, Pondicherry Institute of Medical Sciences, India

<sup>3</sup>(IAS) Additional Principal Secretary to the Chief Minister of Haryana, Director General-Information, India

<sup>4</sup> Dean, Research and Development Center, Sethu Institute of Technology, India

\*Corresponding author: J C Balachandar (CEO), Dr. Bala's School of Fitness & Preventive Medicine, Faridabad, Delhi-NCR, India.

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## Abstract

Polycystic ovary syndrome (PCOS) is of clinical and public health importance as it is very common, affecting up to one in five women of reproductive age. It has significant and diverse clinical implications including reproductive (infertility, hyperandrogenism, hirsutism), metabolic (insulin resistance, impaired glucose tolerance, type 2 diabetes mellitus, adverse cardiovascular risk profiles) and psychological features (increased anxiety, depression, and worsened quality of life). Obesity worsens the presentation of PCOS, and weight management (weight loss, maintenance, or prevention of excess weight gain) is proposed as an initial treatment strategy, best achieved through lifestyle changes incorporating diet, scientific exercises and behavioral interventions.

**Keywords:** Polycystic ovary syndrome, Clinical implications, Lifestyle strategies, Obesity, Insulin resistance and infertility

## Introduction

With regards to fertility, the estimated cost per birth in overweight Australian women with PCOS is high [1]. Promisingly, lifestyle intervention comprising dietary, exercise and behavioural therapy improve fertility and reduce costs per birth significantly. Genetic and environmental contributors to hormonal disturbances combine with other factors, including obesity, ovarian dysfunction and hypothalamic pituitary abnormalities to contribute to the aetiology of PCOS [2]. The aetiology of PCOS is unknown although abnormalities in steroidogenesis (the production of steroid hormones such as reproductive hormones) and gonadotrophin action (the ac-

tion of hormones that control reproductive hormone production) are implicated [3]. Treatment aims in PCOS include optimizing healthy weight, improving underlying hormonal disturbances, prevention of future reproductive and metabolic complications, and improving quality of life. Lifestyle interventions (dietary, exercise, behavioural or combined) are recommended as first-line management in an international evidence-based guideline on PCOS [4]. Despite the high prevalence of PCOS, a strong rationale for lifestyle intervention and the fact that lifestyle intervention is recommended as first-line treatment in women with PCOS who are overweight, the literature in this area is limited and challenging to interpret.



There are a large number of small, uncontrolled trials demonstrating that weight loss achieved through lifestyle management decreases abdominal fat, hyperandrogenism and insulin resistance, and improves lipid profiles, menstrual cyclicity, fertility and risk factors for type 2 diabetes and cardiovascular disease in overweight women with PCOS [5]. Menstrual regularity (an initiation of menses or significant shortening of cycle length where possible), ovulation (number of ovulatory menstrual cycles where possible) [6]. Endocrine (total testosterone, Sex Hormone-Binding Globulin (SHBG), Free Androgen Index (FAI) and clinical hyperandrogenism (hirsutism assessed clinically by Ferriman-Gallwey score) [7].

For dichotomous data, we used the number of events in the control and intervention groups of each study to calculate a Peto odds ratio (OR). For continuous data, we calculated a mean difference (MD) between treatment groups if all studies reported the same outcomes. If similar outcomes were reported on different scales, we calculated the standardized mean difference (SMD). We presented 95% confidence intervals (CI) for all outcomes. The primary analysis was per women randomized. J.P. Higgins et al., reported data that did not allow valid analysis (for example 'per cycle' rather than 'per woman' where women contributed to more than one cycle) in an additional table and did not meta-analyse these data [8].

A variety of balanced dietary approaches to reduce dietary caloric intake and a gradual increase in physical /scientific exercises are recommended to accomplish weight loss. Several previous studies have endeavoured to improve the lifestyles of patients with PCOS using various methods, such as diet, exercise therapy, and behavioural therapy. Consequently, a previous review reported that lifestyle modification programs were observed to affect weight loss or BMI among PCOS patients with or without obesity [9]. The lifestyle modification program was divided into two groups: monotherapy with diet or exercise and combination therapy involving diet and exercise (hereinafter referred to as combination therapy). Regarding the type of intervention program used by the studies, more people used monotherapy with diet, few employed monotherapies with exercise, and many members studies used combination therapy [10].

## Discussion

### How Right Diet Becomes the Medicine for PCOS

Analysis of the impact of lifestyle modification related to the share of energy from macronutrients (protein, fat, and carbohydrates) showed no significant differences in the levels of the analysed parameters. However, a significant factor in these changes was the reduction in the caloric content of the diet [11] and the introduction of a reduced-calorie diet with a low GI [12].

Low GI (LGI) diets decreased homeostatic model assessment for insulin resistance (HOMA-IR), fasting insulin, total and low-density lipoprotein (LDL) cholesterol, triglycerides, waist circumference, and total testosterone compared with high GI (HGI) diets without affecting fasting glucose, HDL cholesterol, weight, or the

free androgen index [12]. In addition, the inclusion of the LGI diet, punitive restrictions, and/or physical activity, and the supplementation of omega-3 increased HDL, sex hormone binding globulin (SHBG) synthesis, and reduction in body fat [13].

