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**Outcomes of Polycystic Ovarian Syndrome**

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## **Abstract**

Polycystic ovarian syndrome is a common endocrine disorder among women of reproductive age and the most common cause of infertility. It is characterized by hyperandrogenism, anovulation and polycystic ovaries. It is not exactly known what causes this syndrome; but several environmental and genetic factors are suspected. Obesity and insulin resistance are common among the affected women. Proper therapeutic management of the syndrome's manifestations and a healthier lifestyle are advised to avoid metabolic, cardiovascular and psychiatric disturbances.

## **Introduction**

Polycystic ovarian syndrome (PCOS) is an endocrine disorder that is considered one of the most common endocrinopathies in women of reproductive age and affects 5-20% of that age group. It's the most common cause for infertility, accounting for 20% of cases.

Patients must show two of the three phenotypes to be diagnosed with PCOS (hyperandrogenism, polycystic ovaries and anovulation). The most common one is anovulation, which occurs in 95% of women with PCOS. Hyperandrogenism, on the other hand, occurs in 60% of patients, and is apparent in hirsutism and acne. Polycystic ovaries are defined as presence of 12 or more follicles in each ovary, and their prevalence is 17-33%.

In the US, there is a prevalence of 8% among black women and 4.8% among white women; while in Hispanic women it is 13%, who also have higher rates for insulin resistance and type II diabetes.

The exact cause is yet to be determined; but a combination of environmental and genetic factors has been suggested. PCOS is considered hereditary; seeing how it is present in high numbers among first-degree relatives. Studies have demonstrated an association with chromosome 2p16.3 which contains luteinizing hormone/chorionic gonadotropin receptor (LHCGR) gene; it plays a role in LH receptors and is important for ovulation.<sup>1</sup>

Obesity has been discussed as a risk factor, seeing how hyperandrogenism and obesity are often associated and taking in consideration that many cases of PCOS the symptoms are preceded by weight gain. However, one study displayed a modest effect of obesity in the development of the syndrome; with obese and normal-weight women having a prevalence of 12.4% and 9.8%, respectively.

Insulin resistance has been associated with PCOS in both obese and non-obese women. The prevalence of insulin resistance ranges from 50-70%. Hyperinsulinemia can produce an increasing effect on androgen production by theca cells as well as reducing the production of sex hormone binding globulin (SHBG) in the liver; thereby increasing the levels of free androgens in the blood.<sup>2</sup>

Treatment of PCOS is concerned with the management of its clinical manifestations; clomiphene is a first-line treatment for those seeking pregnancy, and oral contraceptives for those who don't. The latter are also used to regulate menstrual cycle. Metformin controls glucose levels and is taken to maintain metabolic abnormalities of the syndrome. Weight-loss for obese patients and a healthier lifestyle are recommended.<sup>3</sup>

This report will be discussing the conditions associated with PCOS as it progresses.

## Discussion

A trial aimed to compare triglyceride, low-density lipoprotein (LDL) cholesterol and high-density lipoprotein (HDL) cholesterol levels between women with and without PCOS; all of whom are in their reproductive years. Triglyceride and LDL cholesterol levels in women with PCOS were found higher by 26.39 mg/dL and 12.6 mg/dL, respectively. While HDL cholesterol was lower by 6.41 mg/dL.

Obesity and insulin resistance promote a higher content of triglyceride in the liver, which in turn produce larger particles of very low-density lipoprotein (VLDL). Metabolism of these particles results in the formation of small LDL particles which are more atherogenic.<sup>4</sup>

Several trials determined the prevalence of hypertension is increased in PCOS. One found that 22% of women with PCOS had hypertension in comparison with 2.1% of controls. Mean systolic and mean diastolic blood pressure were also found higher in PCOS after adjusting for body mass index (BMI). Another trial in postmenopausal women found that PCOS group had a hypertension prevalence of 28.1% while in control group; it was 11.1%. It is possible that increased endothelin-1 levels have a part in this dysfunction; as well as increased aldosterone levels.<sup>2</sup>

A study that included 255 women over the course of at least ten years (mean follow-up is 16.9 years). Six of these women had diabetes at the baseline, while 42 of them developed type II diabetes during the follow up. The development was associated with increased BMI (body mass index), especially in middle-aged women.<sup>5</sup>

In a trial with 404 infertile women; metabolic syndrome was found in 58% and 32% of women with and without PCOS, respectively. In the PCOS group, 68% of patients were obese; while obese women with no PCOS accounted for 56.8%. The levels of triglyceride and LDL in PCOS were higher, while HDL levels were lower.<sup>6</sup>

