Main causes of female infertility

Understanding female infertility as a biological pathway

Pregnancy depends on several steps happening in sequence: the ovary must release a mature egg, sperm must reach the egg through the reproductive tract, fertilization usually occurs in the fallopian tube, the early embryo must travel into the uterus, and the uterine lining must be receptive for implantation. A problem at any point can reduce the probability of pregnancy.

This is why female infertility is usually grouped into categories: ovulatory disorders, diminished ovarian reserve, tubal disease, uterine or cervical factors, endometriosis, systemic medical conditions, lifestyle contributors, and unexplained infertility. These categories often overlap. For example, endometriosis may affect ovarian reserve, fallopian tube function, and pelvic inflammation at the same time.

It is also important to remember that fertility is a couple-based outcome when sperm is involved. A female-factor issue can coexist with male-factor infertility, so a complete evaluation usually includes semen analysis as well as assessment of ovulation, ovarian reserve, uterine anatomy, and tubal patency.

Ovulation disorders: when egg release is irregular or absent

Ovulatory dysfunction is one of the leading causes of female infertility. If ovulation is infrequent, unpredictable, or absent, there are fewer opportunities for sperm and egg to meet. Some people with ovulatory problems have irregular periods, very long cycles, skipped periods, or no menstrual bleeding, while others may have more subtle cycle changes.

Common ovulation-related causes include:

Polycystic ovary syndrome: PCOS is associated with irregular ovulation, androgen excess, and often insulin resistance. It is one of the most common endocrine causes of infertility.
Hypothalamic dysfunction: Significant stress, rapid weight loss, very low body weight, intense exercise, or inadequate energy intake can disrupt signaling from the hypothalamus to the pituitary and ovaries.
Hyperprolactinemia: Elevated prolactin can interfere with gonadotropin secretion and suppress ovulation. It may be related to medications, pituitary conditions, or other medical issues.
Thyroid disease: Both hypothyroidism and hyperthyroidism can disturb menstrual regularity and ovulation.
Primary ovarian insufficiency: Also called premature ovarian insufficiency, this occurs when ovarian function declines earlier than expected, typically before age 40.

Ovulation disorders are often evaluated with menstrual history, hormone testing, ultrasound findings, and sometimes confirmation of ovulation through mid-luteal progesterone or cycle tracking. Treatment depends on the underlying cause, so self-diagnosis based only on cycle apps or home tests can be misleading.

Age and diminished ovarian reserve

Age is one of the most powerful influences on female fertility. Ovaries contain a finite number of follicles, and both the number and genetic quality of eggs decline over time. Fertility typically begins to decrease more noticeably in the 30s, with a sharper decline after the mid-30s, although individual variation is significant.

Diminished ovarian reserve means the quantity of remaining eggs is lower than expected for age. It does not always mean pregnancy is impossible, and it does not directly measure egg quality, but it may affect response to fertility treatment and the time available for conception. Clinicians may assess ovarian reserve with tests such as anti-Mullerian hormone, follicle-stimulating hormone with estradiol, and antral follicle count on ultrasound.

Age-related infertility is not a personal failure. Many people delay pregnancy for education, work, relationships, health, financial stability, or life circumstances. If age is a concern, early consultation with a reproductive endocrinologist can help clarify realistic options, including timed intercourse, ovulation induction, intrauterine insemination, in vitro fertilization, or fertility preservation when appropriate.

Fallopian tube damage or blockage

The fallopian tubes are not passive pipes; they are dynamic structures that help capture the egg, support fertilization, and move the early embryo toward the uterus. If one or both tubes are blocked or damaged, conception may be less likely. Tubal disease can also increase the risk of ectopic pregnancy, in which a pregnancy implants outside the uterus, most commonly in a fallopian tube.

Major causes of tubal factor infertility include pelvic inflammatory disease, previous chlamydia or gonorrhea infection, prior pelvic or abdominal surgery, ruptured appendix, endometriosis-related scarring, and previous ectopic pregnancy. Some infections may cause damage with few or no noticeable symptoms, which is one reason sexual health screening and early treatment of infections matter.

Tests used to evaluate tubal patency may include hysterosalpingography, saline infusion sonography with contrast, or laparoscopy in selected cases. The best next step depends on age, duration of infertility, medical history, and whether one or both tubes appear affected.

Endometriosis and pelvic inflammation

Endometriosis occurs when tissue similar to the uterine lining grows outside the uterus. It can cause pelvic pain, painful periods, pain with sex, bowel or

bladder symptoms, and infertility, although some people have few symptoms. The severity of pain does not always match the degree of fertility impact.

Endometriosis may reduce fertility through several mechanisms. Inflammatory molecules in the pelvis can affect egg quality, sperm function, fertilization, and embryo development. Scar tissue and adhesions can distort pelvic anatomy, making it harder for the fallopian tubes to pick up the egg. Endometriomas, which are ovarian cysts related to endometriosis, may affect ovarian tissue and ovarian reserve.

