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Endocrine System and Women's Reproductive Health

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Annotation: This article analyzes the crucial role of the endocrine system in ensuring women's reproductive health. Hormonal imbalance can lead to infertility, menstrual cycle disorders and other reproductive diseases. The article examines common endocrine pathologies such as polycystic ovary syndrome and thyroid dysfunction and their impact on reproductive function. Modern diagnostic methods and effective treatment strategies, including pharmacological and assisted reproductive technologies, are discussed. The study emphasizes the importance of endocrinological approaches in improving women's reproductive health.

Аннотация: Данная статья анализирует ключевую роль эндокринной системы в обеспечении репродуктивного здоровья женщин. Нарушения гормонального баланса могут приводить к бесплодию, расстройствам менструального цикла и другим репродуктивным патологиям. В работе рассматриваются распространенные эндокринные состояния, такие как синдром поликистозных яичников и дисфункция щитовидной железы, а также их влияние на репродуктивную функцию. Обсуждаются современные методы диагностики и эффективные стратегии лечения, включая фармакологические вмешательства и вспомогательные репродуктивные технологии. Исследование подчеркивает значимость эндокринологических подходов в улучшении репродуктивного здоровья женщин.

Keywords: Endocrine System, Reproductive Health, Women's Health, Hormonal Disorders, Polycystic Ovary Syndrome, Infertility, Diagnosis, Treatment

Ключевые слова: Эндокринная Система, Репродуктивное Здоровье, Женщины, Гормональные Нарушения, Синдром Поликистозных Яичников, Бесплодие, Диагностика, Лечение

Introduction

The complex interrelationship between the endocrine system and women's reproductive health is one of the important areas of modern medicine. According to the World Health Organization (WHO), women's health is not limited to reproductive functions but also includes physical, mental and social well-being [1]. Reproductive health covers the menstrual cycle, hormonal balance, pregnancy and sexual health [3]. The endocrine system regulates reproductive functions through hormones; this process is carried out by the hypothalamic-pituitary-ovarian

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axis and is of fundamental importance for fertility, a regular menstrual cycle and overall reproductive health [2].

The biological, social and behavioral circumstances of women create specific disease risks: although women live longer than men, they often suffer from earlier and more severe illnesses [1]. Estrogen and progesterone affect cardiovascular health, bone density and mental state [3], while hormonal imbalance leads to difficulties with the menstrual cycle and pregnancy [2]. Polycystic ovary syndrome (PCOS) is one of the main causes of infertility and increases the risk of diabetes mellitus and heart disease [3, 4]. During pregnancy, an increase of about 50% in thyroid hormone production raises the need for iodine [5]. This article aims to analyze the role of the endocrine system in women's reproductive health, its common disorders and methods of their management.

Literature Review

The endocrine system not only regulates reproductive functions but also affects the overall physiological and psycho-emotional state of the female body. It is important to assess this influence at all stages from puberty to menopause, especially since in developing countries disparities in women's health are particularly evident and may also be related to endocrine factors [1].

The hormonal regulation of the reproductive system is controlled by the hypothalamic-pituitary-ovarian axis [2]. In the follicular phase, estrogen stimulates follicle maturation and proliferation of the endometrium. Ovulation is triggered by the balanced interaction between luteinizing hormone (LH) and follicle-stimulating hormone (FSH). In the luteal phase, sufficient progesterone prepares the endometrium for implantation. Disruption in these processes can lead to reproductive diseases, lengthening or shortening of the menstrual cycle, and difficulties with pregnancy [2].

Low estrogen levels increase the risk of osteoporosis [3]. According to WHO, more than 800 women die every year from complications of pregnancy and childbirth, while the United Nations Population Fund (UNFPA) indicates that one in ten women in developing countries faces similar problems; human papillomavirus (HPV) and cervical cancer cause more than 300,000 deaths every year [3]. A healthy lifestyle, regular medical check-ups and early diagnosis are important for maintaining reproductive health [3].

