POLYCYSTIC OVARY SYNDROME

PCos, Pos, Polycystic Ovarian Syndrome, Hyperandrogenic Anovulation (Ha), Hyperandrogenic Syndrome (Has), Stein - Leventhal Syndrome, Functional Ovarian Hyperandrogenism, Ovarian Hyperthecosis, Sclerocystic Ovary Syndrome.

A condition in which a woman has an imbalance of female sex hormones. This may lead to changes in the menstrual cycle, cysts in the ovaries, trouble g

⚠️ Diagnosis ♂ Female

Related Diagnoses:

- Obesity
- Anovulation
- Menstrual cycle disorders
- Hypogonadism
- Endometrial cancer
- Amenorrhoea
- Endometrial hyperplasia
- Ovarian cancer
- Oligomenorrhea
- Hyperprolactinemia
- Luteinised unruptured follicle syndrome
- Heart disease
- Obstructive sleep apnea
- Atherosclerosis
- Hyperlipidemia
- Hyperinsuлинаemia

ℹ️ About Polycystic ovary syndrome

HAS is defined as production of excessive amounts of male hormones (androgens), in particular testosterone, by either one or a combination of the following:

- the release of excessive luteinizing hormone (LH) by the anterior pituitary gland;
- through high levels of insulin in the blood (hyperinsulinaemia).

PCOs – polycystic ovaries syndrome acquired its most widely used name due to the common sign on ultrasound examination of multiple (poly) ovarian cysts. These "cysts" are actually immature follicles not cysts. The follicles have developed from primordial follicles, but the development has stopped ("arrested") at an early antral stage due to the disturbed ovarian function. The follicles may be oriented along the ovarian periphery, appearing as a 'string of pearls' on ultrasound examination.

Women with PCOS experience an increased frequency of hypothalamic GnRH pulses, which in turn results in an increase in the LH/FSH ratio.

A majority of people with PCOS have insulin resistance. Their elevated insulin levels contribute to or cause the abnormalities seen in the hypothalamic-pituitary-ovarian axis that lead to HAS (PCOS). Hyperinsulinemia increases GnRH pulse frequency, LH over FSH dominance, increased ovarian androgen production, decreased follicular maturation, and decreased SHBG binding; all these steps contribute to the development of PCOS. Insulin resistance is a common finding among women with a normal weight as well as
Adipose tissue possesses aromatase, an enzyme that converts androstenedione to estrone and testosterone to estradiol. The excess of adipose tissue in obese women creates of having both excess estrogens which inhibits FSH via negative feedback.

PCOS may be associated with chronic inflammation, with several investigators correlating inflammatory mediators with anovulation and other PCOS symptoms. Similarly, there seems to be a relation between PCOS and increased level of oxidative stress.

PCOS is a heterogeneous disorder of uncertain cause. **There is strong evidence that it is a genetic disease.** Such evidence includes the familial clustering of cases, greater concordance in monozygotic compared with dizygotic twins and heritability of endocrine and metabolic features of PCOS.

The genetic component appears to be inherited in an autosomal dominant fashion with high genetic penetrance but variable expressivity in females; this means that each child has a 50% chance of inheriting the predisposing genetic variant(s) from apparent, and, if a daughter receives the variant(s), the daughter will have the disease to some extent. The genetic variant(s) can be inherited from either the father or the mother, and can be passed along to both sons (who may be asymptomatic carriers or may have symptoms such as early baldness and/or excessive hair) and daughters, who will show signs of PCOS. The phenotype appears to manifest itself at least partially via heightened androgen levels secreted by ovarian follicle theca cells from women with the allele. The exact gene affected has not yet been identified. In rare instances, single-gene mutations can give rise to the phenotype of the syndrome. Current understanding of the pathogenesis of the syndrome suggests, however, that it is a complex multigenic disorder.

