

Polycystic Ovarian Syndrome – A Health Issue Affecting Women Worldwide

Analysis by [Dr. Joseph Mercola](#)

September 24, 2024

STORY AT-A-GLANCE

- › Polycystic ovarian syndrome (PCOS) affects 5 to 6 million women in the U.S. and 8% to 13% of women worldwide. It's characterized by elevated testosterone, ovulation problems and large ovaries with small follicles, impacting fertility and mental health
- › Women with PCOS are at higher risk for depression, anxiety, eating disorders and suicide attempts. PCOS also affects self-esteem, gender identity, relationships and sexuality
- › PCOS has no specific cause or cure, but risk factors include family history, diabetes, and insulin resistance. Symptoms are manageable and pregnancy still occurs with proper treatment
- › Inositol and carnitine supplements show promise in managing PCOS symptoms, improving menstrual regularity, fertility and other metabolic markers. Other helpful supplements include CoQ10, turmeric, licorice and vitamin K2
- › Environmental factors like exposure to "forever chemicals" (PFAS) and microplastics increase PCOS risk and disrupt hormones. Reducing exposure and considering progesterone therapy may help balance hormones

According to the Endocrine Society, an estimated 5 to 6 million women in America are affected with polycystic ovary syndrome (PCOS), a condition marked by elevated testosterone, ovulation problems and large ovaries with small follicles.¹ Around the world, 8% to 13% of women have PCOS, and many more remain undiagnosed.²

I believe PCOS is an issue that warrants discussion, as research indicates it's a leading cause of infertility worldwide.³ Sharing stories of women going through it will help others become aware of symptoms they have, allowing them to get appropriate help. It just so happens that September is also PCOS Awareness Month, so this is an opportune moment for everyone to learn.

The Impact of PCOS on Women's Mental Health

Aside from the ovulation problems that PCOS brings, it largely affects mental health. Writing for The Guardian, freelance journalist Ali Francis, shares how PCOS is linked to a rise in various mental health issues:⁴

"Though estimates vary, between 8% and 13% of reproductive-age women have PCOS, and many experience adverse mental health outcomes. Recent studies have revealed that people with PCOS are four to seven times more likely to have depression and anxiety, three to six times more likely to have an eating disorder, and 8.47 times more likely to attempt suicide.

In a survey conducted by the nonprofit PCOS Challenge: The National Polycystic Ovary Syndrome Association, 62.15% of the 900 respondents reported high to severe mental health impacts caused by the condition."

Francis also noted that PCOS affects other aspects of your mental well-being. These include "self-esteem, gender identity, relationships and sexuality." Visiting a doctor can be mentally jarring, too. Conflicting medical advice, delayed diagnoses and unsuccessful treatments contribute to the mental health burden experienced by women with PCOS.⁵

Francis experienced the very same struggle herself. To understand what was going through her mind, she consulted a psychiatrist. During her consultation, she explained that she had mood swings that "seemed to occur at the same time every month."⁶

However, the psychiatrist dismissed her claims, suggesting that she could have bipolar disorder. While the consultation didn't arrive at a final diagnosis, Francis was already

offered a prescription to take medication for bipolar disorder. Thankfully, she didn't take it, determined to look for other solutions.⁷

While there are studies^{8,9} indicating a link between PCOS and bipolar disorder due to overlapping symptoms, Francis didn't experience excessive energy and other sudden behavioral changes – hallmark symptoms of bipolar disorder. The fact that the symptoms happen at regular intervals reinforced her intuition. "This suggests a sensitivity to hormonal fluctuations during the menstrual cycle," says Phoutdavone Phimphasone-Brady, Ph.D., a PCOS specialist.¹⁰

What Causes PCOS?

It's important to understand that PCOS is not a disease. In an interview for The Independent,¹¹ hormone specialist Hannah Alderson says that it is a collection of symptoms that vary from one woman to another. She also adds that it's marked by an overproduction of testosterone, cortisol and insulin. Contributing to the problem further is that there's no accurate way to diagnose PCOS with a single test. Instead, women need to meet two of three criteria:¹²

- **Elevated androgens** – Diagnosed via blood tests as well as visual examination, including excess facial hair and acne. One example of an androgen doctors look for is testosterone
- **Ovulatory dysfunction** – Common markers include irregular or absent periods
- **Presence of polycystic ovaries** – Viewed during an ultrasound session

One reason why PCOS is difficult to diagnose is because the cause is unknown. However, factors such as prior family history of PCOS, diabetes and insulin resistance increase accuracy of the diagnosis. Chronic inflammation has been associated with PCOS, too.¹³

Is there a cure for PCOS, at the very least? Unfortunately, there is no known treatment,¹⁴ and it is a lifelong disorder.¹⁵ However, that doesn't mean all hope is lost. In fact, the

symptoms of PCOS are manageable through natural strategies. Alderson even noted that women can still become pregnant:¹⁶

"PCOS can impact fertility because if you're not ovulating, you won't naturally fall pregnant, making PCOS a leading cause of infertility," explains Alderson. "However, it is not a definitive sentence of infertility. By addressing the root causes of PCOS, a woman's chances of falling pregnant can be positively impacted."

