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Nutritional Management Of Pcos: A Review Article

Ajith[1], Dr Meera[2]

[1]*PhD Scholar, Department of Food and Nutrition,RVS College of Arts and Science Sulur,Bharathiar University, Coimbatore, India,Email- ajithgowda27@gmail.com*

[2] *Dean, Basic Science and Bioscience.Dr. N.G.P College of Arts and Science, Coimbatore, India*
Email-ramanmeeras2@gmail.com

Abstract

Polycystic ovarian syndrome (PCOS) is an endocrine disorder characterized by a marked pattern of ovarian cysts, rupture of anovulation, and endocrine differences affecting women. According to figures from the World Health Organization (WHO), more than 116 million women (3.4%) are affected by PCOS worldwide. Risk factors considered include genetic, neuroendocrine, lifestyle / environmental, obesity that contribute to the development of PCOS. The pathophysiological feature of PCOS is mainly focused on hormonal dysfunction, insulin resistance and hyperandrogenism leading to damage to folliculogenesis that triggers the risk of related factors such as endometrial cancer, type II diabetes. This review highlights a brief overview of risk and pathophysiological treatment with drugs that work to relieve anovulation, infertility and clinical symptoms of PCOS.

Introduction:

Polycystic ovarian syndrome (PCOS) is an endocrine disorder associated with metabolic syndrome. (1) .It is characterized by manifestations of anovulation, ovarian cyst and endocrine variables that affect a woman's health and life (2). This condition can be morphological i.e. by the presence of polycystic ovaries or may be biochemical (hyperandrogenemia). Hyperandrogenism is considered a clinical manifestation of PCOS that interferes with the growth of follicles, micro-cysts in the ovaries and menopause (3, 4).

This complex disease usually affects older women by about 6-10% (5). According to the WHO, the prevalence of PCOS is higher than the 116 million (3.4%) affected women worldwide (6). In India an estimated 8.2% to 22.5% of women are affected depending on the method of diagnosis (7).

Aetiology:

PCOS is mainly represented by the signs and symptoms of many androgens and ovulatory dysfunction disrupts the function of the HPO axis (hypothalamic pituitary ovarian). The female HPO axis is closely aligned and controlled by a network responsible for reproduction and survival of animal species. The HPO axis responds to internal signals such as hormonal and external signals as natural influences. These traits affect future generations through epigenetic factors that affect the brain and cells of growing viruses (8, 9). The most common clinical symptoms are hirsutism, chronic anovulation, irregular menstruation and infertility. Chronic hyperandrogenism is associated with hypothalamic-pituitary dysfunction, LH hypersecretion, premature granulose cell luteinization, abnormal oocyte maturation, and premature binding of activated primary follicles (10).

The genetic etiology of PCOS is unknown, family history is common, but family links to PCOS remain unclear. The present study suggests that the collection of PCOS in families resembles a prominent autosomal pattern (11). Natural factors such as obesity can be exacerbated by poor nutrition and exercise, infectious diseases and toxins may also play a role. These factors can be reversed by lifestyle changes such as weight loss and exercise (12).

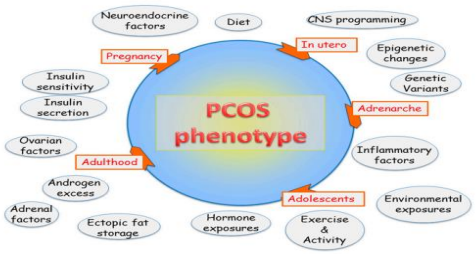


Fig.1 Factors contribute to PCOS phenotype. PCOS encompasses a woman's life cycle (8).

