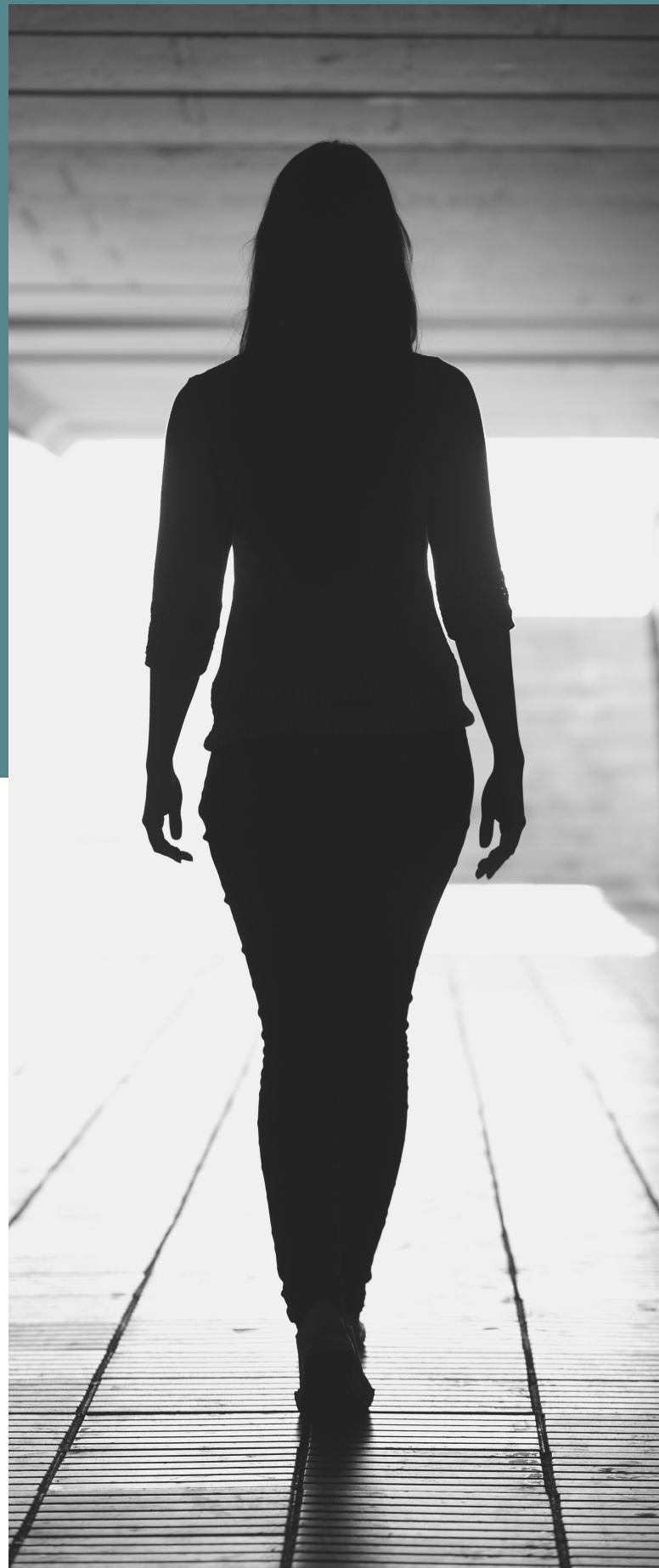


Doctor Guide

POLYCYSTIC OVARIAN SYNDROME AND THE KETOGENIC DIET

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At Ketogenic.com, we are committed to supporting, inspiring, and educating people on the benefits of living a ketogenic lifestyle. We do this by bringing together the top researchers, practitioners, and thought-leaders who provide resources, experience, and awareness associated around the ketogenic diet.



PCOS OVERVIEW

What is PCOS ?

PCOS is an endocrine disorder characterized the growth of cysts on the ovaries. PCOS is common in women of reproductive age and is the result of hormonal imbalance due to increased ovarian androgen production

What characterizes PCOS?

Symptoms of PCOS include:

- infertility
- excess testosterone
- acne
- weight gain
- irregular or absent menstrual cycles
- extra body and/or facial hair
- depression



PCOS is associated with serious health conditions including obesity, insulin resistance, hyperinsulinemia, type 2 diabetes, and dyslipidemia. Risk factors include a family history of PCOS and/or diabetes, and long-term use of the medication valproate (i.e., Depakote) which is used to treat seizures.