Inositol Is Effective for PCOS

In a 2023 study published in the journal *Reproductive Biology and Endocrinology*,¹⁷ researchers from Budapest, Hungary demonstrated that inositol is effective for managing PCOS. For context, inositol (typically called vitamin B8) is a sugar synthesized by the human body that belongs to the vitamin B complex group.

It's considered an insulin sensitizer since it modulates the insulin signaling pathway, and the researchers hypothesize it to be a better alternative to metformin, a drug that causes digestive distress.¹⁸

The team conducted a meta-analysis of previously published literature to assess the safety and effectiveness of inositol. From their initial search, they identified 26 high-quality trials with a total of 1,691 participants. The primary measurement of success was the normalization of the menstrual cycle. Other outcomes considered to be a success were clinical and laboratory hyperandrogenism, body mass index and carbohydrate metabolism.

Based on the team's analysis, inositol produced a regular menstrual cycle in women with PCOS 1.79 times higher than placebos and showed noninferiority compared to metformin. Inositol also induced greater decreases across various biomarkers, including free and total testosterone, glucose levels – important aspects implicated in PCOS.¹⁹

Inositol also produced fewer side effects reported with inositol than with metformin. Meanwhile, side effects in those who took metformin include bloating, generalized

weakness and nausea.²⁰ The researchers concluded by saying, "Inositol is an effective and safe treatment in PCOS. Moreover, inositol showed noninferiority in most outcomes compared to the gold standard treatment, metformin."²¹

Consider Taking a Carnitine Supplement

Carnitine is a popular supplement used in exercise to support energy production and muscle repair,²² but research shows that it has other uses as well. In the context of PCOS, carnitine supplementation helps improve fertility.

In a systematic review and meta-analysis published in 2023,²³ a total of 839 women diagnosed with PCOS were given a dosage ranging anywhere from 250 milligrams to 3,000 milligrams daily for 84 to 90 days, respectively. After calculating the results, those who took carnitine supplements had 3.42 times better ovulation rates and 11.05 times better pregnancy rates compared to placebo groups.

Interestingly, carnitine also helps facilitate weight loss, which is a boon for women struggling to maintain a healthy weight due to PCOS. In a systematic review and meta-analysis of 37 trials published in *Clinical Nutrition ESPEN*,²⁴ L-carnitine (a type of carnitine) supplementation significantly decreased body weight, body mass index and fat mass in overweight and/or obese adults:

"A nonlinear dose-response association was seen between L-carnitine supplementation and body weight reduction ... suggesting that ingestion of 2000 mg L-carnitine per day provides the maximum effect in adults," the team, from Shahid Sadoughi University of Medical Sciences in Iran, noted.

Other Supplements to Help Manage PCOS Better

In addition to taking a carnitine supplement, there are other alternatives available. Here are some recommendations, based on published research:

- **CoQ10** – A 2023 meta-analysis²⁵ found that CoQ10 supplementation improved insulin resistance and blood lipid levels, as well as increased sex hormone levels (while reducing testosterone) in 1,021 participants across nine randomized controlled trials.
- **Turmeric** – Research²⁶ has shown this culinary spice has therapeutic applications thanks to its curcuminoids. In particular, they "are useful in managing PCOS and preventing ovarian cell dysfunction, thereby improving ovulation and fertility."
- **Licorice** – In the same study,²⁷ licorice was noted to have potent anti-androgen properties and helps maintain healthy estrogen levels. Furthermore, the flavonoids in licorice help secrete insulin better, which contributes to better management of insulin-related PCOS symptoms.
- **Vitamin K2** – Depression is another notable symptom of women experiencing PCOS, and one study²⁸ noted that increasing vitamin K2 helps relieve this condition.

Reduce Your Exposure to 'Forever Chemicals'

The very environment you live in and the things you touch influence your risk of developing PCOS. According to one study²⁹ conducted by Mount Sinai Health System researchers, exposure to PFAS (per- and polyfluoroalkyl substances), also known as "forever chemicals," reduces a woman's fertility by 40% and increases the risk of PCOS. In a news release, senior study author Dr. Damaskini Valvi explains:³⁰

"PFAS can disrupt our reproductive hormones and have been linked with delayed puberty onset and increased risks for endometriosis and polycystic ovary syndrome in few previous studies. What our study adds is that PFAS may also decrease fertility in women who are generally healthy and are naturally trying to conceive."

