**AMADI VERA HOMA**

**15/MHS06/014**

**MLS514**

1. A hormone is any member of a class of [signaling molecules](https://en.wikipedia.org/wiki/Cell_signaling), produced by [glands](https://en.wikipedia.org/wiki/Gland) in [multicellular organisms](https://en.wikipedia.org/wiki/Multicellular_organism), that are transported by the [circulatory system](https://en.wikipedia.org/wiki/Circulatory_system) to target distant organs to regulate [physiology](https://en.wikipedia.org/wiki/Physiology) and [behavior](https://en.wikipedia.org/wiki/Behavior). Hormones serve to communicate between [organs](https://en.wikipedia.org/wiki/Organ_(anatomy)) and tissues for [physiological](https://en.wikipedia.org/wiki/Physiological) regulation and [behavioral](https://en.wikipedia.org/wiki/Behavioral) activities such as [digestion](https://en.wikipedia.org/wiki/Digestion), [metabolism](https://en.wikipedia.org/wiki/Metabolism), [respiration](https://en.wikipedia.org/wiki/Respiration_(physiology)), [tissue](https://en.wikipedia.org/wiki/Tissue_(biology)) function, [sensory perception](https://en.wikipedia.org/wiki/Sensory_perception), [sleep](https://en.wikipedia.org/wiki/Sleep), [excretion](https://en.wikipedia.org/wiki/Excretion), [lactation](https://en.wikipedia.org/wiki/Lactation), [stress](https://en.wikipedia.org/wiki/Stress_(physiology)) induction, [growth and development](https://en.wikipedia.org/w/index.php?title=Human_development_n_(biology)&action=edit&redlink=1), [movement](https://en.wikipedia.org/wiki/Motor_coordination), [reproduction](https://en.wikipedia.org/wiki/Reproduction), and [mood](https://en.wikipedia.org/wiki/Mood_(psychology)) manipulation. Hormones affect distant cells by binding to specific [receptor](https://en.wikipedia.org/wiki/Receptor_(biochemistry)) proteins in the target cell, resulting in a change in cell function. When a hormone binds to the receptor, it results in the activation of a [signal transduction](https://en.wikipedia.org/wiki/Signal_transduction) pathway that typically activates gene [transcription](https://en.wikipedia.org/wiki/Transcription_(genetics)), resulting in increased [expression](https://en.wikipedia.org/wiki/Gene_expression) of target proteins; non-genomic effects are more rapid, and can be [synergistic](https://en.wikipedia.org/wiki/Synergy) with genomic effects.

**HORMONES OF THE ANTERIOR PITUITARY**

A major [organ](https://en.wikipedia.org/wiki/Organ_(anatomy)) of the [endocrine system](https://en.wikipedia.org/wiki/Endocrine_system), the anterior pituitary (also called the adenohypophysis or pars anterior) is the [glandular](https://en.wikipedia.org/wiki/Glandular), [anterior](https://en.wikipedia.org/wiki/Anatomical_terms_of_location#Usage_in_human_anatomy) lobe that together with the [posterior](https://en.wikipedia.org/wiki/Anatomical_terms_of_location#Usage_in_human_anatomy) lobe ([posterior pituitary](https://en.wikipedia.org/wiki/Posterior_pituitary), or the neurohypophysis) makes up the [pituitary gland](https://en.wikipedia.org/wiki/Pituitary_gland) (hypophysis). The anterior pituitary regulates several [physiological](https://en.wikipedia.org/wiki/Physiological) processes, including [stress](https://en.wikipedia.org/wiki/Stress_(medicine)), [growth](https://en.wikipedia.org/wiki/Human_development_(biology)), [reproduction](https://en.wikipedia.org/wiki/Reproduction), and [lactation](https://en.wikipedia.org/wiki/Lactation). Proper functioning of the anterior pituitary and of the organs it regulates can often be ascertained via [blood tests](https://en.wikipedia.org/wiki/Blood_test) that measure [hormone](https://en.wikipedia.org/wiki/Hormone) levels.

The anterior pituitary contains five types of endocrine cell, and they are defined by the hormones they secrete: [somatotropes](https://en.wikipedia.org/wiki/Somatotropic_cell) (GH); [Lactotropes](https://en.wikipedia.org/wiki/Prolactin_cell) (PRL); [gonadotropes](https://en.wikipedia.org/wiki/Gonadotropic_cell) (LH and FSH); [corticotropes](https://en.wikipedia.org/wiki/Corticotropic_cell) (ACTH) and [thyrotropes](https://en.wikipedia.org/wiki/Thyrotropic_cell) (TSH). It also contains non-endocrine [folliculostellate cells](https://en.wikipedia.org/wiki/Folliculostellate_cell) which are thought to stimulate and support the endocrine cell populations.

