

## Polycystic Ovarian Syndrome: What It Is and Why Registered Dietitians Need to Know

In 2000, a 29-year-old woman visited a physician, hoping to discover why she had experienced inexplicable weight gain in the months prior. Her eating habits and physical activity level had not varied much in that time, yet the pounds kept adding on. Although she had attempted to provide a full picture to the physician, he fixated on the number on the scale, circled “obese” on her patient chart, and attempted to counsel her on following a high-protein, low-carbohydrate diet, which was hugely popular at the time. Although she wasn’t convinced, the physician insisted her eating habits were to blame and refused to consider any other possibilities.

During a visit to the patient’s gynecologist some months later, a different series of questions yielded another feasible explanation that focused less on food. Besides the weight gain, the patient had been experiencing irregular menses for years—something she hadn’t connected to the weight gain and something the physician had not asked about. A subsequent blood test noted elevated testosterone levels, and an ultrasound revealed growths on the ovaries, leading to a diagnosis of polycystic ovarian syndrome (PCOS).

### WHAT IS PCOS?

PCOS is a hormonal imbalance that is generally thought to affect approximately 10% of the female population. Some experts believe as many as 6 million US women and girls are afflicted and that the syndrome may be present at birth (and not developed over time) (1). PCOS is also the most common endocrine disorder among women of reproductive age (2).

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The cause of PCOS is unknown, though nearly 70 years have passed since it was first identified (1). A cluster pattern of PCOS among women in the same family has been seen; however, genetic inheritance is only a possibility and not proven as its root cause (3,4).

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### Diagnostic Criteria

There is some disagreement regarding the diagnostic criteria for PCOS (1,5). Criteria for diagnosis were established in 1990 and then revised in 2003 (to create what is known as “Rotterdam criteria”). However, some controversy remains because not all patients with PCOS present the “classic” symptoms, and not all women who present those symptoms have PCOS (1). Still, says Monika Woolsey, MS, RD, a dietitian and exercise physiologist who founded After the Diet (a network that creates educational resources for professionals and the public related to nutrition, stress, and mental health, including PCOS), the Rotterdam criteria are the current, most definitive diagnostic criteria for PCOS.

The Rotterdam criteria for a definitive PCOS diagnosis include elevated androgens (male sex hormones), ultrasound findings of cysts on the ovaries, and irregular menses (at least two of these must be present) (6). Additional clinical signs typically associated with PCOS include abnormal facial and body hair growth (for 70% of women with PCOS, coarse hair grows

in androgen-dependent regions [5]), acne, and weight gain (2,7).

High blood pressure, high cholesterol, and upper body obesity—a waist-to-hip ratio of 0.85 or greater—are common among women with PCOS (5). In addition, there is greater incidence of prediabetes, type 2 diabetes, hypertension, and dyslipidemia among this population (8).

### Insulin Resistance

Currently insulin resistance is accepted as the most telling indicator of PCOS and—because of its potential for leading to complications in a woman’s general health, such as its contribution to cardiovascular risk—it is perhaps the biggest concern among all possible effects of the condition.

Insulin helps convert glucose and into energy. But with insulin resistance, the body’s muscle, fat, and liver cells are not using the insulin in an effective way. Though the pancreas tries to produce sufficient insulin to address the body’s needs, it cannot maintain pace, leading to excess buildup of glucose and insulin in the bloodstream (9). In addition, insulin resistance and high blood glucose levels can lead to extra weight at the waist, high low-density lipoprotein and low high-density lipoprotein blood cholesterol levels, high triglyceride levels, and high blood pressure (9).

When compared with weight-matched controls, women with PCOS have higher rates of insulinemia and insulin resistance (5). Most women with PCOS are insulin-resistant regardless of obesity status, though it is more common among obese PCOS patients; however, “the relationship of obesity and insulin resistance to the pathogenesis of PCOS is still incompletely understood” (8).

But diagnostic tests for insulin resistance are largely considered problematic. Reproductive Endocrinologist Mark Perloe, MD, labels such

tests as “more art than science” (1). For example, glucose tolerance and fasting glucose tests can only indirectly indicate—not prove—insulin resistance. Furthermore, the euglycemic clamp, considered the most accurate measure of insulin resistance, is complicated and expensive, thus it could be impractical as a screening tool in most physician offices (9).