**Associated diseases**
- type 2 diabetes
- obesity
- obstructive sleep apnoea
- heart disease
- mood disorders
- endometrial cancer

**Complications**
- Type 2 diabetes
- high blood pressure
- cholesterol and lipid abnormalities
- elevated triglycerides
- low high-density lipoprotein cholesterol
- metabolic syndrome
- nonalcoholic steatohepatitis
- infertility
- sleep apnea
- depression
- anxiety
- abnormal uterine bleeding
- endometrial cancer
- gestation diabetes
- pregnancy induced high blood pressure
Risk factors

- obesity
- not enough physical exercise
- family history

Impact on fertility

Polycystic ovary disease (PCOS) is a hormonal imbalance in women that is thought to be one of the leading causes of female infertility. Polycystic ovary syndrome causes more than 75% of cases of anovulatory infertility. Not all women with PCOS have difficulty becoming pregnant. For those who do, anovulation is a common cause. The mechanism of this anovulation is uncertain, but there is evidence of arrested antral follicle development, which, in turn, may be caused by abnormal interaction of insulin and luteinizing hormone (LH) on granulose cells.

Endocrine disruption may also directly decrease fertility, such as changed levels of gonadotropin-releasing hormone, gonadotropins (especially an increase in luteinizing hormone), hyperandrogenemia, and hyperinsulinemia. Gonadotropins are released by gonadotroph cells in pituitary gland, and these cells appear to harbor insulin receptors, which are affected by elevated insulin levels. A reason that insulin sensitizers work in increasing fertility is that they lower total insulin levels in body as metabolic tissues regain sensitivity to the hormone. This reduces the overstimulation of gonadotroph cells in pituitary.

Prevention

Polycystic ovary syndrome (PCOS) cannot be prevented. PCOS may occur even in girls as young as 11 years old with early onset of pubarche and thelarche. Early diagnosis and treatment helps prevent long-term complications, such as infertility, metabolic syndrome, obesity, diabetes and heart disease.

Symptoms

- menstrual disorders-oligomenorrhea (few menstrual periods), amenorrhea (no menstrual periods)
- sterility/infertility- this generally results directly from chronic anovulation (lack of ovulation), the relationship of elevated androgen concentration to recurrent pregnancy losses is generally known, elevated levels of androgens adversely affect oocytes and endometrial tissue development
- high levels of masculinizing hormones- the most common are acne and hirsutism (male pattern of hair growth), but it may produce hypermenorrhea (heavy and prolonged menstrual periods), androgenic alopecia (increase hair thinning or diffuse hair loss), or other symptoms. Approximately three-quarters of people with PCOS (by the diagnostic criteria of NIH/NICHD 1990) have evidence of hyperandrogenemia.
- neoplasm - permanent stimulation of endometrial tissue may follow to endometrial hyperplasia and dysfunctional bleeding, and may also results in
endometrial cancer (acyclic production of estrogens)

- metabolic syndrome- appears as a tendency towards central obesity and other symptoms associated with insulin resistance. Serum insulin, insulin resistance, and homocysteine levels are higher in women with PCOS. Changes in lipid spectrum (increase in LDL, decrease in HDL).

- late HAS (PCOS) risks - include diabetes mellitus, cardiovascular disease and endometrial cancer

**Laboratory findings**

- finding is not constant for all women with HAS, occurs only in 75% of patients with an ultrasound finding of PCO
- the main criterion for determining the diagnosis of HAS is the increase in androgen levels, especially testosterone, free testosterone, ADION, DHEA and DHES
- increased ratio of FSH and LH, LH : FSH is increased more than 2.5 times
- increased fasting insulin, increase in insulin response - it is recommended to perform oGTT (oral glucose tolerance test)
- increased prolactin (30% females)
- decreased concentration (more than half) SHBG, IGFBP-1
- increased only estrone in serum (peripheral conversion of androgens) generally estrogen production is not increased (estradiol level is similar to that in the early follicular phase)

**Therapies**

**Self therapy**

The prevalence of obesity has increased worldwide in the last few decades. Obesity status is defined according to the body mass index (BMI=body weight in kilograms divided by height in meters$^2$) of 30 kg/m$^2$ or more. BMI of 25 to 29.9 kg/m$^2$ is defined as ‘overweight’, while BMI of less than 25 kg/m$^2$ is considered normal. This had significant impact on the development of chronic diseases such as the metabolic syndrome, coronary heart disease and type 2 diabetes. Also, central obesity can be diagnosed clinically by measuring the waist circumference (WC) larger than 88 cm or waist-to-hip circumference ratio (WHR) greater than 0.85, confer high risk for metabolic complications in obese individuals with BMI between 25.0 and 34.9 kg/m$^2$.