Hormones secreted by the anterior pituitary are [trophic hormones](https://en.wikipedia.org/wiki/Trophic_hormone). Trophic hormones directly affect growth either as hyperplasia or hypertrophy on the tissue it is stimulating. Tropic hormones are named for their ability to act directly on target tissues or other [endocrine glands](https://en.wikipedia.org/wiki/Endocrine_gland) to release hormones, causing numerous cascading physiological responses.

Some of the hormones secreted by the anterior pituitary and their description includes:

1. **Adrenocorticotrophic Hormone (ACTH):** It is a polypeptide, it acts on the adrenal gland and makes it secretes glucorticoid, mineralocorticoid and androgens as an effect.
2. **Thyroid Stimulating Hormone (TSH):** It is a glycoprotein. It is released by the anterior pituitary when acted on by the thyrid releasing hormone from the hypothalamus, it acts on the throid gland causing it to release thyroid hormones
3. **Follicule Stimulating Hormone (FSH):** It is a glycoprotein made up of gonadotrophs. It is released by the anterior pituitary when acted on by the gonadotrophin releasing hormone from the hypothalamus. FSH acts on the gonads which leads to the growth of the reproductive system.
4. **Leutinizing Hormone (LH):** It is a glycoprotein made up of gonadotrophs. It is released by the anterior pituitary when acted on by the gonadotrophin releasing hormone from the hypothalamus. LH acts on the gonads which leads to the production of sex hormones
5. **Growth Hormone:** It is a polypeptide, made up of cells known as somatotrophs. It is released when anterior pituitary when acted on by the growth hormone releasing hormone. Growth hormone acts on the liver, adipose tissue which leads to lipid and carbohydrate metabolism as well as promoting growth.
6. **Prolactin:** It is a polypeptide made up of cells known as lactotrophs. When released by the anterior pituitary, it acts on the ovaries, mammary glands, testes, prostate which leads to the secretion of estrogen/ progesterone, production of milk, spermatogenesis, prostate hyperplasia

1b.

**Letrozole:** Letrozole is an anti-estrogen of the Aromatase Inhibitor (AI) family and is one of the most potent and powerfully effective of all AI’s. Letrozole is an AI, which holds the purpose of blocking the aromatase enzyme, which is in turn responsible for the production of estrogen. By inhibiting estrogen production, this lowers total serum estrogen levels in the body. This will be useful to the breast cancer patient on the basis of such cancer often feeding off the estrogen hormone. It will be beneficial to the anabolic steroid user as excess estrogen often leads to some of the most commonly associated side effects of anabolic steroid use. Letrozole also carries the ability to increase natural testosterone production through an increase in Luteinizing Hormone (LH) and Follicle Stimulating Hormone (FSH).

By including Letrozole in a cycle that contains aromatizing anabolic steroids, this can prevent the estrogenic related side effects. This will protect the individual from gynecomastia and water retention. Further, while many steroids can promote high blood pressure despite aromatization, an AI will improve the individual’s odds when water retention is the culprit. Heavy excess water retention is normally the number one cause of high blood pressure among steroid users.

Undeniably, AI’s like Letrozole are the most effect means at combating estrogenic related side effects. However, they can also have a negative impact on cholesterol. Alone AI’s do not appear to have a strong, negative effect on cholesterol, but when coupled with an aromatizing steroid like testosterone the adverse cholesterol effect is enhanced.

With its ability to promote natural testosterone production, Letrozole is often an appealing choice for Post Cycle Therapy (PCT) plans. This can also make it appealing for low testosterone treatment, but it’s often not enough. However, for PCT purposes, while it can be effective it’s generally not recommended. The primary purpose of PCT is stimulating natural testosterone production, which Letrozole can do very well.

**Clomiphene:** Clomiphene is a widely used effective medicine to treat infertility in women. Certain unique features of this well-known fertility drug account for its popularity. It is within affordable cost and can be easily administered. This fertility drug has good success rate in inducing ovulation which is an important consideration in infertility treatment. There is a lot of similarity between Clomiphene and estrogen in the structure. This makes the feedback receptors in the brain to receive Clomiphene instead of estrogen. This makes the brain incapable of identifying the normal levels of estrogen. The brain receptors think that estrogen levels are low and they trigger the release of F.S.H from the pituitary gland. Thus Clomiphene stimulates the brain to stimulate the pituitary which results in variance stimulation and ovulation. Clomiphene induces ovulation by binding the E2 receptors in the Hypothalamus. This creates a state of hypoestrogenecity and causes the release of GnRH hormone which motivates ovulation due to the increased secretion of gonadotropins.