Valvi's findings are supported by other research. In a study³¹ published in Singapore, researchers gathered plasma from 382 women of childbearing age hoping to conceive. Using various analytical models, they noted that "higher exposure to PFAS, individually

and as a mixture, is associated with reduced probability for clinical pregnancy and live birth."³²

The researchers also noted that forever chemicals not only disrupt reproductive hormones, but also increase the risk of endometriosis and polycystic ovary syndrome (PCOS).³³ Thus, reducing your exposure to forever chemicals is paramount. To start, I recommend avoiding the products listed below:

Pretreated or stain-repellent treatments – Do your due diligence to find out if these chemicals are on your clothing, furniture and carpeting, as well as any you're about to buy. Clothing advertised as "breathable" is typically treated with polytetrafluoroethylene, a synthetic fluoropolymer commonly known as Teflon.

Products treated with flame-retardant chemicals – This includes furniture, carpet, mattresses and baby items. Instead, choose naturally less flammable materials such as leather, wool and cotton.

Fast food and carry-out foods – The containers are typically treated with PFAS.

Microwave popcorn – PFAS may be present in the inner coating of the bag and may migrate to the oil from the packaging during heating. If you still want to eat popcorn, use "old-fashioned" stovetop non-GMO popcorn cooked in healthy cooking oil.

Nonstick cookware and other treated kitchen utensils – Healthier options include ceramic and enameled cast iron cookware, both of which are durable, easy to clean and completely inert, which means they won't release any harmful chemicals into your home.

Personal care products containing PTFE, "fluoro" or "perfluoro" ingredients such as Oral B Glide floss – The Environmental Working Group Skin Deep database is an excellent source to search for healthier personal care options.³⁴

Plastics Cause Hormonal Imbalances

As noted earlier, PCOS causes androgens such as testosterone to rise, causing hormonal imbalance. However, that's just one example. According to Nicole Galan, a registered nurse who has worked with many patients with PCOS, high levels of estrogen are also a factor.³⁵ And what is a major contributor for elevated estrogen levels? Microplastics.

As noted in my article "[Microscopic Menage – Scientists Discover Plastic Nanoparticles in Men's Testicles](#)," plastics are xenoestrogens that mimic the effects of estrogen in the body, and the danger occurs due to them stimulating your estrogen receptors. Phthalates, for instance, have estrogenic properties, and some endocrine-disrupting chemicals are also considered estrogenic carcinogens.

To help restore hormonal balance, consider taking progesterone. As noted in a 2020 study,³⁶ "cyclic progesterone for PCOS lowers androgens and restores estradiol-progesterone balance." In another study,³⁷ progesterone helped a woman develop regular menstrual cycles, cervical mucus and breast tenderness. While these findings shine a ray of hope for PCOS, progesterone must be taken properly. Below, I'll discuss how to take it properly for maximum effect.

How to Use Progesterone

Before you consider using progesterone, it is important to understand that it is not a magic bullet, and that you get the most benefit by implementing a Bioenergetic diet approach that allows you to effectively burn glucose as your primary fuel without backing up electrons in your mitochondria that reduces your energy production. My new book, "Your Guide to Cellular Health: Unlocking the Science of Longevity and Joy" comes out very soon and covers this process in great detail.

Once you have dialed in your diet, an effective strategy that can help counteract estrogen excess is to take transmucosal progesterone (i.e., applied to your gums, not oral or transdermal), which is a natural estrogen antagonist. Progesterone is one of only four hormones I believe many adults can benefit from. (The other three are thyroid hormone T3, DHEA and pregnenolone.)

I do not recommend transdermal progesterone, as your skin expresses high levels of 5-alpha reductase enzyme, which causes a significant portion of the progesterone you're taking to be irreversibly converted primarily into allopregnanolone and cannot be converted back into progesterone.

Ideal Way to Administer Progesterone

Please note that when progesterone is used transmucosally on your gums as I advise, the FDA believes that somehow converts it into a drug and prohibits any company from advising that on its label. This is why companies like Health Natura promotes their progesterone products as "topical."

However, please understand that it is perfectly legal for any physician to recommend an off-label indication for a drug to their patient. In this case, progesterone is a natural hormone and not a drug and is very safe even in high doses. This is unlike synthetic progesterone called progestins that are used by drug companies, but frequently, and incorrectly, referred.

Dr. Ray Peat has done the seminal work in progesterone and probably was the world's greatest expert on progesterone. He wrote his Ph.D. on estrogen in 1982 and spent most of his professional career documenting the need to counteract the dangers of excess estrogen with low LA diets and transmucosal progesterone supplementation.