However, obesity is a common finding in women with PCOS and between 40–80% of women with this condition is reported to be overweight, obese or centrally obese depending on the setting of the study and the ethnical background of the subjects. Obesity has a worse additive effect on features of PCOS such as insulin resistance, hyperandrogenism, infertility, hirsutism and pregnancy complications.

The relationship between PCOS and obesity is complex, and most likely involves interaction of genetic and environmental factors. The most frequent type of obesity in PCOS is the obesity of central variety. It is shown that central obesity is associated with increased risk for diabetes, hyperlipidemia, hypertension, atherosclerosis, and insulin resistance. Fat localized in the upper body is correlated with significantly reduced overall clearance of insulin, which
contributes to hyperinsulinemia.

However, obese and non-obese PCOS patients may have differences in clinical manifestations. The differences in biochemical and clinical features between obese and non-obese PCOS patients allow determining, to some degree, the contributions of obesity to the clinical manifestations of PCOS. Differences in menstrual function have been reported, with obese patients exhibiting a greater prevalence of oligoamenorrhea and anovulation than non-obese women, and the prevalence of infertility has been increasing in obese PCOS patients. Also, it is known that obesity has a direct link to the degree of hirsutism in PCOS patients. Obese women with PCOS had a greater prevalence of hirsutism, acanthosis nigricans, than non-obese patients, reflecting a higher prevalence and magnitude of insulin resistance and hyperinsulinemia among obese PCOS patients. Impaired glucose tolerance, type 2 diabetes mellitus and the dyslipidemia has highest risk in obese PCOS patients. Overall, given the prevalence of risk factors for atherosclerosis in women with PCOS, a higher prevalence of cardiovascular events in these patients can be expected. In addition, obese PCOS patients have higher prevalence of endometrial carcinoma than non-obese PCOS women. Anovulation, unopposed estrogen stimulation, and hyperinsulinemia may play a role in the increased risk of this gynecologic carcinoma in PCOS patients. Also, it is reported that obstructive sleep apnea, pregnancy complications such as preeclampsia, gestational induced hypertension and gestational diabetes are more prevalent in obese PCOS patient.

However, the impact of obesity on PCOS therapy is very important. Therapeutic modalities directed at the reduction of hyperinsulinemia (weight loss or insulin-sensitizing agents) appear to ameliorate symptoms of PCOS and restore normal ovarian function in obese women with PCOS.

Weight loss, especially more than 5% of the baseline weight, is the first-line therapy in treatment of these women. It leads to hormonal, menstrual, and metabolic improvement with reduced serum concentrations of free testosterone in obese women with PCOS. The mechanism by which weight loss leads to a reduction of hyperandrogenism appears to involve improved insulin sensitivity with a resultant decline in circulating insulin levels. Bariatric surgery may be recommended for morbidly obese women.

Alternative medicine

There is insufficient evidence to conclude an effect from D-chiro-inositol. Myo-inositol however appears to be effective based on a systematic review. There is preliminary evidence but no high quality evidence looking at acupuncture in PCOS.

