Etiological Factors and Diagnosis of Female Infertility: A Literature Review

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Abstract: In modern gynecology, female infertility is one of the most common problems. This article presents statistics, contributing factors, and treatment methods for female infertility. Data from Russian-language research literature were processed and analyzed using the electronic search engines cyberleninka.ru and eLIBRARY in the international Scopus database for the period 2020–2025.
Keywords: Infertility, diagnosis, WHO, pregnancy, and diagnosis.

Introduction

Infertility is defined as the inability of a couple of reproductive age to conceive a child within one year of unprotected intercourse, while female infertility is the inability of a woman of reproductive age to conceive [1].

According to the World Health Organization (WHO), 5% of the population—or 48.5 million couples — are currently infertile, of whom approximately 20 million are experiencing difficulties conceiving their first child. The highest rates of inability to conceive a first child are found among women in some developing countries and Moldova (over 2.5%), while the lowest rates (0.5–0.7%) are in South American countries (Peru, Bolivia, Venezuela, Ecuador) and Poland [2].

According to WHO data, secondary infertility is more common among women in African countries (9–12% of all women) and less common in highly developed countries in Europe and the United States (less than 1% of women). Overall, half of all infertile couples live in South Asian and African countries (14.4 million and 10 million, respectively), which far exceeds the figures for economically prosperous countries in Eastern Europe and Central Asia (3.8 million) [2].

Main Part

There are four general types of infertility: male infertility, where the woman is healthy but the man has reduced sperm fertility; female infertility, where the cause of the couple's inability to conceive lies in the woman's reproductive capacity; and mixed infertility, where both the man and the woman have issues. Unexplained infertility occurs when both the woman and the man are healthy, yet pregnancy does not occur. In percentage terms, male, female, and mixed infertility each account for 30%, while unexplained infertility accounts for 10% [6].

An analysis of the medical literature shows that the causes of infertility in couples include anatomical features of the reproductive system, genetic, endocrine, and immunological pathologies, while the main causes of female infertility are psychogenic factors, ovulation disorders (in 35–40% of cases); tubal-peritoneal factor (in 20–30% of cases); various gynecological diseases (15–25%); and immunological causes (2%) [4–5]. Psychogenic factors include periodic conflicts at work,

dissatisfaction with one's sex life, and fear of pregnancy, all of which can cause disruptions in the ovulation cycle that mimic endocrine infertility [1].
Hyperprolactinemia can also cause anovulation, which is caused by metabolic disorders, hypothyroidism, and hyperthyroidism, leading to endocrine infertility. Female infertility can be caused by luteal phase deficiency of the menstrual cycle, which disrupts embryo implantation and results in spontaneous miscarriage. Luteinized anovulatory follicle syndrome, manifested by premature luteinization of the preovulatory follicle without ovulation, also causes primary infertility [2].
Immune infertility develops due to the formation of antisperm antibodies in a woman, which lead to the phagocytosis of spermatozoa. Overall, a single cause of infertility is identified in 48% of infertile women, while a combination of two or more causes is observed in 52% [2].
Among the causes of female infertility, particular importance is attached to the presence of adhesions in the pelvis, inflammatory diseases of the internal reproductive organs, karyotype abnormalities, and developmental abnormalities of the uterus and fallopian tubes. In recent years, the most common causes of female infertility have been hormone-dependent disorders caused by severe disturbances in the hypothalamic-pituitary-ovarian axis [3].
If a woman suspects she may be infertile, she should first make an appointment with a gynecologist and undergo basic tests. A qualified gynecologist will take a detailed medical history and develop a plan for further evaluation [4].
The following aspects are taken into account:

- The duration of attempts to conceive.
- Characteristics of the menstrual cycle.
- Methods of contraception used.
- Information about previous pregnancies, their outcomes, and course.
- The presence or absence of urogenital system pathologies.
- The presence of unhealthy habits and lifestyle.

Previous examinations and their results, as well as test results. A physical examination may be ordered for a woman suspected of infertility. It consists of the following:
1. Assessment of the degree and nature of body hair, and the presence or absence of acne or stretch marks on the skin.
2. Determination of weight, height, and BMI. If the woman is overweight, additional tests may be ordered to assess the impact of excess weight on her reproductive function.
3. Palpation of the breasts to detect lumps (if present). If female infertility is suspected, laboratory testing is performed. Laboratory procedures play a significant role in diagnosing infertility and its causes. Through laboratory testing, infectious diseases that negatively affect a woman's reproductive health can be identified.
Hormone level tests are a mandatory requirement. The following are tested:

- progesterone;
- first-phase hormones (estradiol, luteinizing hormone, follicle-stimulating hormone, anti-Müllerian hormone, prolactin);
- thyroid hormones

- free testosterone,
- other male sex hormones;
- prolactin.

The next step involves testing for TORCH infections and checking for the presence or absence of antibodies to cytomegalovirus, herpes simplex viruses, and Toxoplasma. A gynecological smear test is mandatory; it can be used to detect yeast infections, gonorrhea, and other infections. You will also need to submit:

- Genital swabs.
- Complete blood count.

The task of determining the causes of infertility can also be accomplished through surgical or instrumental diagnostic procedures. Among the simplest methods for diagnosing infertility is an abdominal or transvaginal ultrasound of the pelvic organs. Its advantage is that it has absolutely no contraindications. This diagnostic method is extremely easy and straightforward to perform. The patient may also be prescribed the following types of examinations:

- HSG;
- colposcopy;
- Schuwarksi test.

The time a patient will need to spend on diagnostic testing varies depending on the suspected condition. For example, screening for polyps and endometrial hyperplasia is typically performed at the end of the menstrual cycle. Testing for many other conditions is scheduled for the beginning of the cycle, on days 5–7.

If the tests prescribed for the patient do not yield the desired results, invasive procedures may be recommended. Among the most common are laparoscopy and hysteroscopy. Their purpose is to identify pathological processes, detect adhesions, and locate polyps. They can also be used to diagnose the presence or absence of adenomyosis and uterine abnormalities [3].

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Conclusions

Many people suffer from infertility today, and the causes of this condition vary from person to person, but a timely and accurate diagnosis is half the battle.

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