Global Insights in Biomedical & Multidisciplinary Research (GIBMR)
Volume 01, Issue 04, June-2026
Available Online at: https://biomedglobe.com/index.php/gibmr
ISSN (Online): 3054-5900

Menopause: Hormonal Changes and Modern Treatment Approaches

Yunusova S. SH., Kamolova F. E.
4th-year students of Kimyo International University in Tashkent, Uzbekistan

Article History
Received: 30th March 2026
Accepted: 28th April, 2026

Abstract

The menopausal transition is a natural stage in a woman's reproductive aging, accompanied by complex neuroendocrine changes and the development of clinical symptoms of varying severity. The relevance of this topic stems from the high prevalence of menopausal disorders, which significantly impact the quality of life, work capacity, and health status of middle-aged women. The aim of this review is to analyze current data on hormonal changes occurring during the menopausal transition, as well as to evaluate the effectiveness of existing medical treatment methods. The review examines the characteristics of changes in the secretion of estrogens, follicle-stimulating hormone, anti-Müllerian hormone, and inhibin B, as well as changes in the activity of the hypothalamic-pituitary-ovarian axis and their role in the development of vasomotor, psychoemotional, and urogenital disorders. Modern approaches to the management of menopausal symptoms are presented, including menopausal hormone therapy, non-hormonal treatment methods, and lifestyle modifications. The analysis conducted indicates the need for a personalized approach to the management of women during the menopausal transition, taking into account clinical characteristics, risk factors, and the individual needs of patients.

Keywords: menopausal transition, menopause, estrogen deficiency, ovarian reserve, hormonal changes, vasomotor symptoms, menopausal hormone therapy, quality of life.

Introduction

The menopausal transition is an important stage in a woman's life and represents the initial stage of reproductive aging, accompanied by a gradual decline in

Global Insights in Biomedical & Multidisciplinary Research (GIBMR)
Volume 01, Issue 04, June-2026
Available Online at: https://biomedglobe.com/index.php/gibmr
ISSN (Online): 3054-5900

ovarian function and significant endocrine changes in the body. This process is based on the progressive depletion of the ovarian reserve, manifested by a decrease in the number and quality of follicles in the ovaries. As ovarian function declines, changes in sex hormone secretion occur, including a decrease in levels of estrogen, inhibin B, and anti-Müllerian hormone, as well as a compensatory increase in the concentration of gonadotropins, primarily follicle-stimulating hormone. Since estrogens play a vital role in maintaining reproductive health, metabolic processes, and the functioning of various organs and systems, their deficiency has a significant impact on a woman's health. Typically, the menopausal transition begins between the ages of 40 and 45 and continues until the onset of menopause [1,2].

The decrease in sex hormone secretion has a multifaceted effect on a woman's body and is accompanied by the development of various clinical manifestations. The most common symptoms of the menopausal transition are vasomotor disorders, sleep disturbances, psychoemotional disturbances—including increased anxiety and depressive states—as well as urogenital symptoms associated with estrogen deficiency. The severity of these symptoms can vary significantly; however, in most cases, they negatively impact a woman's physical and psychological well-being, reducing her quality of life and daily activity. Due to the increase in life expectancy and the growing number of women of perimenopausal and postmenopausal age, the issue of maintaining health and quality of life during the menopausal transition has become particularly relevant [3,4].

Current approaches to the management of this patient population are aimed not only at increasing life expectancy but also at maintaining a high quality of life, social activity, and work capacity [4,5].

The aim of this review is to analyze current understanding of the hormonal changes occurring during the menopausal transition, as well as to evaluate modern methods of medical care for women at this stage of life. Particular attention is paid to the impact of hormonal changes on various organs and body systems, as well as to the possibilities for managing menopausal disorders with the aim of preserving quality of life and preventing long-term consequences of estrogen deficiency.