Conventional medicine

Pharmacotherapy

Medications for PCOS include oral contraceptives and metformin. The oral contraceptives increase sex hormone binding globulin production, which increases binding of free testosterone. This reduces the symptoms of hirsutism caused by
high testosterone and regulates return to normal menstrual periods. Metformin is a drug commonly used in type 2 diabetes to reduce insulin resistance, and is used off label (in the UK, US, and EU) to treat insulin resistance seen in PCOS. In many cases, metformin also supports ovarian function and return to normal ovulation. Spironolactone can be used for its antiandrogenic effects, and the topical cream eflornithine can be used to reduce facial hair. A newer insulin resistance drug class, the thiazolidinediones (glitazones), have shown equivalent efficacy to metformin, but metformin has a more favorable side effect profile. The United Kingdom's National Institute for Health and Clinical Excellence recommended in 2004 that women with PCOS and a body mass index above 25 be given metformin when other therapy has failed to produce results. Metformin may not be effective in every type of PCOS, and therefore there is some disagreement about whether it should be used as a general first line therapy. It can be difficult to become pregnant with PCOS because it causes irregular ovulation. Medications to induce fertility when trying to conceive include the ovulation inducer clomiphene or pulsatile leuprolide. Metformin improves the efficacy of fertility treatment when used in combination with clomiphene. Metformin is thought to be safe to use during pregnancy (pregnancy category B in the US). A review in 2014 concluded that the use of metformin does not increase the risk of major birth defects in women treated with metformin during the first trimester.

Another pharmacotherapy which can be used is called myo-inositol. Some studies suggested that myo-inositol could play an important role in cellular morphogenesis and cytogenesis, in the synthesis of lipids, in the creation of cell membranes and in cell growth. It is also a precursor of phospholipids, which are responsible for the generation of important intracellular signals in mammalian oocytes and in the resumption of meiotic maturation.

Myo-inositol also regulates, via signal transduction pathways, the secretion of some exocrine glands such as pancreas and other organs, including the ovaries. In the oocytes these intracellular pathways are involved in the release of cortical granules, in the inhibition of polyspermy, in the completion of meiosis and in the activation of the cell cycle that subsequently results in embryonic development. It has been hypothesized that intrafollicular myo-inositol concentration and oocyte quality might be connected because inositol phospholipids (of which myo-inositol is a precursor) are held responsible for important intracellular signals essential for oocyte development, and because myo-inositol itself seems to improve oocytes in vitro maturation.

Surgery

Surgery can be attempted in case of inefficient result with medications for ovulation induction. Though surgery is not commonly performed, the polycystic ovaries can be treated with a laparoscopic procedure called ovarian drilling (puncture of 4-10 small follicles with electrocautery), which often results in either resumption of spontaneous ovulations or ovulations after adjuvant treatment with clomiphene or FSH.

Assisted reproduction

For patients who do not respond to diet, lifestyle modification and clomiphene, in vitro fertilisation can be performed. This usually includes controlled ovarian
hyperstimulation with FSH/HMG injections, which are the hormones of your body, just a little higher doses.

Find more about related issues

# Diagnoses

**Obesity**
A disease of excess body fat that can have a negative effect on health, leading to reduced life expectancy and other health problems.
Learn more at: [www.fertilitypedia.org/therapy/diag/obesity](http://www.fertilitypedia.org/therapy/diag/obesity)

**Anovulation**
Failure of the ovaries to release an oocyte over a period of time generally exceeding 3 months.
Learn more at: [www.fertilitypedia.org/therapy/diag/anovulation](http://www.fertilitypedia.org/therapy/diag/anovulation)

**Menstrual cycle disorders**
An abnormal condition in a woman’s menstrual cycle.
Learn more at: [www.fertilitypedia.org/therapy/diag/menstrual-cycle-disorders](http://www.fertilitypedia.org/therapy/diag/menstrual-cycle-disorders)

**Hypogonadism**
A medical term which describes a diminished functional activity of the gonads – the testes and ovaries.
Learn more at: [www.fertilitypedia.org/therapy/diag/hypogonadism](http://www.fertilitypedia.org/therapy/diag/hypogonadism)

**Endometrial cancer**
Cancer that arises from the endometrium, the lining of the uterus.
Learn more at: [www.fertilitypedia.org/therapy/diag/endometrial-cancer](http://www.fertilitypedia.org/therapy/diag/endometrial-cancer)