PCOS is a common endocrine disease affecting 4-21% of women and is the main cause of infertility due to anovulation [4]. Its pathophysiology is associated with excess production of androgens, insulin resistance and the formation of multiple cysts in the ovaries. Insulin resistance increases the risk of diabetes mellitus and obesity and negatively affects fertility; altered estrogen and progesterone levels may also reduce endometrial receptivity. However, not all women with PCOS experience fertility difficulties [4].

Treatment of PCOS begins with restoring spontaneous ovulation through a healthy lifestyle; if ineffective, ovulation-inducing drugs are used, and in complex cases in vitro fertilization (IVF) [4]. During hormonal stimulation, careful monitoring is required to prevent ovarian hyperstimulation syndrome. During pregnancy, PCOS is associated with the risk of gestational diabetes, hypertension, preeclampsia and preterm birth and requires a multidisciplinary approach [4].

During pregnancy, thyroid hormone production increases by about 50%, raising the demand for iodine needed for fetal brain development [5]. UNICEF, ICCIDD and WHO recommend a daily iodine intake of 250 mcg for pregnant women (150 mcg for non-pregnant women), while Uzbekistan recommends 220 mcg per day [5]. In 2000-2015 in Europe, about two-thirds of pregnant women consumed insufficient iodine [5]. Iodine deficiency can lead to cretinism (intellectual disability, deaf-mutism, physical developmental defects), and mild deficiency to

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reduced cognitive function in the child [5]. This confirms the decisive role of the endocrine system in maternal and child health.

Overall, the literature review shows the central role of the endocrine system in women's reproductive health: the balance of the hypothalamic-pituitary-ovarian axis and the hormones estrogen, progesterone and thyroid hormones form the basis of women's well-being, while diseases such as PCOS lead not only to infertility but also to long-term metabolic consequences. Future research should focus on studying the genetic and epigenetic basis of endocrine-reproductive disorders and on developing diagnostic and treatment methods based on an individual approach.

Research Methodology

This article is a critical literature review aimed at analyzing the relationship between the endocrine system and women's reproductive health. The search was conducted in the PubMed, Scopus, Web of Science and Google Scholar databases in English and Uzbek using Boolean operators (AND, OR). Key terms: "endocrine system," "women's reproductive health," "polycystic ovary syndrome (PCOS)," "pregnancy," "iodine deficiency" and "treatment". The search focused mainly on publications after 2020 [1, 2, 3, 4, 5].

Inclusion criteria: peer-reviewed original studies, systematic reviews, meta-analyses and clinical guidelines; publications in English or Uzbek that examine the interaction between the endocrine system and reproductive health in women. Excluded: non-peer-reviewed publications, studies based only on animal models, small case reports and outdated works. The data were synthesized through thematic analysis: similar findings were grouped and conflicting evidence was critically assessed.

The scope of the review covers the mechanisms of the menstrual cycle and fertility, common endocrine diseases, diagnosis, treatment and prevention [1]. Limitations: the review relies on previously published data, publication bias is possible, the most recent studies may not be covered, and priority was given to PCOS [4] and iodine deficiency [5]. The review was conducted in compliance with academic integrity and ethical principles, with sources properly cited.

Age range of development of secondary sexual characteristics in girls during puberty

No.	Developmental sign	Approximate age range shown in the diagram
1	Onset of breast development	8–13 years
2	Appearance of pubic hair	8–14 years
3	Peak height growth spurt	9.5–13.5 years
4	Change in body composition	11–15.5 years
5	First menstruation (menarche)	11–14 years
6	Appearance of underarm hair	10.5–16.5 years
7	Mature breast development	12.5–17 years

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Conclusion

The endocrine system is the central basis of women's reproductive health and overall well-being, and hormonal balance determines health during the menstrual cycle, fertility and different stages of life. Common disorders such as PCOS negatively affect reproductive function as well as metabolic and general health. The need for iodine during pregnancy is of decisive importance for

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maternal and child health. Studying genetic and epigenetic factors and improving diagnosis and treatment based on an individual approach contribute to improving women's quality of life.

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