Clomiphene is an active agent in the stimulation of E2 synthesis in the ovaries. It promotes an increased development of follicles which otherwise would not develop under normal circumstances. In patients under Clomiphene therapy additional follicles develop rapidly leading to pregnancy. Clomiphene acts directly to induce ovulation in about seventy percent of cases but pregnancy rates nearly about 25-30% of cases.

**Menotrophin:** Menotropin (also called human menopausal gonadotropin or hMG) is a [hormonally](https://en.m.wikipedia.org/wiki/Hormone) active medication for the treatment of [fertility disturbances](https://en.m.wikipedia.org/wiki/Fertility_disturbances). Menotropins are a standardized mixture of follicle-stimulating hormones and luteinizing hormones. These chemicals are derived from the urine of postmenopausal women. Clomiphene is a synthetic ovulation stimulant. Urine of postmenopausal women reflects the hypergonadotropic state of menopause -levels of follicle stimulating hormone (FSH) and luteinizing hormone (LH) are high - and contain a mixture of these gonadotropins. It is used when clomiphene is not effective  
**For induction of ovulation and assisted reproductive technologies (ART**): Menotropins prepare the ovarian follicle for ovulation. The combination of FSH and LH stimulates follicular growth and maturation. Chorionic gonadotropin, whose actions are nearly identical to those of LH, is administered following menotropins treatment to mimic the naturally occurring surge of LH that triggers ovulation.  
**For treatment of male infertility:** Following administration of chorionic gonadotropin to increase testosterone concentrations in men with hypogonadotropic hypogonadism, administration of menotropins induces spermatogenesis.

1. **The condition stated is known as Amenorrhea.**

Menstruation, also known as a period or monthly, is the regular discharge of blood and mucosal tissue (known as menses) from the inner lining of the uterus through the vagina.

It is condition whereby there is absence of menstruation in a woman of reproductive age. It could be primary or secondary.

Primary amenorrhea is a condition where there is total absence of menstruation in a woman of reproductive age. In this condition the woman has come of age for menstruation but has never menstruated.

Secondary Amenorrhea is a condition whereby a woman in her reproductive age has not menstruated for three consecutive months in the absence of pregnancy. In this condition, the reproductive woman has been menstruating over the years but it has been consecutively absent for the past three months. **This condition suits the condition of the woman in the question; the woman has secondary amenorrhea.**

Causes of Amenorrhea includes;

**Natural amenorrhea**: During the normal course of your life, you may experience amenorrhea for natural reasons, such as: pregnancy, breast-feeding, menopause.

**Contraceptives**: Some women who take birth control pills may not have periods. Even after stopping oral contraceptives, it may take some time before regular ovulation and menstruation return. Contraceptives that are injected or implanted also may cause amenorrhea, as can some types of intrauterine devices.

**Medications**: Certain medications can cause menstrual periods to stop, including some types of: antipsychotics, cancer chemotherapy, antidepressants, blood pressure drugs, allergy medications

**Lifestyle factors**: Sometimes lifestyle factors contribute to amenorrhea, for instance:

* **Low body weight.** Excessively low body weight — about 10 percent under normal weight — interrupts many hormonal functions in your body, potentially halting ovulation. Women who have an eating disorder, such as anorexia or bulimia, often stop having periods because of these abnormal hormonal changes.
* **Excessive exercise**. Women who participate in activities that require rigorous training, such as ballet, may find their menstrual cycles interrupted. Several factors combine to contribute to the loss of periods in athletes, including low body fat, stress and high energy expenditure.
* **Stress.** Mental stress can temporarily alter the functioning of your hypothalamus — an area of your brain that controls the hormones that regulate your menstrual cycle. Ovulation and menstruation may stop as a result. Regular menstrual periods usually resume after your stress decreases.

**Hormonal imbalance**: Many types of medical problems can cause hormonal imbalance, including:

* **Polycystic ovary syndrome (PCOS)**. PCOS causes relatively high and sustained levels of hormones, rather than the fluctuating levels seen in the normal menstrual cycle.
* **Thyroid malfunction.** An overactive thyroid gland (hyperthyroidism) or underactive thyroid gland (hypothyroidism) can cause menstrual irregularities, including amenorrhea.
* **Pituitary tumor**. A noncancerous (benign) tumor in your pituitary gland can interfere with the hormonal regulation of menstruation.
* **Premature menopause**. Menopause usually begins around age 50. But, for some women, the ovarian supply of eggs diminishes before age 40, and menstruation stops.