**Amenorrhoea**
The absence of a menstrual period in women of reproductive age.
Learn more at: [www.fertilitypedia.org/therapy/diag/amenorrhoea](http://www.fertilitypedia.org/therapy/diag/amenorrhoea)

**Endometrial hyperplasia**
Thickening of the lining of the uterus.
Learn more at: [www.fertilitypedia.org/therapy/diag/endometrial-hyperplasia](http://www.fertilitypedia.org/therapy/diag/endometrial-hyperplasia)

**Ovarian cancer**
A type of cancer in which abnormal cells begin to grow in one or both of a woman's ovaries.
Learn more at: [www.fertilitypedia.org/therapy/diag/ovarian-cancer](http://www.fertilitypedia.org/therapy/diag/ovarian-cancer)

**Oligomenorrhea**
Light or infrequent menstrual flow at intervals of 39 days to 6 months or 5–7 cycles in a year.
Learn more at: [www.fertilitypedia.org/therapy/diag/oligomenorrhea](http://www.fertilitypedia.org/therapy/diag/oligomenorrhea)
**Hyperprolactinemia**
The presence of abnormally high levels of prolactin in the blood.
Learn more at: www.fertilitypedia.org/therapy/diag/hyperprolactinemia

**Luteinised unruptured follicle syndrome**
The luteinisation of ovulatory follicle without a release of an oocyte.
Learn more at: www.fertilitypedia.org/therapy/diag/luteinised-unruptured-follicle-syndrome

**Heart disease**
Various types of conditions that can affect the function of the heart or blood vessels, which may have the negative effect also to the infertility
Learn more at: www.fertilitypedia.org/therapy/diag/heart-disease

**Obstructive sleep apnea**
Repetitive nocturnal complete collapses (apneas) or partial collapses (hypopneas) of the upper airway during sleep.
Learn more at: www.fertilitypedia.org/therapy/diag/obstructive-sleep-apnea

**Atherosclerosis**
The thickening, hardening and loss of elasticity of the walls of arteries.
Learn more at: www.fertilitypedia.org/therapy/diag/atherosclerosis

**Hyperlipidemia**
Abnormally elevated levels of any or all lipids in the blood.
Learn more at: www.fertilitypedia.org/therapy/diag/hyperlipidemia

**Hyperinsulinaemia**
Excess levels of insulin circulating in the blood relative to the level of glucose and impairing the hormonal levels, even those involved in reproduction
Learn more at: www.fertilitypedia.org/therapy/diag/hyperinsulinaemia

**Organs**

**Ovary**
The ovum-producing organs of the internal female reproductive system
Learn more at: www.fertilitypedia.org/edu/organs/ovary

**Pituitary gland**
An endocrine gland, about the size of a pea, whose secretions control the other endocrine glands and influence growth, metabolism, and maturation.
Learn more at: www.fertilitypedia.org/edu/organs/pituitary-gland

**Reproductive cells**
Oocyte
A female germ cell involved in reproduction.
Learn more at: www.fertilitypedia.org/edu/reproductive-cells/oocyte

Biological control

Estrogen
The primary female sex hormone responsible for the development and regulation of the female reproductive system and secondary sex characteristics.
Learn more at: www.fertilitypedia.org/edu/biological-control/estrogen

Follicle-stimulating hormone
FSH is a hormone secreted by the anterior pituitary gland. It regulates the development, growth, pubertal matur and reproductive functions of the body
Learn more at: www.fertilitypedia.org/edu/biological-control/follicle-stimulating-hormone

Insulin
A peptide hormone that decreases blood glucose levels.
Learn more at: www.fertilitypedia.org/edu/biological-control/insulin

Luteinizing hormone
A hormone, that stimulates ovulation and the development of the corpus luteum in females, and the production of androgens in males.
Learn more at: www.fertilitypedia.org/edu/biological-control/luteinizing-hormone

Progesterone
Steroid hormone, secreted by the ovaries, whose function is to prepare the uterus for the implantation of a fertilized ovum and to maintain pregnancy.
Learn more at: www.fertilitypedia.org/edu/biological-control/progesterone