CURRENT TREATMENT OPTIONS?

There is no known cure for PCOS. To improve symptoms associated with PCOS, doctors may prescribe anti-diabetic medications (i.e., metformin) to improve insulin resistance and dyslipidemia, birth control pills to normalize menstrual cycles, statins to control high cholesterol, and/or hormones to increase fertility. Also, lifestyle changes may be recommended such as cessation from smoking, performing regular moderate to vigorous physical activity, and/or incorporating nutritional plans that include foods low in saturated fats such as vegetables, fruits, and whole grains. Support groups or counselors may be suggested to help deal with symptoms of depression.

THERAPEUTIC EFFECTS OF KETONE BODIES?

Insulin resistance and weight gain, two serious health issues associated with PCOS, are typically improved by the incorporation of a very low carbohydrate ketogenic diet. Studies have also shown that women with PCOS following a very low carbohydrate ketogenic diet reduced circulating testosterone levels and improved their luteinizing hormone/follicle stimulating hormone ratio. Improvements in insulin resistance and hormone balance as well as weight loss may help reduce other symptoms of PCOS such as normalizing menstrual cycles, reducing excess body/facial hair growth, and reducing the risk for type 2 diabetes, dyslipidemia, and depression.



PCOS RESEARCH BREAKDOWN

Mavropoulos, J. C., Yancy, W. S., Hepburn, J., & Westman, E. C. (2005). The effects of a low-carbohydrate, ketogenic diet on the polycystic ovary syndrome: a pilot study. Nutrition & metabolism, 2(1), 35.

Background

Polycystic ovary syndrome (PCOS) is an endocrine disorder, in which an excess of testosterone is produced, that affects 4% of women during the reproductive years of 15-49. Associated symptoms include abnormal menstrual cycles, excessive body hair, infertility, obesity, insulin resistance, type 2 diabetes, and dyslipidemia. A cure has not been found, however, therapies that result in weight loss and improved insulin resistance (i.e., anti-diabetic medications, exercise, and dietary interventions) may help treat PCOS symptoms.

Purpose

A low-carbohydrate, ketogenic diet (LCKD) has been shown to lead to weight loss and improve insulin resistance. Therefore, the aim of this pilot study was to determine if a LCKD may improve symptoms in women with PCOS.

Methods

Women ages 18-45 years with a diagnosis of PCOS with no signs of pregnancy received a 6-month LCKD dietary intervention. The intervention included intensive group educational program with bi-monthly meetings. On a daily basis, the LCKD included less than 20 grams of carbohydrates, unlimited animal foods, up to 4 ounces of prepared cheese, up to 2 ounces of fresh cheese, unlimited eggs, 2 cups of salad vegetables, 1 cup of low carbohydrate vegetables, at least 48 ounces of permitted fluids, 1 multivitamin, and no caffeine or alcohol. Three days of exercise was also recommended.

Dietary adherence was measured with urinary ketones and 5-day food records completed during weeks 0 (baseline), 2, 4, 12, and 24. Serum total and free testosterone and insulin were measured after a 12 hour fast at weeks 0, 10, and 24. A PCOS-specific questionnaire, which inquired about emotions, hair growth, body weight, infertility, and menstruation, was completed every 2 weeks of the intervention.

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Results

Eleven women were enrolled in the study and only 5 (mean age of 34.5 years) attended visits throughout the 24 weeks; circumstances that caused the other 6 women to drop out of the study did not include adverse side effects from the diet. The 5 women adhered to the diet as urinary ketones were significantly elevated (ketonuria) throughout the study and 5-day food records showed dietary compliance.

Over the 24 weeks, the women lost a mean of 12.1% of their body mass, free testosterone significantly reduced 30% from 2.19 to 1.70, the LH/FSH (luteinizing hormone to follicle stimulating hormone ratio) significantly reduced 36% from 2.23 to 1.21, and fasting serum insulin significantly reduced 53.7% from 23.5 to 8.2. Insulin resistance improved which was demonstrated by reduced insulin with maintained fasted glucose and HgbA1c levels. Also, two women with previous infertility complications became pregnant during the study. Mean systolic and diastolic blood pressure decreased 6.3 mmHG and 9.6 mmHg, respectively. Lastly, there was a trend toward significant improvement in areas associated with "hair", "infertility" and "menstruation" on the PCOS-specific questionnaire.

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