



Polycystic Ovary Syndrome

Nutritional approaches to
recover from PCOS

BY FIONA MCCULLOCH, BSC, RAC, ND

the female body is equipped with the power to create new life out of just a few microscopic cells. But along with that comes many physical burdens. It's difficult to maintain the complex and delicate web of internal processes that turn zygotes into infants. Women can struggle with multitudinous health problems like menstrual irregularities; pelvic floor disorders; pregnancy complications; ovarian and cervical cancers; and one of the most prevalent issues, polycystic ovary syndrome (PCOS).

Polycystic ovary syndrome is the most common hormonal condition in women across the globe, affecting an estimated 10-15 percent of women in the US alone. It's a complex condition that influences many systems in the body, including metabolism, hormones, fertility, the brain, and the immune system. It stems from genetic origins, and certain environmental and dietary factors can amplify symptoms. The name PCOS is somewhat misleading as cysts aren't a common symptom of the affliction. For this reason, experts are considering a name change to reflect the overall nature of its broad and lifelong effects.

The symptoms of PCOS can vary from woman to woman, which is probably why 50 percent of women with PCOS are unaware they have it. In fact, many women don't realize they have PCOS until they try to have children and experience difficulty. However, symptoms are usually present for a woman's entire life, and can be dismissed by medical professionals, or masked by oral contraceptive pills, which are the first-line treatment for the effects of PCOS on the menstrual cycle. Symptoms to look out for include:

Irregular periods

Some women miss their periods altogether, going many months between cycles. This is caused by delays in ovulation as the menstrual period typically arrives around 2 weeks after ovulation occurs. In PCOS, the ovaries don't function well, as high levels of androgen hormones like testosterone stall the development of the follicles that house the eggs in the ovary. This causes ovulation to be delayed, or absent, resulting in long times between periods. Even cycles that are 35 days or more can be a sign of PCOS.

High levels of androgen hormones

Androgens are a class of hormones that includes testosterone, DHEA-S, and androstenedione. Androgens are primarily responsible for producing characteristics thought of as masculine; including the growth of facial hair, increased muscle mass, and many more. Most women with PCOS have either signs of, or blood testing that reveals, high androgen levels.

Although androgens are essential for the health of women, too much can cause problems. Women with PCOS

can experience increased growth of facial or body hair; moderate to severe acne on the jawline, back, or chest that persists beyond the teen years or doesn't relent after treatment; or hair loss that is located primarily in the frontal part of the scalp. In addition, women with PCOS are prone to boils in the areas where skin touches skin such as the groin, or armpit—a condition known as hidradenitis suppurativa.

Cystic ovaries

The cysts found on ultrasound in PCOS aren't the same as other types of ovarian cysts. In fact, they aren't really cysts at all. They are tiny, underdeveloped follicles with eggs inside that didn't go through the ovulatory process normally and instead have accumulated within the ovary. These follicles tend to gather around the peripheral edges of the ovary, and there are usually many of them—on ultrasound, this is often described as “multiple small follicles.” Not all women have cysts, though, and many teenaged girls who don't have PCOS can have a cystic appearance to their ovaries. As a result, criteria can be confusing indeed—hence the suggestion to rename PCOS.

Infertility

Although infertility isn't present in all women with PCOS, it is common. As the most common cause of ovulatory infertility, PCOS can make it challenging to conceive at all without medical help. The good news is that either with time, or with treatment, most women with PCOS will eventually conceive. As women with PCOS have an abundance of follicles and high androgens, it's also thought that this is why they tend to hit their reproductive peak and menopause around 2 years later than women without PCOS.

Weight gain

Around 75 percent of women with PCOS struggle with their weight and have much more trouble losing weight than others do. As a result, women with PCOS are more prone to insulin resistance, causing them to have higher than normal amounts of insulin in their bloodstreams. With high levels of insulin, their cells become resistant to its effects. Since insulin's role is to move sugar from the bloodstream into the cell, this can wreak havoc with blood sugar regulation. Elevated insulin levels also trigger the release of more androgens and cause problems with ovulation.

Since insulin also plays a role in fat storage, high levels can keep the body from burning fat and create a strong risk for type 2 diabetes and cardiovascular disease. The fat cells in women with PCOS may play a role in this. Women with PCOS, even lean ones, secrete less adiponectin, a beneficial hormone that is secreted from fat cells. This fat cell dysfunction causes a cascade of problems including insulin resistance, weight gain, and inflammation.