**Structural problems**: Problems with the sexual organs themselves also can cause amenorrhea. Examples include:

* **Uterine scarring.** Asherman’s syndrome, a condition in which scar tissue builds up in the lining of the uterus, can sometimes occur after a dilation and curettage (D&C), cesarean section or treatment for uterine fibroids. Uterine scarring prevents the normal buildup and shedding of the uterine lining.
* **Lack of reproductive organs**. Sometimes problems arise during fetal development that lead to a girl being born without some major part of her reproductive system, such as her uterus, cervix or vagina. Because her reproductive system didn’t develop normally, she can’t have menstrual cycles.
* **Structural abnormality of the vagina**. An obstruction of the vagina may prevent visible menstrual bleeding. A membrane or wall may be present in the vagina that blocks the outflow of blood from the uterus and cervix.

Periods can also sometimes stop as a result of a long-term medical condition, such as heart disease, uncontrolled diabetes, an overactive thyroid, or premature ovarian failure.

**Hypothalamic and pituitary causes**: The ovaries require physiologic stimulation by pituitary gonadotropins for appropriate follicular development and estrogen production. Functional hypothalamic amenorrhea occurs when the hypothalamic-pituitary-ovarian axis is suppressed due to an energy deficit stemming from stress, weight loss (independent of original weight), excessive exercise, or disordered eating. It is characterized by a low estrogen state without other organic or structural disease.

**Primary ovarian insufficiency/premature ovarian failure**: Primary ovarian insufficiency, also called premature ovarian failure (menopause before age 40) can be caused by: abnormal chromosomes, immune disorders, damage to the ovaries from chemotherapy or radiation.

**LABORATORY FINIDINGS IN AMENORRHEA**

### Urine or serum pregnancy test: Pregnancy test should be negative. This is done to rule out pregnancy especially in cases of secondary amenorrhea. Some patients with amenorrhea may have positive urine or serum [pregnancy test](https://www.wikidoc.org/index.php/Pregnancy_test), which is usually suggestive of [pregnancy](https://www.wikidoc.org/index.php/Pregnancy)-induced amenorrhea.

### Thyroid Function Tests: Thyroid function tests in patients of amenorrhea include:

* + Elevated [TSH](https://www.wikidoc.org/index.php/TSH) and reduced free [thyroxine (T4)](https://www.wikidoc.org/index.php/Thyroxine), suggestive of [hypothyroidism](https://www.wikidoc.org/index.php/Hypothyroidism).
  + Reduced [TSH](https://www.wikidoc.org/index.php/TSH) and elevated [T4](https://www.wikidoc.org/index.php/Thyroxine), suggestive of [hyperthyroidism](https://www.wikidoc.org/index.php/Hyperthyroidism).
  + Elevated [anti-thyroglobulin antibodies](https://www.wikidoc.org/index.php/Antithyroglobulin_antibody) and anti-[thyroid peroxidase](https://www.wikidoc.org/index.php/Thyroid_peroxidase) [antibodies](https://www.wikidoc.org/index.php/Antibodies), suggestive of [thyroiditis](https://www.wikidoc.org/index.php/Thyroiditis).
  + Elevated anti-[thyrotropin receptor](https://www.wikidoc.org/index.php/Thyrotropin_receptor) [antibodies](https://www.wikidoc.org/index.php/Antibodies), suggestive of [Graves' disease](https://www.wikidoc.org/index.php/Graves%27_disease).

### Prolactin (PRL): Some patients with amenorrhea may have elevated concentration of [prolactin](https://www.wikidoc.org/index.php/Prolactin), which is usually suggestive of amenorrhea due to [hyperprolactinemia](https://www.wikidoc.org/index.php/Hyperprolactinemia) (may be due to [pituitary](https://www.wikidoc.org/index.php/Pituitary) causes, such as [prolactinoma](https://www.wikidoc.org/index.php/Prolactinoma)).

### Basal plasma gonadotropins: Basal plasma [gonadotropins](https://www.wikidoc.org/index.php/Gonadotropins) in patients of amenorrhea include:

* + Reduced [luteinizing hormone (LH)](https://www.wikidoc.org/index.php/Luteinizing_hormone) and [FSH](https://www.wikidoc.org/index.php/FSH), suggestive of [hypothalamic](https://www.wikidoc.org/index.php/Hypothalamic) and [pituitary](https://www.wikidoc.org/index.php/Pituitary) diseases or [premature ovarian failure](https://www.wikidoc.org/index.php/Premature_ovarian_failure).
  + Reduced [LH](https://www.wikidoc.org/index.php/LH), suggestive of complete [androgen insensitivity syndrome](https://www.wikidoc.org/index.php/Androgen_insensitivity_syndrome).