Main Section

Hormonal changes during the menopausal transition are caused by the progressive depletion of the ovarian reserve and a decrease in the number of

Volume 01, Issue 04, June-2026
Available Online at: https://biomedglobe.com/index.php/gibmr
ISSN (Online): 3054-5900

functional follicles. One of the earliest endocrine changes is a decrease in the secretion of inhibin B, which normally suppresses the production of follicle-stimulating hormone (FSH) via a negative feedback mechanism. A decrease in inhibin B levels leads to a compensatory increase in FSH concentration, which is considered one of the early laboratory signs of the menopausal transition. At the same time, a decrease in anti-Müllerian hormone (AMH) levels is observed; AMH is an important marker of ovarian reserve and reflects the number of remaining follicles in the ovaries. Unlike AMH and inhibin B, estradiol levels in the early stages of the menopausal transition may remain within the normal range or even temporarily increase due to enhanced ovarian stimulation by elevated FSH levels. As the follicular reserve continues to deplete, estradiol production becomes unstable and then gradually decreases, contributing to the development of characteristic clinical manifestations of the menopausal transition [2,3].

As the ovarian reserve depletes, the frequency of anovulatory cycles increases. The absence of ovulation prevents the formation of the corpus luteum, resulting in decreased progesterone production. A decrease in this hormone's level often occurs before a sustained reduction in estradiol concentration and is one of the causes of menstrual cycle disturbances characteristic of the menopausal transition [2,3].

The clinical manifestations of the menopausal transition are closely linked to changes in hormonal levels and the progressive development of estrogen deficiency. The most common symptoms are vasomotor disorders, including hot flashes and night sweats. Their development is caused by fluctuations and subsequent decreases in estrogen levels, which affect the thermoregulatory centers in the hypothalamus. Estrogen deficiency disrupts the mechanisms that maintain a constant body temperature and narrows the thermoneutral zone, causing even minor temperature changes to be perceived by the body as overheating. In response, compensatory mechanisms are activated, including the dilation of skin blood vessels and increased sweating. Clinically, these processes manifest as a sudden sensation of heat, redness of the skin on the face, neck, and upper torso, as well as increased sweating, which is often followed by a feeling of chills [3,8].

Fluctuations and the subsequent decline in estrogen levels during the menopausal transition may be accompanied by the development of psychoemotional disturbances. The most common manifestations include increased anxiety, emotional lability, irritability, decreased concentration, and depressive symptoms.

The development of these disorders is associated with the influence of estrogen on the brain's neurotransmitter systems, including the serotonergic and dopaminergic systems, which are involved in the regulation of mood, emotional state, and cognitive functions. Sleep disturbances are also common during the menopausal transition and may be caused by both hormonal changes and vasomotor symptoms, particularly night sweats and hot flashes. Anxiety and depressive disorders further contribute to the development of insomnia, leading to a reduced quality of life and daily functioning in women [3,10].

A decrease in estrogen levels during the menopausal transition contributes to the development of urogenital disorders. Estrogen deficiency leads to thinning of the vaginal mucosa, a reduction in its elasticity, and impaired blood supply to the tissues of the genitourinary system. As a result, symptoms such as vaginal dryness, itching, burning, dyspareunia, frequent urination, and urinary incontinence may occur. The severity of urogenital symptoms may progress as estrogen deficiency worsens and can significantly impact a woman's quality of life [7].

In addition to the development of vasomotor, psychoemotional, and urogenital symptoms, estrogen deficiency affects various organs and systems of the body. A prolonged decrease in estrogen levels is accompanied by accelerated bone loss, which contributes to the development of osteoporosis and an increased risk of fractures. Furthermore, estrogens have a cardioprotective effect; therefore, their deficiency is associated with an increased risk of cardiovascular disease and the progression of atherosclerotic changes. A number of studies also indicate a link between the menopausal transition and cognitive decline, including reduced attention span and memory. These changes can significantly affect women's health and quality of life in the long term [6].

Menopausal hormone therapy (MHT) is the primary method for managing symptoms associated with estrogen deficiency during the menopausal transition and postmenopause. The primary goal of HRT is not to slow the aging process, but to reduce the severity of clinical manifestations of estrogen deficiency and improve a woman's quality of life. HRT has been shown to be most effective for vasomotor symptoms, including hot flashes and night sweats, as well as urogenital disorders. In addition, hormone therapy helps slow bone loss and reduce the risk of developing osteoporosis and related fractures. At the same time, prescribing MHT requires an individualized approach, taking into account the

Volume 01, Issue 04, June-2026
Available Online at: https://biomedglobe.com/index.php/gibmr
ISSN (Online): 3054-5900

patient's age, the severity of symptoms, the presence of comorbidities, and possible contraindications [5,9].