Testosterone
Steroid hormone produced primarily in the testes of the male; responsible for the development of secondary sex characteristics in the male.
Learn more at: www.fertilitypedia.org/edu/biological-control/testosterone

Reproductive functions

Folliculogenesis
Development of ovarian follicles from primordial to tertiary under the stimulation of gonadotropins.
Learn more at: www.fertilitypedia.org/edu/reproductive-functions/folliculogenesis

Ovulation
The release of egg(s) from the ovaries.
Learn more at: www.fertilitypedia.org/edu/reproductive-functions/ovulation

Risk factors
**Early onset of menses**
Occurrence of menstruation in 11 years or less.
Learn more at: [www.fertilitypedia.org/therapy/rf/early-onset-of-menses](http://www.fertilitypedia.org/therapy/rf/early-onset-of-menses)

**Early onset of pubarche**
The development of pubic hair before the age of 8 years in females and 9 years in males, without other signs of puberty.
Learn more at: [www.fertilitypedia.org/therapy/rf/early-onset-of-pubarche](http://www.fertilitypedia.org/therapy/rf/early-onset-of-pubarche)

**Early onset of thelarche**
An isolated appearance of breast development, usually in girls younger than 3 years.
Learn more at: [www.fertilitypedia.org/therapy/rf/early-onset-of-thelarche](http://www.fertilitypedia.org/therapy/rf/early-onset-of-thelarche)

**Eating disorder**
A mental disorder defined by abnormal eating habits that negatively affect a person’s physical or mental health.
Learn more at: [www.fertilitypedia.org/therapy/rf/eating-disorder](http://www.fertilitypedia.org/therapy/rf/eating-disorder)

**Emotional stress**
Learn more at: [www.fertilitypedia.org/therapy/rf/emotional-stress](http://www.fertilitypedia.org/therapy/rf/emotional-stress)

**Genetic predisposition to PCOS**
Predisposition to developing polycystic ovary syndrome (PCOS).
Learn more at: [www.fertilitypedia.org/therapy/rf/genetic-predisposition-to-pcos](http://www.fertilitypedia.org/therapy/rf/genetic-predisposition-to-pcos)

**High level of AMH**
Serum level of AMH (Anti-Müllerian hormone) above the upper limit of the reference range.
Learn more at: [www.fertilitypedia.org/therapy/rf/high-level-of-amh](http://www.fertilitypedia.org/therapy/rf/high-level-of-amh)

**High level of estrogen**
A medical condition characterized by an excessive amount of estrogenic activity in the body.
Learn more at: [www.fertilitypedia.org/therapy/rf/high-level-of-estrogen](http://www.fertilitypedia.org/therapy/rf/high-level-of-estrogen)

**High level of LH**
A condition with high blood luteinizing hormone (LH) leading to irregular periods and reduced fertility in both females and males.
Learn more at: [www.fertilitypedia.org/therapy/rf/high-level-of-lh](http://www.fertilitypedia.org/therapy/rf/high-level-of-lh)

**High level of testosterone**
A condition characterized by excessive levels of testosterone in the body.
Learn more at: [www.fertilitypedia.org/therapy/rf/high-level-of-testosterone](http://www.fertilitypedia.org/therapy/rf/high-level-of-testosterone)

**Hypertension**
An elevated blood pressure, clinically defined as at or greater than 140/90 (systolic/diastolic) mmHg.
Learn more at: [www.fertilitypedia.org/therapy/rf/hypertension](http://www.fertilitypedia.org/therapy/rf/hypertension)
Lack of physical activity
A type of lifestyle with little or no physical activity.
Learn more at: www.fertilitypedia.org/therapy/rf/lack-of-physical-activity

Low level of FSH
A condition with low serum follicle–stimulating hormone (FSH) concentration.
Learn more at: www.fertilitypedia.org/therapy/rf/low-level-of-fsh

Obesity
A medical condition of excess body fat that can have a negative effect on health, leading to reduced life expectancy and other health problems.
Learn more at: www.fertilitypedia.org/therapy/rf/obesity