Gonzales et al., found that saturated fat acid (SFA) ingestion stimulates increases in circulating TNF- $\alpha$  and peripheral leukocytic suppressor of cytokine-3 (SOCS-3) expression [14]. Therefore, eliminating SFA from the diets of these patients is imperative. Dietary  $\alpha$ -linolenic acid-rich flaxseed oil exerted beneficial effects on polycystic ovary syndrome through the sex steroid hormones-microbiota-inflammation axis in rats, but other sources of  $\alpha$ -linolenic acid will probably produce an equally good effect. The effects of soluble dietary fiber on SCFAs were demonstrated. Fermentable fibre has positive metabolic benefits on the gut microbiome with subsequent release of SCFAs [15]. Diets with a low GI may influence appetite-regulating hormones including ghrelin and glucagon [16]. Low-GI meals reduced ghrelin and increased glucagon in women with PCOS [17]. High fructose consumption (HFC) synergistically aggravated endocrine but not metabolic changes in PCOS, suggesting that (HFC) might deteriorate endocrine-related phenotypes in PCOS. A meta-analysis and systematic review showed that the LGI diet is an effective, acceptable, and safe intervention for relieving IR, and professional dietary advice should be offered to all PCOS patients [18].

It seems that another reduced-GI diet modification is the ketogenic diet, which limits the consumption of total carbohydrates in favour of plant-based fat. The ketogenic diet (KD) improves the menstrual cycle, reducing blood glucose and body weight, improving liver function, and treating fatty liver in women with PCOS and liver dysfunction who were obese [19]. Even more interesting results were reported by Paoli et al., after using the KD for 12 weeks in women with PCOS [20]. The anthropometric and body composition measurements revealed a significant reduction in body weight (-9.43 kg), body mass index (BMI; -3.35), and fat-free body mass (8.29 kg). A significant decrease in glucose and insulin blood levels was observed, together with a significant improvement in HOMA-IR scores. A significant decrease of triglycerides, total cholesterol and LDL were observed along with a rise in HDL levels. The LH/FSH ratio, LH total and free testosterone, and DHEAS blood levels were also significantly reduced. Estradiol, progesterone and SHBG increased. The Ferriman Gallwey Score was slightly, although not significantly, reduced [21].

There was no significant association between parameters of hirsutism and the visceral adiposity index (VAI). Hirsutism is unlikely to be due to visceral adipocyte dysfunction [22]. Therefore, in PCOS patients with advanced obesity and/or obesity accompanied by full-blown metabolic syndrome, the introduction of a ketogenic diet may provide even better results than a diet with a LGI. Nonetheless, a general conclusion is that by following the main principles of a healthy diet, the physiological homeostasis can be managed, as well as faster recovery from disease achieved [12].

## How Scientific Exercises Becomes the Medicine for PCOS

**Reduces Risk of Diabetes:** Having PCOS can significantly influence your insulin sensitivity. Exercise will improve your response to insulin. Betterment in insulin management helps reduce the risks of diabetes.

**Releases Endorphins:** Having PCOS can make you prone to depression and various other mood disorders due to hormonal imbalances. Exercising regularly results in the release of endorphins and various other happy hormones that lower your risks of developing mood disorders & depression.

**Help Manage Cholesterol:** Most women with PCOS have high cholesterol and High cholesterol can significantly affect our metabolism. Exercises will keep your cholesterol under check.

**Lowers Risk of Cardiovascular Diseases:** Besides high cholesterol, women with PCOS are also at a higher risk of developing high blood pressure and more chronic heart-related diseases. Exercise, in general, improves our heart health and makes us less prone to various heart related diseases.

**Promotes Weight Loss:** Weight gain will cause or worsen PCOS. Exercising consistently will help you lose weight and Weight loss will also help you lower your risks of other diseases discussed above.

**Helps Manage Hormones:** PCOS cause's hormonal imbalance which can be easily managed and improved through regular exercise. Exercising will help lower insulin and estrogen.

The clinical phenotypes can change over the life span with weight gain and can coexist in the same patient. Individualized treatment remains the main approach, but grouping the phenotypes and following therapeutic recommendations may also prove to be clinically suitable [23]. Vitamin D indirectly influences carbohydrate metabolism by normalizing extracellular calcium and parathyroid hormone concentration. It also affects the expression of the genes of the metabolic pathways affecting systemic inflammation by inhibiting the synthesis of pro-inflammatory cytokines, which may contribute to the occurrence of IR [24].

Analysis of the impact of lifestyle modification related to the share of energy from macronutrients (protein, fat, and carbohydrates) showed no significant differences in the levels of the analysed parameters. However, a significant factor in these changes was the reduction in the caloric content of the diet and the introduction of a reduced-calorie diet with a low GI [25].

## Conclusion

PCOS is often a warning sign that your body is no longer as sensitive to insulin as it should be. And while medication may help this, these come with unwanted side effects and don't really address the root cause – an unhealthy lifestyle causing insulin resistance. Lifestyle changes are the key to reversing & preventing PCOS. Losing

weight will not only reduce insulin and androgen levels, but it will also restore normal ovulation. Leading a healthy lifestyle that depends on eating a clean, healthy LCHF diet and focuses on getting regular scientific exercises to improve insulin-sensitivity is a long-term fix that will also improve your odds of getting pregnant naturally, counter obesity and will regulate the periods and help you enjoy hormonal balance permanently. A healthy lifestyle will not only fix insulin resistance, but it also improves quality of life, making you feel stronger, fitter, healthier and more at peace, finally helps fight, prevent & reverse PCOS effectively.

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