### Estradiol: Estradiol interpretation in patients of amenorrhea include:

* + Reduced [estradiol](https://www.wikidoc.org/index.php/Estradiol), suggestive of [ovarian failure](https://www.wikidoc.org/index.php/Ovarian_failure) or [pituitary](https://www.wikidoc.org/index.php/Pituitary) causes.
  + Elevated [estradiol](https://www.wikidoc.org/index.php/Estradiol), suggestive of [androgen insensitivity syndrome](https://www.wikidoc.org/index.php/Androgen_insensitivity_syndrome).

### Progesterone: Some patients with amenorrhea may have reduced concentration of [progesterone](https://www.wikidoc.org/index.php/Progesterone), which is usually suggestive of [ovarian failure](https://www.wikidoc.org/index.php/Ovarian_failure).

### Free and total testosterone: Some patients with amenorrhea may have elevated concentration of [testosterone](https://www.wikidoc.org/index.php/Testosterone), which is usually suggestive of amenorrhea due to complete [androgen insensitivity syndrome](https://www.wikidoc.org/index.php/Androgen_insensitivity_syndrome).

### Dehydroepiandrosterone sulfate (DHEAS): Some patients with amenorrhea may have elevated concentration of [dehydroepiandrosterone sulfate (DHEAS)](https://www.wikidoc.org/index.php/Dehydroepiandrosterone_sulfate), which is usually suggestive of amenorrhea due to [polycystic ovary syndrome (PCOS)](https://www.wikidoc.org/index.php/Polycystic_ovary_syndrome).

### Delta 4-androstenedione: Some patients with amenorrhea may have elevated concentration of [delta 4-androstenedione](https://www.wikidoc.org/index.php/Androstenedione), which is usually suggestive of amenorrhea due to [polycystic ovary syndrome (PCOS)](https://www.wikidoc.org/index.php/Polycystic_ovary_syndrome).

### 17-hydroxyprogesterone: Some patients with amenorrhea may have elevated concentration of [17-hydroxyprogesterone](https://www.wikidoc.org/index.php/17-hydroxyprogesterone), which is usually suggestive of amenorrhea due to [congenital adrenal hyperplasia (CAH)](https://www.wikidoc.org/index.php/Congenital_adrenal_hyperplasia_(CAH)).

### Fasting insulin: Some patients with amenorrhea may have elevated concentration of fasting [insulin](https://www.wikidoc.org/index.php/Insulin), which is usually suggestive of amenorrhea due to [polycystic ovary syndrome (PCOS)](https://www.wikidoc.org/index.php/Polycystic_ovary_syndrome).

### Fasting glucose (FBS): Some patients with amenorrhea may have elevated concentration of [fasting glucose (FBS)](https://www.wikidoc.org/index.php/Fasting_plasma_glucose), which is usually suggestive of amenorrhea due to [polycystic ovary syndrome (PCOS)](https://www.wikidoc.org/index.php/Polycystic_ovary_syndrome).

### Insulin resistance indexes: Some patients with amenorrhea may have elevated [insulin resistance](https://www.wikidoc.org/index.php/Insulin_resistance) indexes, which is usually suggestive of amenorrhea due to [polycystic ovary syndrome (PCOS)](https://www.wikidoc.org/index.php/Polycystic_ovary_syndrome).

### Adrenocorticotropic hormone (ACTH): Some patients with amenorrhea may have elevated concentration of [adrenocorticotropic hormone (ACTH)](https://www.wikidoc.org/index.php/Adrenocorticotropic_hormone), which is usually suggestive of amenorrhea due to [pituitary](https://www.wikidoc.org/index.php/Pituitary) causes ([ACTH-secreting adenoma](https://www.wikidoc.org/index.php/Adreno-corticotrophic_adenoma)).

### Cortisol: Some patients with amenorrhea may have elevated concentration of [cortisol](https://www.wikidoc.org/index.php/Cortisol), which is usually suggestive of amenorrhea due to [pituitary](https://www.wikidoc.org/index.php/Pituitary) causes ([ACTH-secreting adenoma](https://www.wikidoc.org/index.php/Adreno-corticotrophic_adenoma)).

### Markers of ovarian tumors: Some patients with amenorrhea may have elevated concentration of markers of [ovarian tumors](https://www.wikidoc.org/index.php/Ovarian_cancer), which is usually suggestive of [ovarian failure](https://www.wikidoc.org/index.php/Ovarian_failure) (due to [adenocarcinoma](https://www.wikidoc.org/index.php/Adenocarcinoma)).

