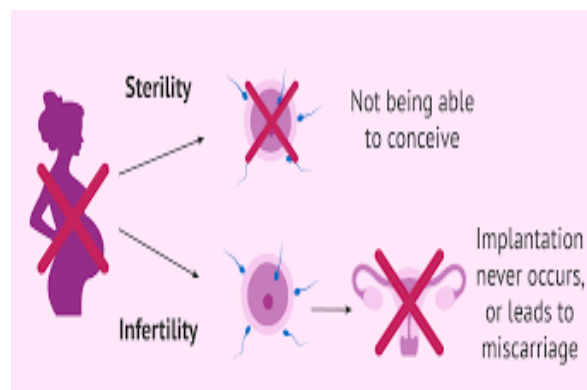


## Infertility

### Introduction:

#### Definition and overview:

Infertility is a disease that can happen to the male or female reproductive system and leads to failure in pregnancy after 12 months of unprotected sex. Infertility could occur due to a female, male, or unexplained reasons. Some causes of infertility are preventable. Treatment of infertility often involves in-vitro fertilization (IVF) and other types of medically assisted reproduction.



#### Historical context:

In centuries past, couples sought all kinds of remedies for childlessness. They prayed and went on pilgrimages. In medieval England, men and women took remedies containing the sexual organs of animals in the belief that this would stimulate their reproductive organs.

#### Epidemiology:

Estimates suggest that approximately one in every six people of reproductive age worldwide experience infertility in their lifetime.

### Etiology:

#### Causes and Risk factors:

##### Causes of male infertility:

Conditions that can affect how much sperm is made or sperm quality, problems with sperm reaching the female reproductive tract, and damage related to cancer and its treatment.

##### Causes of female infertility:

Ovulation disorders affect the release of eggs from the ovaries, conditions of the uterus, fallopian tube damage or blockage, Endometriosis which is tissue that's like the inner lining of the uterus grows outside of the uterus, primary ovarian insufficiency, which happens when the ovaries stop working as they should, Pelvic adhesions and cancer and its treatment.

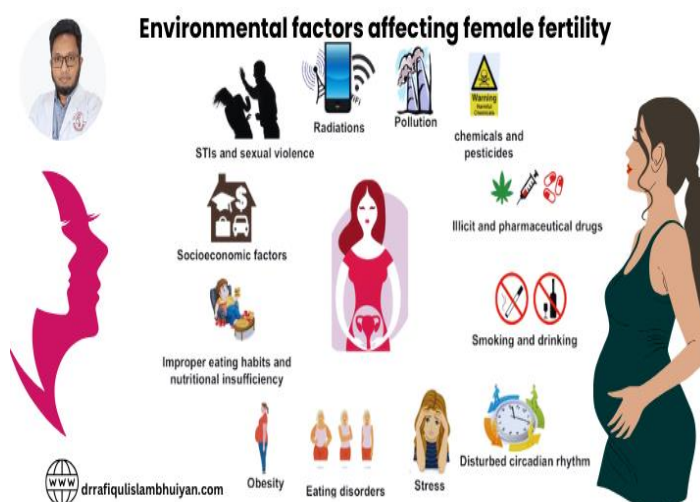
### Risk Factors:

Age, smoking, marijuana use, alcohol use, being overweight, being underweight, and lack of exercise.

### Genetic and Environmental influences:

Infertility can be significantly influenced by genetics. Infertility in men and women can be brought on by genetic issues like chromosomal abnormalities, gene mutations, and epigenetic modifications.

Exposure to toxic chemicals and pollutants can damage the reproductive system and reduce fertility.



### Clinical features:

### Signs and symptoms:

There are no specific symptoms of infertility. The main one is not getting pregnant. Some women with infertility may have irregular menstrual periods or no periods. And some men may have some symptoms of hormonal problems, such as changes in hair growth or sexual function.

### Disease Stages and Progression:

Infertility can be primary or secondary. Primary when a pregnancy has never been achieved by a person. Secondary infertility when at least one prior pregnancy has been achieved.

### Complications:

The most common complication of infertility treatment is multiple pregnancy, twins, triplets, or more. A higher number of unborn babies in the womb raises the risk of premature labor and delivery. There are also other complications like bleeding or infection, and ovarian hyperstimulation syndrome (OHSS).

### Diagnosis:

#### Diagnostic criteria:

If the patient is younger than 35 years, then the health provider will diagnose infertility after one year of unprotected sex. If the patient is 35 years or older the health provider may diagnose infertility after 6 months of unprotected sex.

#### Diagnostic Tests and Procedures:

Tests for infertility include laboratory tests, imaging tests, and certain procedures. Imaging tests and procedures look at the reproductive organs and how they work. Laboratory tests often involve testing samples of blood or semen.

Tests for men include semen analysis, hormone testing, genetic testing, and Testicular biopsy. Tests for women include Hysteroscopy and Hysterosonography.