**PCOS AND OBESITY**

Although PCOS is a “common comorbidity of obesity in adolescent girls,” PCOS can be seen in both obese and nonobese adolescents (8). Still, the number of cases of PCOS developing in young girls has risen along with the increased prevalence of childhood obesity (7).

Among women with PCOS, more than half are obese (1,8), and by the age of 40, 40% to 50% develop diabetes and 40% develop impaired glucose

tolerance (1,10). There is a predisposition among this population for central obesity (8).

Furthermore, a study that used fasting insulin, body mass index, waist-to-hip ratio, the Block Food Frequency Questionnaire, and the Paffenbarger Physical Activity Questionnaire to compare 84 women with PCOS determined that “differences in dietary intake and physical activity alone are not sufficient to explain differences in weight between women with and without PCOS. Further research is necessary to determine the relative contributions of lifestyle factors and metabolism to obesity in PCOS” (11).

**SUPPLEMENTS AND MEDICATION**

Supplements and medications with insulin-sensitizing effects have been promising in helping to treat PCOS.

However, according to some researchers, “there are no studies of adequate power or design to allow them to be recommended as standard therapy, especially in women with normal glucose function” (5).

**Diabetes Medications**

**Metformin.** The type 2 diabetes medication metformin helps with insulin regulation of glucose (4). It has also shown to improve ovulation activity and lowered incidence of miscarriage in women with PCOS (3). In a study of metformin and obese adolescent girls with PCOS, the medication improved insulin sensitivity and lowered plasma total and free testosterone; however, in another study, body mass index and fasting insulin were improved in obese adolescent girls on metformin, but insulin resistance was not significantly affected (8).

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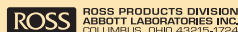
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**Thiazolidinediones.** These insulin sensitizers, more potent than metformin, are also potentially promising in treating insulin sensitivity associated with PCOS and improved glucose tolerance and cardiovascular risk factors in a study of obese subjects who had impaired glucose tolerance but not diabetes (8).

The thiazolidinediones, rosiglitazone and pioglitazone, and metformin have also shown to reduce hyperandrogenism and restore ovulation function in some patients with PCOS (10).

However, a potential adverse reaction with diabetes medications is liver toxicity and it should be monitored in this population.

### Antioxidants

According to Woolsey,  $\alpha$ -lipoic acid may have benefits for women with PCOS, and melatonin is useful if there is a comorbid sleep disorder that interferes with exercise and appetite.

### Fish Oil

Fish oil has been found to address some of the issues PCOS presents. Recent studies (12,13) have found that fish oil has insulin-sensitizing effects, which can help to address the insulin resistance seen in many patients with PCOS.

According to Woolsey, before beginning a metformin prescription, women with PCOS should try a diet that has a low ratio of n-6 to n-3 fatty acids and is high in antioxidants, arguing that "although metformin is useful, it cannot replace the benefits of a good nutritional intake." Researchers have begun to study the n-3 fatty acid treatment option for PCOS (particularly in the form of fish oil), which addresses components of the condition that carbohydrate restriction does not help, such as a reduction in the development of depression (14).

### Advising Patients And Clients

Essential to an effective PCOS treatment plan are improved diet as well as weight loss and exercise, which help in minimizing lipid irregularities and decreasing insulin resistance and the levels of testosterone, insulin, and luteinizing hormone in the body (1).

According to Woolsey, the most

damaging dietary recommendations are the ones she was indoctrinated to teach as a new dietitian in the early 1980s. Woolsey says registered dietitians (RDs) need to think about treatment in different ways.

Carbohydrates may be identified as the most important dietary modification for women with PCOS. In fact, according to Woolsey, cravings for carbohydrates and sweets can be intense for women with PCOS. The patients with PCOS who visit Judy Simon, MS, RD, clinical dietitian and nutritionist at the University of Washington Medical Center in Seattle, have indicated that these cravings for sweets are often at their peak just before menstruation. To combat these cravings, RDs should suggest a nutrition prescription for a high-fiber, low-sugar carbohydrate diet.