### Progesterone challenge test: [Progesterone](https://www.wikidoc.org/index.php/Progesterone) challenge test is used in secondary amenorrhea with normal female [androgen](https://www.wikidoc.org/index.php/Androgen) in order to measure circulating [estrogen](https://www.wikidoc.org/index.php/Estrogen). It reveals the insufficient [endometrial](https://www.wikidoc.org/index.php/Endometrial) estrogenization. It is consisted of [Provera](https://www.wikidoc.org/index.php/Provera) 10 mg PO for 7 days and then following for [bleeding](https://www.wikidoc.org/index.php/Menstrual_bleeding). If patient bleed it means that [estrogen](https://www.wikidoc.org/index.php/Estrogen) is repleted, [hypothalamic-pituitary-ovarian (HPO) axis](https://www.wikidoc.org/index.php/Hypothalamic-pituitary-gonadal_axis) immaturity or [PCOS](https://www.wikidoc.org/index.php/PCOS).

### Leptin: Some patients with amenorrhea may have reduced concentration of [leptin](https://www.wikidoc.org/index.php/Leptin), which is usually suggestive of amenorrhea due to [hypothalamic](https://www.wikidoc.org/index.php/Hypothalamic) disorders.

### Inhibin: Some patients with amenorrhea may have reduced concentration of [inhibin](https://www.wikidoc.org/index.php/Inhibin), which is usually suggestive of amenorrhea due to [ovarian failure](https://www.wikidoc.org/index.php/Ovarian_failure).

2b. The woman described is known to be on going menopause.

**Menopause**, also known as the **climacteric**, is the time in most women's lives when [menstrual periods](https://en.wikipedia.org/wiki/Menstrual_cycle) stop permanently, and they are no longer [able to bear children](https://en.wikipedia.org/wiki/Fertility). It occurs when the ovaries are no longer responsive to the gonadotropins such as follicle stimulating hormone and leutinizing hormone, therefore there’ll be no production of estrogen and progesterone. It usually occurs in women within 49 and 52 years of age. It is the opposite of menarche.

Menopause is usually naturally induced but can occur earlier in women who smoke tobacco, menopause can also occur after oophorectomy (surgical removal of the ovaries) or prematureovria failure.

Treatment is not needed for menopause but there are some medications that help ease the symptoms.

There are three phases of menopause

1. Premenopause: Premenopause is a term used to mean the years leading up to the last period, when the levels of reproductive hormones are becoming more variable and lower, and the effects of hormone withdrawal are present. Premenopause starts some time before the monthly cycles become noticeably irregular in timing
2. Perimenopause: The term "perimenopause", which literally means "around the menopause", refers to the menopause transition years before the date of the final episode of flow. According to the [North American Menopause Society](https://en.wikipedia.org/wiki/North_American_Menopause_Society), this transition can last for four to eight years. The [Centre for Menstrual Cycle and Ovulation Research](https://en.wikipedia.org/wiki/Centre_for_Menstrual_Cycle_and_Ovulation_Research) describes it as a six- to ten-year phase ending 12 months after the last menstrual period. During perimenopause, [estrogen](https://en.wikipedia.org/wiki/Estrogen) levels average about 20–30% higher than during premenopause, often with wide fluctuations These fluctuations cause many of the physical changes during perimenopause as well as menopause, especially during the last 1–2 years of perimenopause (before menopause). Some of these changes are [hot flashes](https://en.wikipedia.org/wiki/Hot_flash), night sweats, difficulty sleeping, mood swings, [vaginal dryness](https://en.wikipedia.org/wiki/Vaginal_dryness) or [atrophy](https://en.wikipedia.org/wiki/Vaginal_atrophy), [incontinence](https://en.wikipedia.org/wiki/Fecal_incontinence), [osteoporosis](https://en.wikipedia.org/wiki/Osteoporosis), and heart disease. During this period, [fertility](https://en.wikipedia.org/wiki/Fertility) diminishes but is not considered to reach zero until the official date of menopause. The official date is determined retroactively, once 12 months have passed after the last appearance of menstrual blood.
3. Postmenopause: The term "postmenopausal" describes women who have not experienced any menstrual flow for a minimum of 12 months, assuming that they have a [uterus](https://en.wikipedia.org/wiki/Uterus) and are not pregnant or [lactating](https://en.wikipedia.org/wiki/Lactation). In women without a uterus, menopause or postmenopause can be identified by a blood test showing a very high FSH level. Thus postmenopause is the time in a woman's life that takes place after her last period or, more accurately, after the point when her ovaries become inactive. The reason for this delay in declaring postmenopause is because periods are usually erratic at this time of life. Therefore, a reasonably long stretch of time is necessary to be sure that the cycling has ceased. At this point a woman is considered infertile; however, the possibility of becoming pregnant has usually been very low (but not quite zero) for a number of years before this point is reached.