Alongside menopausal hormone therapy, non-hormonal treatment methods are used in modern clinical practice, especially in women who have contraindications to hormone therapy or who refuse to use it. Among the most well-studied non-hormonal agents are selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors, which can reduce the frequency and severity of vasomotor symptoms. In addition, cognitive-behavioral therapy and measures aimed at normalizing sleep and reducing stress levels have demonstrated some effectiveness. Lifestyle modifications, regular physical activity, a balanced diet, and avoiding harmful habits are also important. A comprehensive approach to managing patients helps reduce the severity of menopausal symptoms and improve women's quality of life [3,9].

Conclusion.

Menopausal transition is a natural stage of a woman's reproductive aging, accompanied by complex hormonal changes caused by the gradual depletion of the ovarian reserve and a decline in the production of sex hormones. The developing estrogen deficiency affects various organs and systems of the body, contributing to the onset of vasomotor, psychoemotional, and urogenital disorders, as well as increasing the risk of developing osteoporosis and cardiovascular diseases. An analysis of current literature data has shown that the timely identification of menopausal symptoms and their appropriate management are crucial for maintaining women's health and quality of life. Currently, menopausal hormone therapy remains the most effective method for treating symptoms associated with estrogen deficiency; however, the choice of treatment strategy must be made on an individual basis, taking into account the specific characteristics of each patient. A comprehensive approach, including both pharmacological and non-pharmacological methods of care, allows for effective control of menopausal symptoms and prevention of their long-term consequences.

References:

1. Harlow, Siobán D et al. "Executive summary of the Stages of Reproductive Aging Workshop + 10: addressing the unfinished agenda of staging reproductive aging." *The Journal of clinical endocrinology and metabolism* vol. 97,4 (2012): 1159-68. doi:10.1210/jc.2011-3362

Volume 01, Issue 04, June-2026
Available Online at: https://biomedglobe.com/index.php/gibmr
ISSN (Online): 3054-5900

2. Santoro, Nanette, and John F Randolph Jr. "Reproductive hormones and the menopause transition." *Obstetrics and gynecology clinics of North America* vol. 38,3 (2011): 455-66. doi:10.1016/j.ogc.2011.05.004
3. Santoro N, Epperson CN, Mathews SB. Menopausal Symptoms and Their Management. Endocrinol Metab Clin North Am. 2015 Sep;44(3):497-515. doi: 10.1016/j.ecl.2015.05.001. PMID: 26316239; PMCID: PMC4890704.
4. Faubion SS, Kuhle CL, Shuster LT, Rocca WA. *Long-term Health Consequences of Premature or Early Menopause and Considerations for Management.* Mayo Clin Proc. 2015;90(2):296–315.
5. The North American Menopause Society. *The 2022 Hormone Therapy Position Statement of The North American Menopause Society.* Menopause. 2022;29(7):767–794.
6. Faubion SS, Kuhle CL, Shuster LT, Rocca WA. Long-term Health Consequences of Premature or Early Menopause and Considerations for Management. Mayo Clin Proc. 2015;90(2):296–315.
7. The 2020 Genitourinary Syndrome of Menopause Position Statement of The North American Menopause Society. Menopause. 2020;27(9):976–992.
8. Avis NE, Crawford SL, Greendale G, et al. Duration of Menopausal Vasomotor Symptoms Over the Menopause Transition. JAMA Intern Med. 2015;175(4):531–539.
9. Lobo RA. Hormone-replacement therapy: current thinking. Nat Rev Endocrinol. 2017;13(4):220–231.
10. Maki PM, Kornstein SG, Joffe H, et al. Guidelines for the Evaluation and Treatment of Perimenopausal Depression. Menopause. 2018;25(10):1069–1085.