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The Center for Young Women's Health at Children's Hospital in Boston, MA, for example, provides many suggestions for a more healthful PCOS diet on its Web site. Among the recommendations are substituting sugar-free drinks for sugary drinks such as soda pop or juice, and choosing whole or darker grains (such as whole-wheat bread and pasta) instead of refined grains made with white flour.

Some in the medical community might be inclined to prescribe a low-carbohydrate diet. However, according to Simon, there is no clinical evidence that such a diet is effective, and she has not personally witnessed any benefits in clients who followed such a nutrition plan. Instead, she says, she advises a carbohydrate-controlled diet with an emphasis on whole foods; small, frequent meals; and n-3 fatty acid supplementation. Woolsey agrees that a carbohydrate-restricted

diet is unrealistic: "It is not fair—or even possible—to tell someone who is craving sweets to not eat the food their brain is asking for." Instead, Woolsey focuses on fatty acid balance with clients to reduce cravings and carbohydrate intake naturally. Though she acknowledges this approach might seem counterintuitive, she says it works and research to support this method will be forthcoming.

### PCOS AND THE PROFESSION

Many women are unaware of the condition and if they have a symptom of PCOS, they might seek out treatment for that symptom alone. Because of the unknowns in the etiology and symptomology in PCOS, physicians too sometimes are unaware of—or overlook—its possibility when treating patients with these symptoms, perhaps only prescribing birth control pills for the irregular menstruation and hormone imbalance or recommending a diet (1,15).

But, according to endocrinologist Rhoda H. Cobin, MD, chair of the PCOS task force of the American Association of Clinical Endocrinologists, women with PCOS should not be dismissed by health care professionals as "merely having annoying cosmetic complaints. . .but as having potential metabolic disorders that may be associated with type 2 diabetes and cardiovascular events" (2). Instead, though the immediate problems should be addressed, the opportunity to provide preventive care should also be seized (2).

According to Woolsey, there are many challenges for women working with health care professionals in diagnosing and managing PCOS.

- As in the case of the woman described at the beginning of this article, many physicians do not view endocrine disorders as a possible explanation for women with weight issues, instead focusing on diet. Furthermore, physicians tend to have a negative opinion about obese patients, sometimes considering them to be "weak-willed," which could have an impact on their willingness to consider alternative explanations besides intake (16). However, if a diet is not properly designed for a woman with PCOS, symptoms can worsen.

- Because of previous advice that did not help or because of fear of judgment related to weight issues, women with PCOS frequently have a difficult time trusting RDs.
- Understanding hormones is essential to assisting clients, yet some RDs find endocrinology to be a daunting discipline.

Given that the symptoms of PCOS are not specific to one medical specialty, and because obesity and type 2 diabetes are increasing in the general population, “those who treat PCOS see it as essential that physicians in many disciplines learn to screen for symptoms, make preliminary diagnoses, and refer patients to specialists” (1).

Because of these diet-related concerns, food and nutrition professionals are in a strong position to participate in the management of this condition.

However, on the Polycystic Ovarian Syndrome Association Web site, it says that “dietary treatment of PCOS is a new topic for many dietitians” (17). It is suggested that if patients cannot find a food or nutrition professional with experience treating PCOS, they might seek out the services of a dietitian with type 2 diabetes and gestational diabetes experience because of the requisite knowledge of insulin resistance that comes with the territory.

But Woolsey believes that working with patients and clients could have broader implications. “By not being proficient in working with this syndrome,” says Woolsey, “we are not as effective as we could be in the fields of weight management, endocrinology, mental health, cardiology, bariatrics, and disordered eating.”

Both Simon and Woolsey developed their interest in treating PCOS by way of endocrinology—Woolsey through a graduate course she had taken, and Simon from having worked with reproductive endocrinologists. Woolsey believes that many RDs are intimidated by endocrinology, but cautions, “We are nutritional endocrinologists, and if we don’t understand hormones, we can’t expect to help our clients.”

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