Pathophysiology:

The pathophysiology of PCOS treats it as a multifactorial disease and includes uncontrolled ovarian steroidogenesis, unexplained insulin expression, excessive oxidative stress and genetic and environmental factors (14). An internal factor in theca cells explains hyperandrogenemia in patients with PCOS. This theca cell promotes high levels of androgens due to the internal functioning of steroidogenesis even when there are no trophic factors. This intrinsic dysfunction affects granulose cells producing high levels of antimullerian hormone via PCOS compared to healthy controls. Studies have shown that the higher the number of follicles, the more pre-antral and small antral follicles, in women with PCOS. Also impairment in apoptotic processes in the mature follicles increases the number in PCOC patients (15, 16, 17).

Decreased insulin sensitivity caused by the binding factor of the post receptor in insulin signaling pathways leading to the internal component of PCOS (18). The study noted that alterations in the genetic expression of other athletes in insulin signaling pathways by microarray genetic analysis. In addition, PCOS is also associated with an increase in secondary glycooxidative stress for mitochondrial dysfunction (19).

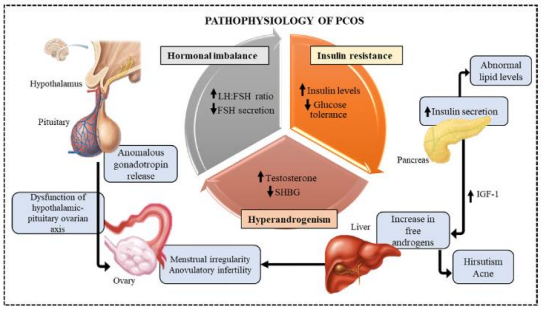
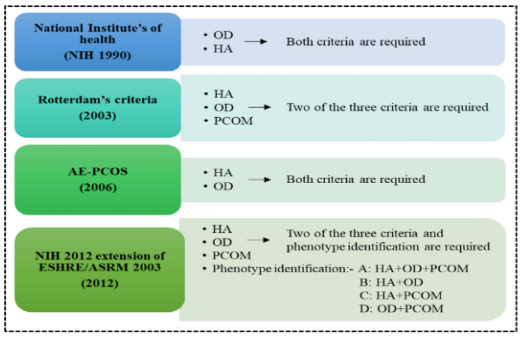


Fig 2.schematic depiction of PCOS linked mechanism (1,13)

PCOS TEST:

According to the old features of PCOS, the current consensus is that the use of the Rotterdam procedure is appropriate for older women. To diagnose PCOS, women should complete two-thirds: oligo-ovulation, anovulation, clinical hyperandrogenism and biochemical or polycystic ovary morphology on ultrasound without any other interference (20).



Summary of PCOS diagnostic criteria. (2,21)
Abbreviations: AE-PCOS: Androgen Excess and PCOS community; ASRM: American Reproductive Organization; ESHRE: European Society for Human Reproduction and Embryology; HA: Hyperandrogenism; OD: Ovulatory dysfunction; PCOM: Polycystic ovarian morphology (12 follicles with 2-9 mm per uterus).

PCOS treatment:

The most commonly used treatments for women with PCOS include lifestyle changes (i.e., diet, exercise and behavioral therapy) and medications such as clomiphene citrate, aromatase inhibitors, low-dose human menopausal gonadotropin or FSH, insulin sensors, laparoscopic ovarian drilling and in vitro. . pregnancy (IVF) (22).

NUTRITION INTERVENTION:

Studies have reported that there is no proper diet or diet pattern such as calorie restriction and modified macronutrient dietary composition of PCOS (23, 24). There is a difference in weight loss with different diets, and this variation depends on how the body reacts to different macro- or micronutrients. Negative energy balance appears to be an important factor leading to active weight loss and fat loss, improvement of the menstrual cycle and insulin sensitivity, regardless of the accepted dietary pattern (25, 26).

Low Glycemic Foods:

Studies have shown that low-glycemic diets play an important role in reducing risk and complications and at the same time enhance the clinical and biochemical features of PCOS (27). Insulin resistance is a major cause in obese and non-obese patients with PCOS. Since insulin plays an important role in PCOS and its metabolic factors, controlling PCOS diet is the best step (28,29). About 50% of patients with PCOS develop diabetes or Non-diabetes before the age of 40 (30),

so maintaining weight with a special diet and lifestyle significantly reduces insulin levels and associated symptoms (31).