He determined that most solvents do not dissolve progesterone well and discovered that vitamin E is the best solvent to optimally provide progesterone in your tissue. Vitamin E also protects you against damage from LA. You just need to be very careful about which vitamin E you use as most supplemental vitamin E on the market is worse than worthless and will cause you harm not benefit.

It is imperative to avoid using any synthetic vitamin E (alpha tocopherol acetate – the acetate indicates that it's synthetic). Natural vitamin E will be labeled "d alpha tocopherol." This is the pure D isomer, which is what your body can use.

There are also other vitamin E isomers, and you want the complete spectrum of tocopherols and tocotrienols, specifically the beta, gamma, and delta types, in the effective D isomer. As an example of an ideal vitamin E, you can look at the label on our vitamin E in our store. You can use any brand that has a similar label.

You can purchase pharmaceutical grade bioidentical progesterone as Progesterone Powder, Bioidentical Micronized Powder, 10 grams for about \$40 on many online stores like Amazon. That is nearly a year's supply, depending on the dose you choose.

However, you will need to purchase some small stainless steel measuring spoons as you will need a 1/64 tsp, which is 25 mg and a 1/32 tsp, which is 50 mg. A normal dose is typically 25-50 mg and is taken 30 minutes before bed, as it has an anti-cortisol function and will increase GABA levels for a good night's sleep.

Unfortunately, this vendor frequently runs out of product, and if that's the case, then you can use [Simply Progesterone by Health Natura](#). It's premixed with vitamin E and MCT oil. Again, while Health Natura states that its product is for "topical use only," I recommend applying it transmucosally, by rubbing it on your gums.

If you are a menstruating woman, you should take the progesterone during the luteal phase or the last half of your cycle, which can be determined by starting 10 days after the first day of your period and stopping the progesterone when your period starts.

If you are a male or non-menstruating woman, you can take the progesterone every day for four to six months and then cycle off for one week. The best time of day to take progesterone is 30 minutes before bed as it has an anti-cortisol function and will increase GABA levels for a good night's sleep.

This is what I have been personally doing for over a year with very good results. I am a physician so do not have any problems doing this. If you aren't a physician, you should consult one before using this therapy, as transmucosal progesterone therapy requires a doctor's prescription.

Sources and References

- ¹ Endocrine Society, January 24, 2022
- ² WHO, June 28, 2023
- ³ Cureus. 2022 Aug; 14(8): e27943, Abstract
- ^{4, 5, 6, 7, 10} The Guardian, September 3, 2024
- ⁸ Progress in Neuro-Psychopharmacology and Biological Psychiatry Volume 115, 20 April 2022, 110498, Abstract
- ⁹ Journal of Affective Disorders Volume 263, 15 February 2020, Pages 458-462, Abstract
- ^{11, 12, 16} The Independent, August 30, 2024
- ¹³ The Economic Times, August 31, 2024
- ¹⁴ Cleveland Clinic, "Polycystic Ovary Syndrome (PCOS)"
- ¹⁵ Yale Medicine, "Polycystic Ovary Syndrome (PCOS)"
- ^{17, 19, 21} Reproductive Biology and Endocrinology, 2023;21:10, Abstract
- ¹⁸ Reproductive Biology and Endocrinology, 2023;21:10, Background
- ²⁰ Reproductive Biology and Endocrinology, 2023;21:10, Side Effects
- ²² Journal of the International Society of Sports Nutrition, volume 17, Article number: 49 (2020), Background
- ²³ Clin Endocrinol (Oxf). 2023 May;98(5):682-691, Abstract
- ²⁴ Clin Nutr ESPEN. 2020 Jun;37:9-23, Highlights
- ²⁵ Reprod Sci. 2023 Apr;30(4):1033-1048, Abstract
- ²⁶ BioTech (Basel). 2023 Mar; 12(1): 4, Curcuma Longa
- ²⁷ BioTech (Basel). 2023 Mar; 12(1): 4, Glycyrrhiza Glabra
- ²⁸ BMC Womens Health. 2022; 22: 315, Abstract
- ^{29, 30} Mount Sinai, March 17, 2023
- ³¹ Science of The Total Environment, Volume 873, 15 May 2023, 162267, Abstract
- ³² Science of The Total Environment, Volume 873, 15 May 2023, 162267, Discussion
- ³³ Science of The Total Environment, Volume 873, 15 May 2023, 162267, Introduction
- ³⁴ Environmental Working Group Skin Deep Database
- ³⁵ Very Well Health, "Estrogen Dominance in Women with PCOS"
- ³⁶ Drug Discovery Today: Disease Models, Volume 32, Part B, Winter 2020, Pages 71-82, Highlights
- ³⁷ Medicina (Kaunas). 2021 Oct; 57(10): 1024, Abstract