Oxidative stress
Disturbance in the balance of free radicals and antioxidant defenses which can affect oocyte maturation, fertilization, and embryo development.
Learn more at: www.fertilitypedia.org/therapy/rf/oxidative-stress

Poor dietary habits
Eating habits are one of the few factors within our control that impact not only our chances of falling pregnant.
Learn more at: www.fertilitypedia.org/therapy/rf/poor-dietary-habits

Sedentary lifestyle
Type of lifestyle with no or irregular physical activity.
Learn more at: www.fertilitypedia.org/therapy/rf/sedentary-lifestyle

 Symptoms

Acne
A long-term skin condition characterized by areas of blackheads, whiteheads, pimples, greasy skin, and possibly scarring.
Learn more at: www.fertilitypedia.org/edu/symptoms/acne

Anxiety
The emotional state characterized by unpleasant feelings such as uneasiness, worry, apprehension and dread.
Learn more at: www.fertilitypedia.org/edu/symptoms/anxiety

Breast atrophy
Normal or spontaneous atrophy or shrinkage of the breasts.
Learn more at: www.fertilitypedia.org/edu/symptoms/breast-atrophy
**Chronic inflammation**  
A prolonged condition in which tissue injury and attempts at repair coexist, leading to tissue remodeling and dysfunction.  
Learn more at: [www.fertilitypedia.org/edu/symptoms/chronic-inflammation](http://www.fertilitypedia.org/edu/symptoms/chronic-inflammation)

**Decreased level of FSH**  
A condition with low serum follicle-stimulating hormone (FSH) concentration.  
Learn more at: [www.fertilitypedia.org/edu/symptoms/decreased-level-of-fsh](http://www.fertilitypedia.org/edu/symptoms/decreased-level-of-fsh)

**Depression**  
The emotional state characterized by persistent feel of low self-esteem, loss of interest, sadness and negative attitude.  
Learn more at: [www.fertilitypedia.org/edu/symptoms/depression](http://www.fertilitypedia.org/edu/symptoms/depression)

**Early puberty for girls**  
The onset of puberty before the average age in girls (8 years).  
Learn more at: [www.fertilitypedia.org/edu/symptoms/early-puberty-for-girls](http://www.fertilitypedia.org/edu/symptoms/early-puberty-for-girls)

**Elevated estrogen level**  
A condition with high serum estrogen hormone concentration and thus harms sperm production and menstrual periods.  
Learn more at: [www.fertilitypedia.org/edu/symptoms/elevated-estrogen-level](http://www.fertilitypedia.org/edu/symptoms/elevated-estrogen-level)

**Elevated insulin level**  
The condition when there are elevated levels of insulin within the blood in relation to levels of glucose.  
Learn more at: [www.fertilitypedia.org/edu/symptoms/elevated-insulin-level](http://www.fertilitypedia.org/edu/symptoms/elevated-insulin-level)

**Elevated LH level**  
A condition with high serum luteinizing hormone (LH) concentration.  
Learn more at: [www.fertilitypedia.org/edu/symptoms/elevated-lh-level](http://www.fertilitypedia.org/edu/symptoms/elevated-lh-level)

**Elevated testosterone level**  
The presence of elevated testosterone concentration within the circulating blood.  
Learn more at: [www.fertilitypedia.org/edu/symptoms/elevated-testosterone-level](http://www.fertilitypedia.org/edu/symptoms/elevated-testosterone-level)

**Excessive facial and body hair growth in women**  
The excessive hairiness on women in those parts of the body where terminal hair normally is absent or minimal, such as a beard or chest hair.  
Learn more at: [www.fertilitypedia.org/edu/symptoms/excessive-facial-and-body-hair-growth-in-women-1](http://www.fertilitypedia.org/edu/symptoms/excessive-facial-and-body-hair-growth-in-women-1)