Diagnosis may involve history, pelvic examination, ultrasound, MRI in selected situations, and sometimes laparoscopy. Management is individualized. Pain-focused hormonal suppression may help symptoms but usually prevents conception while being used, so people actively trying to conceive need fertility-specific guidance rather than general symptom treatment alone.

Uterine causes: fibroids, polyps, adhesions, and anatomy

The uterus must provide a cavity where an embryo can implant and a lining that can support early pregnancy. Structural abnormalities can interfere with implantation, increase miscarriage risk, or make embryo growth more difficult depending on their type, size, and location.

Uterine contributors to infertility include:

Fibroids: These benign muscle tumors are common. Submucosal fibroids, which distort the uterine cavity, are more strongly linked with infertility than fibroids located entirely within the outer uterine wall.
Endometrial polyps: These overgrowths of the uterine lining may interfere with implantation in some cases.
Intrauterine adhesions: Also known as Asherman syndrome, adhesions can develop after uterine surgery, infection, or procedures involving the uterine lining.
Congenital uterine anomalies: A septate uterus or other developmental differences may affect implantation or pregnancy maintenance.

Evaluation may include transvaginal ultrasound, saline infusion sonography, hysteroscopy, MRI, or other imaging depending on the suspected issue. Not every fibroid or uterine variation requires treatment, and decisions should be

individualized with a gynecologist or fertility specialist.

Cervical and immune-related factors

Cervical factors are less common than ovulatory, tubal, or uterine causes, but they can contribute. The cervix produces mucus that changes around ovulation to help sperm enter the uterus. Prior cervical surgery, scarring, stenosis, or abnormalities in cervical mucus may make sperm transport more difficult.

Procedures such as cone biopsy or repeated cervical interventions can sometimes alter cervical anatomy, though many people conceive normally after cervical treatment. Cervical stenosis may be suspected when menstrual flow is obstructed, fertility procedures are difficult, or imaging suggests an issue.

Immune and clotting-related explanations for infertility are complex and sometimes overemphasized in nonmedical settings. Certain autoimmune conditions can affect reproductive health, but broad immune testing without clear indications may lead to confusion and unnecessary treatments. A specialist can help determine when these evaluations are appropriate.

Medical, lifestyle, and environmental contributors

General health and reproductive function are closely connected. Diabetes, untreated thyroid disease, celiac disease, autoimmune disease, kidney disease, and some genetic conditions can affect fertility directly or indirectly. Medications, chemotherapy, pelvic radiation, and some surgeries may also affect ovarian function, uterine anatomy, or hormonal signaling.

Lifestyle factors do not explain every case of infertility, and they should never be used to blame someone. However, they can influence fecundability and treatment outcomes. Smoking is associated with reduced fertility and earlier ovarian aging. Heavy alcohol use, some recreational drugs, very high or very low body weight, nutritional deficiency, and severe chronic stress may affect ovulation, implantation, or pregnancy health.

Environmental exposures, including certain endocrine-disrupting chemicals, workplace toxins, and high levels of some pollutants, are an area of ongoing research. The practical message is not to pursue perfection, but to reduce

avoidable risks where feasible and discuss occupational or environmental concerns with a clinician.

Unexplained infertility and combined factors

Unexplained infertility is diagnosed when standard testing does not identify a clear cause. This can be frustrating because it may sound like a lack of answers rather than a real medical category. In practice, it means that ovulation appears to occur, the fallopian tubes seem open, the uterine cavity does not show a major abnormality, and semen testing is not clearly abnormal, yet pregnancy has not occurred.

Possible hidden contributors include subtle egg or sperm dysfunction, fertilization problems, embryo development issues, mild endometriosis, tubal function problems not visible on routine testing, or endometrial receptivity factors that current tests cannot reliably measure. Age and duration of infertility also influence the likelihood of pregnancy even when tests look reassuring.

Combined infertility is also common. A mild ovulation issue plus borderline sperm parameters, or endometriosis plus diminished ovarian reserve, may have a greater effect together than either factor alone. This is why a broad and balanced evaluation is usually more helpful than focusing only on one suspected cause.

When to seek professional evaluation

Many clinicians recommend seeking evaluation after 12 months of regular unprotected intercourse if the person trying to conceive is under 35, and after 6 months if age 35 or older. Earlier assessment is appropriate if there are irregular or absent periods, known endometriosis, previous pelvic inflammatory disease, recurrent miscarriage, prior chemotherapy or pelvic radiation, known uterine or tubal disease, or a history suggesting premature ovarian insufficiency.

A fertility evaluation may include menstrual and medical history, pelvic ultrasound, ovulation assessment, ovarian reserve testing, thyroid and prolactin testing when indicated, tubal evaluation, uterine cavity assessment,

and semen analysis for the partner if sperm is involved. The aim is not to assign blame, but to map the biology and choose the most appropriate next step.

If you are going through this, it is understandable to feel grief, anger, envy, or exhaustion. Infertility is a medical condition with emotional consequences. Support from clinicians, counselors, peer groups, and trusted people can be as important as laboratory results and imaging reports.