A woman's reproductive hormone levels continue to drop and fluctuate for some time into post-menopause, so hormone withdrawal effects such as hot flashes may take several years to disappear.

The following are the general signs and symptoms of menopause: Symptoms that may appear during menopause and continue through postmenopause include:

* [painful intercourse](https://en.wikipedia.org/wiki/Dyspareunia)
* [vaginal dryness](https://en.wikipedia.org/wiki/Vaginal_dryness)
* [atrophic vaginitis](https://en.wikipedia.org/wiki/Atrophic_vaginitis) – thinning of the membranes of the [vulva](https://en.wikipedia.org/wiki/Vulva), the [vagina](https://en.wikipedia.org/wiki/Vagina), the [cervix](https://en.wikipedia.org/wiki/Cervix), and the outer [urinary tract](https://en.wikipedia.org/wiki/Urinary_tract), along with considerable shrinking and loss in elasticity of all of the outer and inner genital areas.

Other physical symptoms of menopause include [lack of energy](https://en.wikipedia.org/wiki/Fatigue_(medical)), [joint soreness](https://en.wikipedia.org/wiki/Arthralgia), [stiffness](https://en.wikipedia.org/wiki/Joint_stiffness), [back pain](https://en.wikipedia.org/wiki/Back_pain), breast enlargement, [breast pain](https://en.wikipedia.org/wiki/Mastodynia), [heart palpitations](https://en.wikipedia.org/wiki/Heart_palpitation), [headache](https://en.wikipedia.org/wiki/Headache), [dizziness](https://en.wikipedia.org/wiki/Dizziness), [dry](https://en.wikipedia.org/wiki/Xeroderma), [itchy](https://en.wikipedia.org/wiki/Itch) skin, thinning, [tingling](https://en.wikipedia.org/wiki/Paresthesia) skin, [weight gain](https://en.wikipedia.org/wiki/Obesity), [urinary incontinence](https://en.wikipedia.org/wiki/Urinary_incontinence), [urinary urgency](https://en.wikipedia.org/wiki/Urinary_urgency), interrupted sleeping patterns, heavy [night sweats](https://en.wikipedia.org/wiki/Night_sweat), and [hot flashes](https://en.wikipedia.org/wiki/Hot_flash).

### Mood and memory effects: Psychological symptoms include [anxiety](https://en.wikipedia.org/wiki/Anxiety), poor memory, inability to concentrate, depressive mood, [irritability](https://en.wikipedia.org/wiki/Irritability), [mood swings](https://en.wikipedia.org/wiki/Mood_swing), and less [interest in sexual activity](https://en.wikipedia.org/wiki/Libido).

1. Infertility is the inability to produce offspring after one year of intercourse without contraception.

Primary infertility is defined as the absence of a live birth for women who desire a child and have been in a union for at least 12 months, during which they have not used any contraceptives.

Secondary infertility is defined as the absence of a live birth for women who desire a child and have been in a union for at least 12 months since their last live birth, during which they did not use any contraceptives

**CAUSES OF INFERTILITY**

The most common causes of infertility include;

In women: overweight/underweight, ovulation disorders, uterine or cervical abnormalities, fallopian tube damage or blockage, endometrioses, primary ovarian insufficiency, pelvic adhesions, cancer and its treatment.

In men: abnormal sperm production or function, overexposure to certain environmental factors such as cigarette smoking, alcohol intake, anabolic steroids and use of some medication such as flagyl for bacterial infection, damage related to cancer and its treatment

**INVESTIGATION OF MALE INFERTILITY**

Diagnosing male infertility problems usually involves:

* General physical examination: this includes overall body habitus (e.g obesity, muscular development, virilisation).location, size and consistency of the testes and presence and absence of ductal structures.
* Medical history: this includes medical illness and medications, surgical interventions in the past, sexual ability/ limitation, lifestyle factors (smoking drinking), supplement usage (vitamins, oral antioxidant) and history of malignancy.
* Semen analysis: A sample is studied with a microscope to determine the number of sperm, the appearance of the sperm, and the ability of the sperm to move. A low sperm count decreases fertility.
* Hormone testing: Hormones produced by the pituitary gland, hypothalamus and testicles play a key role in sexual development and sperm production. Abnormalities in other hormonal or organ systems also might contribute to infertility. A blood test measures the level of testosterone and other hormones.
* Post-ejaculation urinalysis: Sperm in your urine can indicate your sperm are traveling backward into the bladder instead of out the penis during ejaculation (retrograde ejaculation).
* Genetic tests: When sperm concentration is extremely low, there could be a genetic cause. A blood test can reveal whether there are subtle changes in the Y chromosome — signs of a genetic abnormality. Genetic testing might be ordered to diagnose various congenital or inherited syndromes e.g Klinefelter’s syndrome (47 XXY chromosome makeup instead of 46XY).
* Testicular biopsy: This test involves removing samples from the testicle with a needle. If the results of the testicular biopsy show that sperm production is normal, the problem is likely caused by a blockage or another problem with sperm transport
* Transrectal ultrasound: A small, lubricated wand is inserted into the rectum. It allows the doctor to check the prostate and look for blockages of the tubes that carry semen (ejaculatory ducts and seminal vesicles).

