APTI Women's Forum

Newsletter

Perimenopause and Menopause: Easing the transition

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Editor's Note

Prof. Vandana B. Patravale
Chief Editor,
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Dear Readers,

Menopause is a natural phase in every woman's life, yet it often comes with challenges that can be overwhelming, both physically and emotionally. Perimenopause, the transition leading up to menopause, brings its own set of changes, from hormonal fluctuations to shifts in overall well-being. But in developing countries like India, many myths surround menstrual cycle and menopause. This edition of our newsletter is dedicated to shedding light on perimenopause and menopause and hence, the theme for January - April, 2025 APTI women's newsletter is "**Perimenopause and Menopause: Easing the Transition**".

The newsletter provides comprehensive information on the mechanisms and biomarkers of menopausal transition, hormonal changes, metabolic disruptions, perimenopausal symptoms, genetic influence, and disease risk. There are articles that can act as holistic toolkit to cope up the changes mentioning lifestyle modifications, nutrition tips, hormone therapy, and alternative treatments. Article with advanced delivery systems for hormone therapy is also present showing the futuristic approach to deal with perimenopause and menopause. By fostering awareness and open conversations, we hope to break the stigma surrounding menopause and encourage a proactive approach to managing its symptoms.

The editorial board is certain that you will get equal interest from reading this issue focused on geriatric healthcare as you did from reading our prior APTI Women Forum Newsletters. We express our utmost gratitude to all the authors for their diligent work in making this newsletter very enlightening. I express my gratitude to the whole editorial team for their tireless efforts, which included both the conceptualization and editing of the reviews provided by authors from different parts of the country. I would like to convey my thanks and gratitude to Dr. Vanaja K, Dr. Preeti Suresh, Dr. Shubhini Saraf, Dr. Rashmi Trivedi, and Dr. Vaishali Shirsat for providing editorial comments for the articles. Also, thanks to Dr. Clara Fernandes for providing puzzles for the newsletter.

Also, I wish to thank VBP research group, especially Preeya Negi, Shivhar Khot, and Suraj Sawane for all the support rendered for this newsletter.

APTI Women's Forum
Editorial Board

The menopausal transition and metabolic disruptions: Unraveling the role of estrogen decline


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Abstract

Menopause associated estrogen decline presents the interplay of the hypothalamic pituitary gonadal axis and estrogen leading to loss of estrogen's protective effects causing significant metabolic challenges marked by glucose homeostasis dysregulation, insulin resistance leading to obesity, increased cardiovascular disorders and non-alcoholic fatty liver disease. Managing these metabolic disruptions require a comprehensive approach using insulin sensitizers, lipid lowering agents, hormone replacement therapy along with the lifestyle modifications involving a well-balanced diet with regular physical activity. While these approaches mitigate these effects, treatment strategies to address concerns regarding the long term safety of the current approaches can improve women's health during this transition.

Keywords: Perimenopause, metabolism, insulin resistance, cholesterol

1. Introduction

Perimenopause also known as menopausal transition is a biological process marking an end of a women's reproductive years caused due to the physiological changes in a female's body primarily driven by hormonal fluctuations (1). The aging of ovary has significant impact on ovarian follicle leading to declined estrogen and progesterone production further influencing the pace of menopausal transition (2). 17β- Estradiol (E2), follicle stimulating hormone (FSH) and luteinizing hormone (LH) levels in the blood vary significantly in the early menopause transition phases considering depletion of oocytes to critical threshold and complicated endocrinology of female reproductive tract (3). Throughout the menopausal transition taking place in female, some subtle changes in the body takes place characterized by irregular menstrual cycles due to unpredicted ovulation, hot flashes which vary in frequency, duration and the intensity, sudden mood swings and irritability often leading to sleep disruption, vaginal dryness (2). Other chronic diseases like atherosclerosis, diabetes, hyperlipidemia, obesity, PCOD are considered to be most prevalent causing decline in the immune functions which influences age related metabolic changes in females. The interplay of declining estrogen levels has profound impact on health leading to metabolic disruptions like altered glucose metabolism, musculoskeletal degeneration, lipid imbalance contributing to high risk of cardiovascular diseases (4–6).