**Hair loss**  
A hair loss that frequently occurs due to an underlying susceptibility of hair follicles to androgenic miniaturisation.  
Learn more at: [www.fertilitypedia.org/edu/symptoms/hair-loss-1](http://www.fertilitypedia.org/edu/symptoms/hair-loss-1)
Heavy or prolonged bleeding in menstrual period
Abnormally heavy or prolonged bleeding in menstrual periods.
Learn more at: www.fertilitypedia.org/edu/symptoms/heavy-or-prolonged-bleeding-in-menstrual-period-1

Higher libido
Unusually increased sexual desires and urges.
Learn more at: www.fertilitypedia.org/edu/symptoms/higher-libido

Infrequent menstruation
The medical term for infrequent, often light menstrual periods (intervals exceeding 35 days).
Learn more at: www.fertilitypedia.org/edu/symptoms/infrequent-menstruation-1

Irregular menstruation
Irregular menstruation is a menstrual disorder whose manifestations include irregular cycle lengths as well as metrorrhagia
Learn more at: www.fertilitypedia.org/edu/symptoms/irregular-menstruation

Ovarian cysts
A fluid-filled sac or pockets that develops on a woman's ovary.
Learn more at: www.fertilitypedia.org/edu/symptoms/ovarian-cysts

Overweight
Body weight that's greater than what is considered healthy for a certain height.
Learn more at: www.fertilitypedia.org/edu/symptoms/overweight

Sleep apnea
Pauses in breathing or periods of shallow breathing during sleep.
Learn more at: www.fertilitypedia.org/edu/symptoms/sleep-apnea

Virilization
The biological development of sex differences, changes that make a male body different from a female body.
Learn more at: www.fertilitypedia.org/edu/symptoms/virilization

Therapies

Acupuncture
A form of alternative medicine and a key component of traditional Chinese medicine involving thin needles inserted into the body at acupuncture points
Learn more at: www.fertilitypedia.org/edu/therapies/acupuncture

Bariatric surgery
A variety of surgical procedures to reduce weight performed on people who have obesity.
Learn more at: www.fertilitypedia.org/edu/therapies/bariatric-surgery
**Egg donation**
Process by which a woman donates eggs for purposes of assisted reproduction or biomedical research.
Learn more at: [www.fertilitypedia.org/edu/therapies/egg-donation](http://www.fertilitypedia.org/edu/therapies/egg-donation)

**ICSI**
A micromanipulative fertilization technique in which a single sperm is injected directly into an egg.
Learn more at: [www.fertilitypedia.org/edu/therapies/icsi](http://www.fertilitypedia.org/edu/therapies/icsi)

**Ovarian drilling**
A surgical treatment that can trigger ovulation in women with polycystic ovary syndrome (PCOS).
Learn more at: [www.fertilitypedia.org/edu/therapies/ovarian-drilling](http://www.fertilitypedia.org/edu/therapies/ovarian-drilling)

**Pharmacotherapy of PCOS**
Medications used in the management of polycystic ovary syndrome.
Learn more at: [www.fertilitypedia.org/edu/therapies/pharmacotherapy-of-pcos](http://www.fertilitypedia.org/edu/therapies/pharmacotherapy-of-pcos)

**Physical exercise**
Physical exercise is any bodily activity that enhances or maintains physical fitness and overall health and wellness.
Learn more at: [www.fertilitypedia.org/edu/therapies/physical-exercise-1](http://www.fertilitypedia.org/edu/therapies/physical-exercise-1)

**Sperm donation**
The procedure in which a man (sperm donor) provides his sperm for fertility treatment.
Learn more at: [www.fertilitypedia.org/edu/therapies/sperm-donation](http://www.fertilitypedia.org/edu/therapies/sperm-donation)

**Standard IVF**
A process in which an egg is fertilised by sperm outside the body: in vitro. Own or donated gametes may be used.
Learn more at: [www.fertilitypedia.org/edu/therapies/standard-ivf](http://www.fertilitypedia.org/edu/therapies/standard-ivf)

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**Gallery**

**Polycystic ovary**
*Sonogram of several cysts in polycystic ovary.*

**Ultrasound PCOS**
*Transvaginal ultrasound scan of polycystic ovary.*
Sources

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