In one trial with 295 postmenopausal women, those with PCOS had an earlier menopause, and were more likely to develop coronary heart disease; accounting for 42%. On the other hand; women with no PCOS had a probability of 27%. Mortality of a cardiovascular cause accounted for 20% in PCOS groups and 17% in no PCOS groups.<sup>7</sup>

A meta-analysis that aimed to calculate the risk of gynecological cancers in PCOS found that there is a three-fold increase in risk of endometrial cancer in women with PCOS; it could be due to proliferative consequences of unopposed estrogen on endometrial tissue, which may lead to carcinoma. It should also be noted that the increased prevalence of obesity and diabetes in PCOS is considered a risk factor in endometrial carcinoma. The incidence of ovarian breast cancer, on the other hand, was only slightly increased.<sup>8</sup>

Regarding the mental health disorders, a meta-analysis of several studies estimated the prevalence of anxiety symptoms in 20.4% of PCOS patients and 3.9% in controls.<sup>9</sup>

Depression is more common in PCOS patients with a prevalence of 35% in comparison to 10.7% in controls. In a trial with 78 women with PCOS; 27% had been diagnosed with bipolar disorder. Binge-eating was more common in PCOS with 12.6% than controls with 1.9%. All these disorders are probably associated with the psychological stress caused by the conditions that accompany the syndrome like obesity and infertility.<sup>2</sup>

## Conclusion

In studies mentioned above. PCOS could lead to hypertension, dyslipidemia, coronary heart disease, metabolic syndrome, type II diabetes, endometrial carcinoma and a variety of mental disorders. Many seem associated with higher aldosterone levels. Obesity was found to increase the severity and is considered a risk factor for these manifestations; proving the importance of having a healthier lifestyle in women with PCOS.

## References

- [1] Barthelmess EK, Naz RK. Polycystic ovary syndrome: current status and future perspective. *Frontiers in bioscience (Elite edition)*. 2014;6:104-119 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4341818/> Accessed April 12 2018
- [2] Sirmans SM, Pate KA. Epidemiology, diagnosis, and management of polycystic ovary syndrome. *Clinical Epidemiology*. 2014;6:1-13. doi:10.2147/CLEP.S37559. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3872139/> Accessed April 12 2018
- [3] Williams, T., Mortada, R. and Porter, S. Diagnosis and Treatment of Polycystic Ovary Syndrome. [online] *Am Fam Physician*. 2016;7:15;94(2):106-113 <https://www.aafp.org/afp/2016/0715/p106> Accessed April 12 2018
- [4] Wild RA, Rizzo M, Clifton S, Carmina E. Lipid levels in polycystic ovary syndrome: systematic review and meta-analysis. *Fertility Sterility*. 2011;95(3):1073–1079. doi: 10.1016/j.fertnstert. [http://www.fertstert.org/article/S0015-0282\(10\)02969-9/](http://www.fertstert.org/article/S0015-0282(10)02969-9/) Accessed April 12 2018
- [5] Gambineri A, Patton L, Altieri P, et al. Polycystic Ovary Syndrome Is a Risk Factor for Type 2 Diabetes: Results From a Long-Term Prospective Study. *Diabetes*. 2012;61(9):2369-2374. doi:10.2337/db11-1360. <http://diabetes.diabetesjournals.org/content/61/9/2369> Accessed April 12 2018
- [6] Shaman AA, Mukhtar HB, Mirghani HO. Risk factors associated with metabolic syndrome and cardiovascular disease among women with polycystic ovary syndrome in Tabuk, Saudi Arabia. *Electronic Physician*. 2017;9(11):5697-5704. doi:10.19082/5697. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5783117/> Accessed April 12 2018
- [7] Merz CNB, Shaw LJ, Azziz R, et al. Cardiovascular Disease and 10-Year Mortality in Postmenopausal Women with Clinical Features of Polycystic Ovary Syndrome. *Journal of Women's Health*. 2016;25(9):875-881. doi:10.1089/jwh.2015.5441. <http://online.liebertpub.com/doi/full/10.1089/jwh.2015.5441> Accessed April 12 2018
- [8] Barry JA, Azizia MM, Hardiman PJ. Risk of endometrial, ovarian and breast cancer in women with polycystic ovary syndrome: a systematic review and meta-analysis. *Human Reproduction Update*. 2014;20(5):748-758. doi:10.1093/humupd/dmu012. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4326303/> Accessed April 12 2018
- [9] Dokras A, Clifton S, Futterweit W, Wild R. Increased prevalence of anxiety symptoms in women with polycystic ovary syndrome: systematic review and meta-analysis. *Fertility and Sterility* 2012. 97 225–230. doi:10.1016/j.fertnstert.2011.10.022 <https://www.ncbi.nlm.nih.gov/pubmed/22127370> Accessed April 12 2018