2. Neuroendocrine connection: Estrogen and metabolism

One of the most critical systems orchestrating the balance between the hormonal signals in females is the Hypothalamic-Pituitary-Gonadal (HPG) axis (7). The female reproductive hormones are precisely regulated by hypothalamus, pituitary glands and the gonads working in cohesion thereby regulating the overall reproductive health. The master gland of the body popularly known as the hypothalamus release gonadotropin releasing hormone (GnRH) stimulating release of gonadotropins (LH and FSH) signaling the ovaries to produce estrogen (mainly 17β estradiol, E2) and progesterone essential for regulating menstrual cycle, follicular development and ovulation to prepare uterine walls for implantation (8). In healthy premenopausal females, the primary site for the production of E2 are the ovaries which circulate in the bloodstream exerting several physiological effects and acting on the target tissues by binding to estrogen receptors (9). Eventually when the female approaches menopause, dysregulation of HPG axis and hormonal fluctuations lead to decline in normal ovarian follicular reserve. The loss of the regulatory influence of estrogen extends to affecting the metabolic health of the females.

2.1. Role of estrogen in regulating female metabolism

2.1.1. Maintain steady glucose levels

Glucose, a monosaccharide sugar, which easily breaks down for releasing energy serves as primary substrate for humans for maintaining cellular functions and overall metabolic health. The food rich in carbohydrates yield glucose when broken down in body adding to daily calorie intake for energy utilization (10). Glucose breakdown occurs by two main metabolic pathways involving glycolysis yielding pyruvate and lactate anaerobically generating small amount energy and citric acid cycle generating energy aerobically in the most efficient way to fuel biological processes (11). As the body continuously utilizes glucose, insulin produced by the β cells of pancreas keep the levels of glucose maintained in blood stream as well as preventing its excess production by liver stimulating glycogen storage. The main role of estrogen in regulating glucose levels is by improving the insulin sensitivity preventing sudden surge in blood glucose levels. Estrogen possessing anti-inflammatory properties, also aid in regulating inflammation and oxidative stress and preventing β cell dysfunction (10-12).

2.1.2. Regulate cholesterol levels

Cholesterol, a steroid alcohol is a lipid produced by the liver essential to maintain cell membrane integrity, hormone synthesis like estrogen, progesterone and testosterone, bile acid production and Vitamin D synthesis (13). Though cholesterol is beneficial to the body, the excess buildup in the body poses risk of cardiovascular diseases. In premenopausal females, as the estrogen levels are high, its cardioprotective effect helps regulate the lipid metabolism thereby lowering low density lipoprotein (LDL) known as the “Bad Cholesterol” by preventing plaque buildup across the arteries caused by lowering its oxidation and the chances of atherosclerosis. On the other hand, estrogen promotes clearing cholesterol from the blood stream by increasing high density lipoprotein (HDL) thereby reducing risk of cardiovascular disease and strokes by promoting nitric oxide production leading to vasodilation, thus reducing arterial stiffness (4,14).

3. Metabolic disruptions during menopausal transition

When a female approaches perimenopause, hormonal fluctuations, alteration in body composition and metabolic changes are observed and one of the most significant concerns primarily observed is the weight gain and obesity (10,15). It is the persistent decline in the estrogen levels that cause shift in the fat storage from subcutaneous (under the skin) to visceral (abdominal fat). Another reason for fat accumulation and obesity is the reduced body’s ability to regulate lipids due to low estrogen increasing the risk of low body mass ratio and low fat oxidation giving rise to reactive oxygen species (16). The fat eventually starts accumulating in the arteries with likelihood of developing cardiovascular disease due to atherosclerosis. When the excess fat starts accumulating in the liver in absence of alcohol is Nonalcoholic Fatty Liver Disease which leads to inflammation, fibrosis and cirrhosis which eventually develops to more severe forms like nonalcoholic steatohepatitis (17). Another metabolic disorder associated with low estrogen and obesity is insulin resistance due to the insulin receptors becoming less responsive and overtime developing resistance. In turn, compensatory hyperinsulinemia leads to Type II diabetes (10,18). This condition reduces the glucose uptake into muscles and increased gluconeogenesis.

Table 1. Metabolic disorders associated with low estrogen during menopausal transition

Metabolic disorders	Effect observed	Reference
Obesity	Increase in excess fat, oxidative stress, lipogenesis and body mass index, Decrease in calorie utilization	(10,16)
Cardiovascular disease	Increase in LDL, reactive oxygen species, triglycerides leading to risk of atherosclerosis, Decrease in HDL	(6,9)
Nonalcoholic fatty liver disease	Increase in adipose tissue lipolysis, free fatty acid, fat deposition in liver, and fibrosis	(17)
Type II diabetes	Increase in insulin resistance leading to hyperinsulinemia and hepatic glucose production (hyperglycemia), Decreased sensitivity to GLUT 4 receptors	(10,18)

4. Strategies for managing metabolic disruptions

A multifaceted holistic approach is essential to manage the metabolic syndromes associated with estrogen deficiency focusing on therapies, lifestyle modifications for hormone balance.