Inflammation

Compounding fat cell dysfunction, inflammation is a central part of PCOS and is implicated in causing many of its unpleasant side effects. Inflammation has been linked to cardiovascular disease and type 2 diabetes, and women with PCOS are also prone to conditions ranging from TMJ and joint pain to autoimmune disease like Hashimoto's thyroiditis.

NUTRITION FOR PCOS Fortunately, PCOS responds very well to dietary changes. Due to its strong links to insulin resistance, nutritional plans based on lower glycemic index foods, low carbohydrate and sugar intake, and avoidance of processed foods often prove effective. A randomized crossover study published in the journal *Metabolism* stated, "In women with PCOS, consumption of a diet lower in carbohydrates resulted in preferential loss of

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fat mass from metabolically harmful adipose depots, whereas a diet high in carbohydrates appeared to promote repartitioning of lean mass to fat mass."

More recently, it's been found that although carbohydrates can raise insulin levels, certain proteins can as well. In particular, dairy proteins, due to their high quantity of branched chain amino acids, can spike insulin levels, with less than a cup of yogurt increasing insulin more than 2 slices of white bread.

This effect relates to the insulin index—which stands on the shoulders of the well-known glycemic index. The insulin index measures how much a given food raises blood insulin levels after consumption. Research has found that following a low food insulin demand diet (based on the insulin index but including quantity information) seems to provide more

benefit for patients with type 2 diabetes than the gold standard, which includes carbohydrate counting.

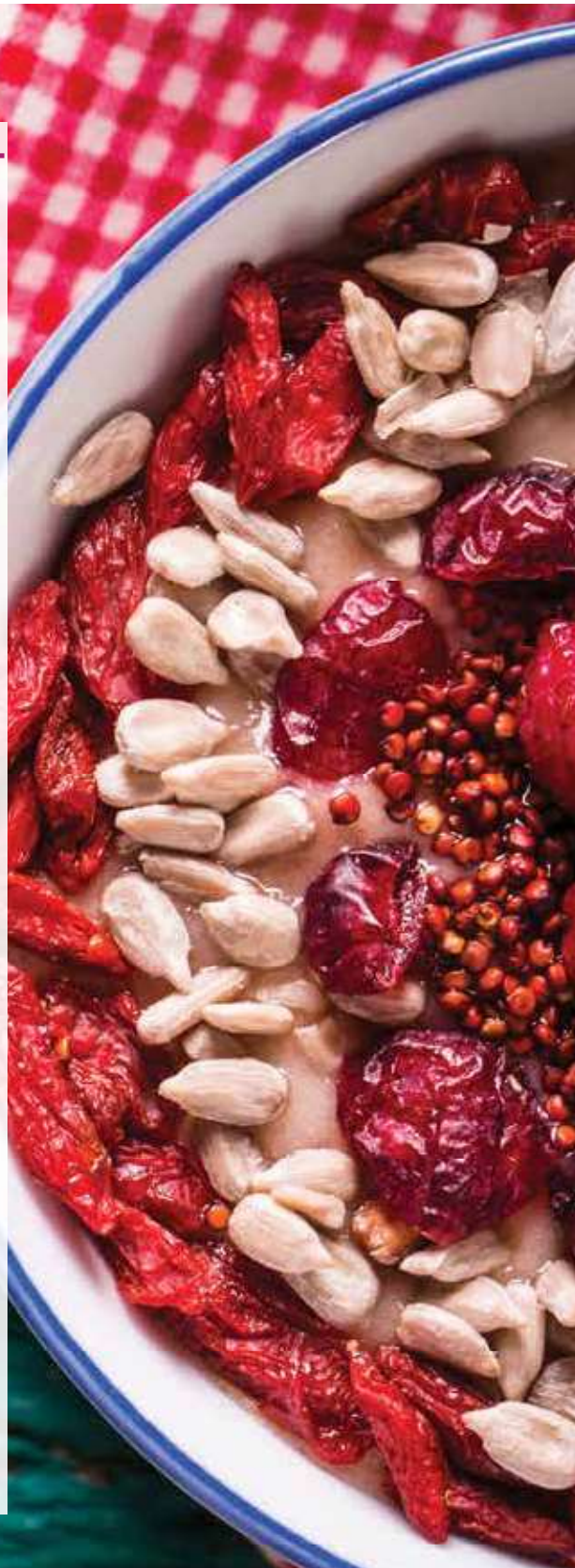
Likewise, it's been found that women with PCOS do better on a low-dairy diet. Given that dairy protein is one of the proteins that stimulates insulin release the most, this makes complete sense. In my clinic, we follow a low insulin load program for women with PCOS, or an insulin counting (IC) program. See the table for insulin counts of common foods I use when developing IC diets.