**INVESTIGATION OF FEMALE INFERTILITY**

* Medical history: this includes medical illness and medications, surgical interventions in the past, sexual ability/ limitation, lifestyle factors (smoking drinking), supplement usage (vitamins, oral antioxidant) and history of malignancy.
* Ovulation testing: An at-home, over-the-counter ovulation prediction kit detects the surge in luteinizing hormone (LH) that occurs before ovulation. A blood test for progesterone can also show if someone is ovulating. Other hormone levels, such as prolactin, also may be checked.
* Hysterosalpingography: The hysterosalpingogram is an X-ray study of the cervix. A dye is injected that outlines the contours of the uterus. This shows if the fallopian tubes are open or blocked.
* Genetic testing: Genetic testing helps determine whether there is a genetic defect causing infertility. Some patients carry genetic diseases that can cause infertility, such as Fragile X syndrome. Some women can have rearrangements of their chromosomes such that their eggs and sperm can have abnormal chromosomes and this can lead to repeated miscarriage or infertility. These problems are rare but do exist.
* Ovarian reserve testing: This testing helps determine the quality and quantity of eggs available for ovulation.

3b.

* 1. The couple should try the timing method for intercourse: Some individuals try sexual intercourse for conception at the wrong time, this means sex is done during the woman’s safe period (the period during the menstrual cycle when conception is considered least likely to occur; it comprises approximately the ten days after menstruation begins and the ten days preceding menstruation). This is a method where sexual intercourse is done three days before or after ovulation (release of ovum) so the sperm waits for the egg to be released or the egg is released and the sperm meets with it before fertilization can occur. If this method doesn’t work, then the couple can opt for other methods such as assisted reproductive technology.
  2. Assisted reproductive technology (ART) can help the couple achieve conception. Assisted reproductive technology (ART) refers to any fertility treatment or procedure for assisting reproduction that includes the handling of human eggs, sperms or embryos. ART falls into the category of field endocrinology and cryopreservation, reproductive technology and infertility treatments. ART procedures involve surgically removing eggs from a woman ovaries, combining them with sperm in the laboratory and returning them to the woman’s body or donating them to another woman. There are several forms of assisted reproductive technology and they include;
* In vitro fertilization (IVF): In vitro fertilization is a technique which involves fertilization outside the body in an artificial environment. Sperm are placed with unfertilized eggs in a petri dish, where fertilization can take place. The embryo is then placed in the uterus to begin a pregnancy. Sometimes the embryo is frozen for future use.
* Intracytoplasmic sperm injection (ICSI): Intracytoplasmic sperm injection (ICSI) is the injection of single mature immobilized normal spermatozoa into the cytoplasm of a mature metaphase II oocyte. This procedure is most commonly used to overcome male infertility problems, although it may also be used where eggs cannot easily be penetrated by sperm and occasionally in addition to sperm donation. ICSI is the technique of choice in cases of obstructive azoospermia since it enables the best use of micro surgically retrieved spermatozoa from the epididymis or testis.
* Intrauterine insemination: Intrauterine Insemination (IUI) is a fertility treatment that involves placing sperm inside a woman’s uterus to facilitate fertilization. The goal of IUI is to increase the number of sperm that reach the fallopian tubes and subsequently increase the chance of fertilization.
* Surrogacy: Surrogacy is an arrangement, often supported by a legal agreement, whereby a woman (the surrogate mother) agrees to bear a child on behalf of another person who is will become the parent of the child. Surrogacy is considered one of many assisted reproductive technologies. Surrogacy may be either traditional or gestational, which are differentiated by the genetic origin of the egg.
* Sperm or egg donation: If necessary, sperm or eggs can be received from a donor. Fertility treatment with donor eggs is usually done using IVF.

Other assisted reproductive technology may include;

* Zygote intrafallopian transfer
* Gamete intrafallopian transfer
* Artificial embryo twinning
* Embryo donation