Table 2. Detailed strategies to address metabolic disorders associated with perimenopause

Strategies		Ref
Hormone replacement therapy		
Estrogen therapy	• Alleviate perimenopausal symptoms binding to intracellular receptors • Restore balance and eventually mitigate vasomotor symptoms - regulate cardiovascular health - increasing nitric oxide production – vasodilation • Regulate lipid metabolism and glucose levels • Usually given to females undergone hysterectomy	(19)
Combined estrogen-progestin therapy	• Given to females who haven't undergone hysterectomy • Alleviate perimenopausal symptoms • Reduce chances of endometrial cancer (protective effect of progestin)	(20)
Selective estrogen receptor modulators (SERM)	• It intends to target estrogen receptors in selective manner • Prevent osteoporosis, manage menopausal symptoms and improve lipid profile • Prevents breast cancer • Example: Tamoxifen, raloxifen, bazedoxifen, ospemifine	(21)
Pharmacological approaches		
Insulin sensitizers	• Improves body's sensitivity to insulin and lowering blood glucose levels • Biguanides (eg. Metformin) reduce gluconeogenesis, enhance glucose uptake in muscle and fats by amp activated protein kinase pathway. • Aids in weight loss, no hypoglycemia and has cardioprotective action • Thiazolidinediones (eg. Pioglitazone, rosiglitazone) activate peroxisome proliferator-activated receptor gamma – regulate glucose and lipid metabolism by reducing inflammation, oxidative stress, improving lipid profile and enhancing β cell function • Increase insulin sensitivity by promoting glucose uptake, shift visceral fat to subcutaneous fat • For type ii diabetes, pcos, nonalcoholic fatty liver disease • Other insulin sensitizers include Glucagon like peptide 1 (eg. Exenatide, semaglutide, dulaglutide) that reduce blood sugar and energy intake. Sodium glucose cotransporter-2 (eg.Dapagliflozin, sotagliflozin, empagliflozin) that promotes weight loss by improving insulin sensitivity.	(22)
Lipid lowering agents	• Statins (eg. Atorvastatin, rosuvastatin) inhibit HMG CoA reductase – decrease LDL and triglycerides, increase HDL • Primary therapy to treat hypercholesterolemia and reduce cardiovascular disorders • Ezetimibe inhibits intestinal cholesterol absorption and is adjunct to statin intolerant patients • Bile acid sequestrants (eg.Cholestyramine) prevent bile acid intestinal reabsorption • Fibrates (eg. Fenofibrate, gemfibrozil) activate peroxisome proliferator-activated receptor alpha increasing lipolysis and reduce triglyceride production • Main therapy in hypertriglyceridemia, reduce LDL	(23)

Lifestyle modifications		
Nutritional interventions	• Phytoestrogens are plant compounds with mild estrogenic effects to balance hormones • Food source: flaxseeds, chickpea, lentils • Vitamins and minerals like calcium, magnesium, vitamin d, vitamin b are essential for bone health,reduce mood swings, help with sleep, boost metabolism	(24,25)
Physical activity and exercise	• The benefits include maintaining cardiovascular health, bone mineral density,sleep quality, immunity • Also reducing the risk for PCOD, type II diabetes, cholesterol	(26)

5. Conclusion

The extensive research on the role of estrogen in metabolic syndromes associated with menopause and perimenopause underscores significant concerns and challenge in women's healthcare. The role of current approaches and interventions offer potential solutions, but it is essential to scrutinize its long term efficacy and safety in individuals. Additionally physical activities and certain lifestyle changes pertaining to diet can pave the way for an improved health during menopausal transition phase. However, the development of advanced delivery systems could help in multidisciplinary approach which would be instrumental in optimizing menopausal health and mitigating the metabolic disruptions

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Restoring balance: Advancing hormonal therapy for menopause through modern drug delivery



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Abstract

Menopause represents a pivotal transition in a woman's life, accompanied by multiple repercussions. Menopausal symptoms range from vasomotor instability to chronic diseases, like osteoporosis. While hormone replacement therapy (HRT) remains the cornerstone for providing symptomatic relief, conventional oral formulations pose substantial risks, including thromboembolism, stroke, and other malignancies. This has facilitated the development of innovative drug delivery systems, such as transdermal patches and intravaginal rings (IVRs). Transdermal systems are unaltered by first-pass metabolism, enabling controlled hormone release. IVRs offer localized and systemic benefits with extended efficacy. The integration of nanotechnology has refined drug penetration, optimizing therapeutic outcome. However, transdermal HRT faces various challenges, including erratic hormone absorption, dermal irritation, and compliance issues. Future advancements must employ personalized medicine to customize therapeutic regimens according to the patient's profile. As drug delivery technology evolves, it holds immense potential to redefine menopause management, enhancing safety, efficacy, and quality of life.