### Pathophysiology:

#### Mechanism of Disease Development:

Infertility is commonly caused by problems with ovulation (the monthly release of an egg from the ovaries). Some problems stop an egg from being released at all, while others prevent an egg from being released during some cycles but not others. Ovulation problems can be a result of polycystic ovary syndrome (PCOS).

#### Cellular and Molecular Changes:

Female infertility can happen due to Ovulation Disorders, Endometriosis or tubal Factors. Men infertility can occur due to Sperm Defects or Testicular Dysfunction.

#### Impact on Body Systems:

In the female reproductive system, infertility may be caused by a range of abnormalities of the ovaries, uterus, fallopian tubes, and the endocrine system.

## Management and Treatment:

### Medical and Surgical Treatments:

For men's treatment, sometimes, surgery may be able to reverse sperm blockage and restore fertility. In other cases, repairing a large varicocele may improve the overall chances of pregnancy. For women's treatment, some conditions of the uterus can be treated with hysteroscopy. These include polyps, scar tissue, and some fibroids. Laparoscopic surgery with small cuts or traditional surgery with a large cut in the stomach area may be needed to treat conditions such as endometriosis, pelvic adhesions, and larger fibroids. There is also IUI, healthy sperm are placed directly in the uterus around the time that the ovary releases one or more eggs to be fertilized. Depending on the reasons for infertility, IUI can be timed with your menstrual cycle or with the use of fertility medicines. Your partner or a donor provides the sperm.

### Pharmacological Therapies:

For men's treatment, the team may prescribe medicines to improve sperm count and boost the chances of a successful pregnancy. These prescription drugs may help the testicles function better too.

### Lifestyle and Dietary Modifications:

Having sex more often and closer to the time of ovulation. Getting regular exercise. Drinking less alcohol or giving up harmful substances such as tobacco. Stop taking medicines that can affect fertility, but only if the healthcare team recommends it.

### Rehabilitation and Supportive Care:

There is no specific rehabilitation process for infertility. The support for it can be emotional, physical well-being, and medical support.

## Prevention and Control:

Primary, Secondary, and Tertiary Prevention Strategies:

Primary prevention includes eating well, sleeping well, reducing your stress, and taking all things in moderation. Consider your body a temple and take care of it. A good healthy body is a good reproductive body

Secondary prevention includes locating cases of STDS and sexual contact of infected individuals is also an important means of secondary prevention since it allows for early diagnosis and treatment of individuals infected.

### Public Health Interventions:

Public health is trying to control infertility by preventing STLs, early detection through screening, lifestyle modifications, improving access to treatment, and developing new treatments.

### Vaccination and Screening programs:

Reproductive endocrinologists recommend women have the Rubella vaccine before infertility treatment.

Regular screening for STIs can help to prevent infertility and also genetic screening.

### Prognosis:

#### Disease Outcomes and Survival Rates:

Approximately 9 out of 10 couples get pregnant after undergoing fertility treatments. Success depends on the cause of the infertility

#### Factors Influencing Prognosis:

Some factors affect prognosis including age, lifestyle, cause of infertility, duration of infertility, and overall health.

#### Quality of Life:

Infertility has significant negative social impacts on the lives of infertile couples particularly women, who frequently experience violence, divorce, social stigma, emotional stress, depression, anxiety, and low self-esteem.

### Current Research and Future Directions:

### Recent Advances and Discoveries:

In IVF the eggs are extracted from the body surgically and mixed with the sperm then transferred back into the uterus. In IVF women under 40 years old can get pregnant with a success percentage of 40%.

### Ongoing Clinical Trials:

A study to collect ovarian tissue from girls undergoing fertility-preserving cryopreservation. This study aims to study the handling of ovarian tissue, cryopreservation technology, and oocyte maturation for female pediatric cancer patients and other female patients whose future fertility will be affected due to a disease or treatment. A study to evaluate the ability of a newly developed sperm antibody to attach to human sperm from men with normal sperm counts.

### Future Research Needs:

The top research needs for infertility are how to cope with infertility, short and long-term side effects of infertility treatment, alternative therapies, risks associated with ART, the impact of diet on ART and fertility, the impact of exercise on fertility and ART success, and healthy habits.

### Case Studies:

#### Example Cases:

A 42-year-old woman and his husband (42 years) came to the infertility clinic. She had been married for eight years and had two abortions during this time. After the second abortion, dilatation, and curettage (D&C) were done at her hometown hospital. This is a case of secondary infertility. The IVF was done without intracytoplasmic sperm injection (ICSI). The treatment was unsuccessful. On April 1, 2021, oocytes were retrieved from the donor, and ICSI was done using the semen sample of the husband. On April 6, 2021, two embryos at the day six stage were transferred to the patient's uterus. After 14 days of embryo transfer, a beta-human chorionic gonadotrophic hormone ( $\beta$ hCG) test was done. Her  $\beta$ hCG was positive, and the couple was delighted.