Low calorie foods:

Researchers believe that a high-calorie diet leads to reversible hormonal disorders and menopause (32). High fiber diets reduce weight and some androgens like testosterone in obese and overweight women suffering from hirsutism. Taking a high fiber diet for 12 weeks results in a significant decrease in free testosterone and LH levels and an increase in SHBG, a decrease in BMI and weight loss in people with PCOS (33).

Role of calcium and vitamin D:

Vitamin D deficiency has been reported in about 67-85% of people with PCOS .and there are good associations for PCOS and other well-known joint diseases such as type 2 diabetes, insulin resistance, metabolic syndrome and heart disease. (34). There is a direct effect of calcium and vitamin D on the ovarian tract and the adrenal steroid genesis may be linked to the observed decrease in circulating androgens (35). Studies have shown a positive link between serum calcium content and insulin levels and insulin resistance and fasting glucose levels in many healthy people. 1,25 (OH) 2D contributes to insulin production with a significant increase in intracellular ionic calcium level following 1.25 (OH) 2D which stimulates insulin secretion by islet cells. Along with a significant decrease in Vitamin D, glucose and phosphorus levels in obese and overweight women with PCOS are negatively associated with insulin and insulin resistance (36). Calcium and vitamin D metabolism affect oocyte maturation and production of androgens (37). Based on research (Razavi et al 2016) describing vitamin D-K-calcium co-supplementation for 8 weeks among vitamin D-deficient women with PCOS has beneficial effects on serum dehydroepiandrosterone sulfate (DHEAS), free testosterone, plasma antioxidant capacity, malondialdehyde (MDA) concentration (38).

Prebiotics and PCOS:

Studies in humans and mice have shown that there is a link between mutations in the gut micro biome and metabolic parameters and in the PCOS clinic. Additionally it has been suggested that dysbiosis of the gut microbiota is a possible pathogenic factor in the development of PCOS. Therefore prebiotics, probiotics and symbiotic products may serve as a new treatment for PCOS (39).

In the gut micro biota a decrease in b variation and b variability and the formation of micro intestinal biota may lead to changes in intestinal function which may increase PCOS (40). One of the most important mechanisms involved in gut microbiota dysbiosis is activating the immune system. Activating the immune system also disrupts the function of the insulin receptor which causes hyperinsulinemia which increases the production of ovarian androgens and inhibits the growth of normal follicle. This leads to features of the PCOS feature. This can be due to normal obesity and high-fat diets - low fiber in PCOS (41).

Cinnamon:

It is a promising agent in the treatment of PCOS by increasing the activity of phosphatidylinositol 3-kinase in insulin signaling pathways, thereby stimulating insulin action (42). Studies have provided evidence that the presence of inositol is necessary for insulin sensitivity and function, which play an important role in patients with PCOS. They regulate the use of insulin-dependent glucose in the cell by various means such as cellular glucose uptake or glycogen synthesis. In addition inositol plays a role in fertility recovery in women with PCOS (43). Myo -inositol is the second messenger of LH and FSH signaling pathways in oocytes and follicular cells. Follicular maturation and oocyte quality are determined by myo-inositol concentration in human follicular cells (44).

Flax seeds:

Flaxseeds contain high levels of dietary lignan and lignan secoisolariciresinol diglucoside (SDG). A typical dose of 15 gm of flax powder will improve menstrual frequency by significantly reducing ovarian volume and the number of follicles in the ovary (46).

Conclusion:

PCOS is a complex problem due to insulin resistance and obesity. Therapies should therefore include dietary and exercise changes as well as medication interventions. Management of certain conditions such as menstrual irregularities, infertility and hirsutism play an important role in PCOS. Elements of nutrition such as LGD, high fiber diets, balanced diets, low-calorie diets, probiotics have significant effects on PCOS control.

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