Recommended meals include lean protein, plenty of vegetables, a serving of healthy fats, and minimal carbohydrates. These carbohydrates can be derived from vegetables, smaller amounts of low GI fruits, and small amounts of healthful starches, including sweet potatoes, rice, quinoa, and squash.

Insulin Count Chart

Below are insulin counts of the most commonly consumed foods, healthy and otherwise, in the Standard American Diet. The insulin count should be adjusted for quantity. For example, if you have 14 shrimp instead of 7, the count will double from 4 to 8.

Food	Serving Size	Insulin Count
Low Fat Blueberry Muffin	1 muffin	116
Pancake	100 g pancake	83
Low Fat Fruit Yogurt	175 g	57
White Bread	2 slices	53
White Rice	1 cup	46
Cottage Cheese (2.5% fat)	1 cup (240 g)	42
Sweet Potato	1 small (120 g)	37
Lean Beef Steak, Grilled	130 g	30
Skim Milk	1 cup	23
Banana	1 small (104 g)	23
Navy Beans	1 cup	22
Chicken	130 g	20
Butternut Squash	1/2 cup (102 g)	18
White Fish	130 g	17
Poached Eggs	2 large	14
Apple	1 medium (125 g)	14
Orange	1 medium (130 g)	11
Shrimp	7 shrimp (98 g)	9
Cauliflower, steamed	1 cup (124 g)	6
Walnuts	1/4 cup	4
Broccoli, steamed	1 cup (156 g)	3
Avocado	1/4 avocado	2
Olive or Coconut oil	1 tbsp	2
Almond Butter	1 tbsp	2
Berries	1 cup	2
Leafy Green Vegetables	1 cup	0



SUPPLEMENTS FOR PCOS A complex and lifelong condition like PCOS can require different treatments depending on the symptoms and life stage. For women in their reproductive years, treating PCOS focuses primarily on reducing insulin resistance, managing ovary health, and minimizing androgens and inflammation.

Inositols

Treatments most beneficial at this stage include both myo- and d-chiro inositol. Generally, myo-inositol has been found to provide the most benefit to ovarian health and egg quality, while simultaneously improving markers of insulin resistance. D-Chiro inositol is a beneficial supplement for insulin resistance, however when it comes to fertility, its effects appear to be dose dependent. When used at a physiological ratio of 40:1, the combination of myo- and d-chiro inositol seem to provide the most benefit for women with PCOS by reducing androgen excess and improving ovulation rates without side effects. Higher amounts of d-chiro inositol may impair embryo quality and therefore, though they may be recommended for women who are not trying to conceive, they are best to avoid for women in their reproductive years.

N-Acetyl Cysteine

N-Acetyl Cysteine (NAC) is another supplement with robust research supporting its use in the treatment of PCOS. NAC has been found to improve insulin receptor activity and insulin secretion in response to glucose. A systematic review of 8 studies on the effect of NAC in women with PCOS found that NAC improved clinical pregnancy and ovulation rates.

Berberine


Berberine has been found to improve symptoms of PCOS. It is an insulin sensitizer, sharing some of the same mechanisms with the same level of efficacy as, or potentially even better than, metformin, which is widely used to treat insulin resistance in women

Berberine is another natural supplement that has been found to improve symptoms of PCOS.



with PCOS. Not surprisingly, berberine produces similar changes in the GI microbiome as metformin. Metformin is known for causing unpleasant side effects on the gastrointestinal tract including nausea and diarrhea. However, berberine has a much lower incidence of side effects. Not surprisingly, given the effect on the microbiome, berberine also has an excellent anti-inflammatory profile and has been found to reduce many of the inflammatory mediators, such as NF-kappa B and TNF-alpha. A study on 89 insulin-resistant women with PCOS found that 500 mg of berberine taken 3 times per day significantly improved metabolic markers of insulin resistance such as HOMA-IR better than metformin did.

Although PCOS has long been characterized as a condition affecting women of reproductive age, we now know it's actually a lifelong condition that increases the risks for type 2 diabetes and cardiovascular disease, and these risks endure long past menopause. Awareness helps practitioners and women alike to know

the signs and help detect PCOS early on. Changing lifestyle and nutritional habits soon after diagnosis will empower women not only to improve their hormonal regulation during the reproductive years, but also to minimize the metabolic and cardiovascular risks later in life. 

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