Keywords: Menopause, Hormonal Therapy, Transdermal Patch, Intravaginal ring

1. Introduction

Menopause is a significant stage in a woman's life, as it comprises almost one-third of their lifespan. From an evolutionary perspective, menopause is viewed as a survival tactic that protects women from the dangerous effects of late childbirth (1). However, changes during menopause makes women highly vulnerable to diseases, making it the second cause of disability-adjusted life among 45 to 60-year-old women (2). Thus, a majority of the population views menopause as a biological flaw, rather than an advantage. More than 80% of women face vasomotor symptoms that include hot flushes, night sweats, and others like osteoporosis, vaginal atrophy, and augmented anxiety (3). The severity and duration of these symptoms vary to a great extent among individuals, which may be a result of differences in genetic make-up, lifestyle and other factors. Thus, a 'one size fits all' approach is inefficient in easing navigation through menopause (4). Various commercial formulations currently available for hormonal replacement therapy (HRT) in the treatment of menopausal symptoms are showcased in Table 1.

Table 1. Comparative chart between different formulations of HRT

Route of administration	Advantages	Disadvantages	Active	Marketed formulations	References
Parenteral	Alleviate perimenopausal symptoms and improve overall well-being, help maintain bone density, balance hormone levels.	Invasive process, higher chances of side effects.	Progestin	Bioidentical hormone pellets, Nexplanon® implant	(5)
Parenteral	Provide symptomatic relief, low dosing frequency, long-term effect.	Requires medical supervision, invasive process.	Estradiol cypionate	Depo-Estradiol® injectable	(6)
			Progestin	Depo-Provera injectable	
Oral	High dosing flexibility, may prevent atherosclerosis.	Hepatotoxic, increases vascular fat.	Estrogen	Estrace and Estrofem tablets	(7)
			Progestin	Provera tablets	
Topical	Bypasses first-pass metabolism.	Skin irritation, allergic reactions, poor systemic effect.	Estrogen	Estrogel and Divigel	(8)
Vaginal	Treats vaginal dryness and discomfort associated with menopause.	Vaginal burning or irritation, Vaginal discharge or spotting.	Estrogen	Estrace cream	(9)

2. Conventional treatment and its risks

About 90% of perimenopausal women seek medical treatment for their symptoms. The management of vasomotor symptoms involves utilizing HRT, which includes orally administered ethinyl estradiol. Women's Health Initiative (WHI) has highlighted the several health risks such as increased risk of blood clots, stroke, breast cancer, endometrial cancer, etc. associated with orally administered HRT. Oral contraceptives undergo first-pass metabolism and require a high dosing frequency to receive satisfactory effectiveness. Higher frequency of dose reduces patient compliance and increases vulnerability towards adverse effects, like myocardial infarction. These issues have encouraged the administration of ethinyl estradiol through the transdermal route. Transdermal HRT has been widely explored during the last two decades. It is highly convenient and includes formulations like, creams, gels, lotions, patches to name a few (10).

3. Emerging therapeutic approaches

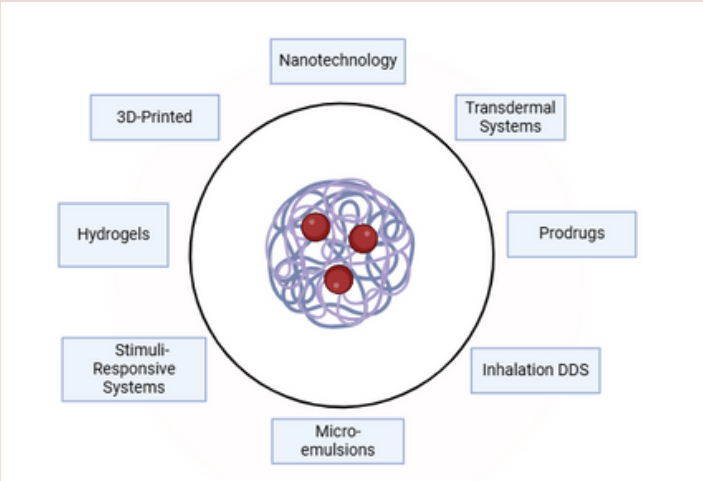

Figure 1. Plethora of emerging therapeutic approaches and novel drug delivery systems

3. Transdermal patches

Transdermal drug delivery systems are unaffected by first-pass metabolism and provide a long-term impact, resulting in reduced dosage frequency and better patient compliance (11). Transdermal patches are a non-invasive and effective method for delivering HRT to alleviate menopausal symptoms. The transdermal patches for HRT can be classified based on the mechanism of drug release as matrix-type, reservoir-type, microneedle-based, and ultra-thin patches. The basic mechanism of penetration of actives from transdermal patch through the skin are depicted in Figure 1.

In matrix-type patches, the drug is dispersed within a polymer matrix, which controls the rate of its release based on its diffusion through the polymer. Polymers such as ethylene-vinyl acetate, polyisobutylene and polyacrylate are widely used for their ability to efficiently control the drug release from the patch. Hydrogel-based matrix patches may also be fabricated to enhance skin hydration and permeation (12). In reservoir-types patches, the drug is contained in a liquid or gel reservoir, and separated from the skin by a membrane. The reservoir system is surrounded by an adhesive to ensure patch adherence to the skin. Drug release from the reservoir can be modified to suit the desired release profile, by utilizing the right blend of polymers for the membrane. Estraderm is a reservoir-type marketed formulation that delivers estradiol into the skin (13).

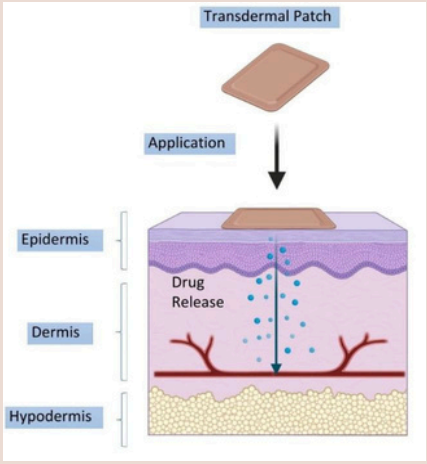

Figure 2. Penetration of actives from transdermal patch (14)

Microneedle patches comprise of micro-sized projections on the surface, which penetrate the outermost layer of the skin and deliver the drug directly into the dermis. These needles are usually dissolvable in nature, which release the drug as they dissolve upon contact with the skin. These patches are minimally invasive and can even deliver larger molecules through the transdermal route (15). Ultra-thin patches, on the other hand are patches with minimal thickness made up of polymers such as polyurethane and ethylene-vinyl acetate, which provide flexibility, better diffusion and adherence to the skin. They are non-irritant and improve patient compliance, making them ideal for long-term use. Minivelle is a commercially available ultra-thin patch that utilizes DOTMatrix technology to continuously release the drug from the patch. Ortho Evra is a transdermal patch that is composed of multiple layers. The outermost layer of the patch is a protective sheath and must be removed before application. The second layer comprises of drug-loaded adhesive layer. The innermost layer behaves like a 'cover' and is made up of flexible polymers. For the patch to stick firmly to the user's skin, its surface energy must be lower than that of clean, dry human skin, which is approximately 27 dyne/cm (16).

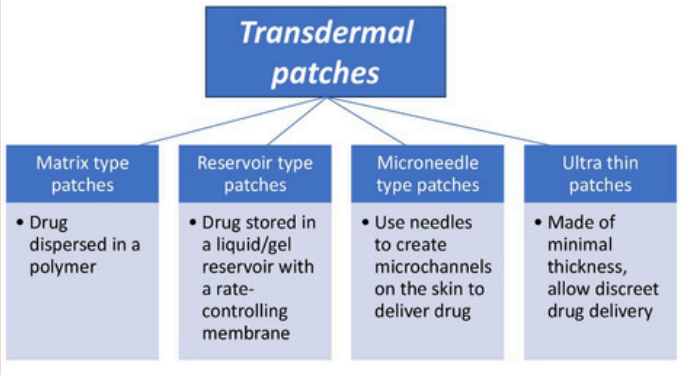

Figure 3. Systematic classification of various types of transdermal patches

In recent times, nanotechnology has been integrated into transdermal patches, wherein nanoparticles (NPs) are utilized to encapsulate the drug. NPs such as liposomes, nanostructured lipid carriers, metallic nanoparticles, polymeric nanoparticles, etc. are capable of disrupting the lipid bilayer membranes present in the stratum corneum, which would normally act as a barrier for drug penetration (17). NPs can be engineered to optimize skin-penetration through hair follicles, sweat glands or other pathways and provide sustained release of the drug, maintaining therapeutic levels for an extended period. Functionalized NPs, such as ligand-coated NPS, have been designed to provide increased affinity towards estrogen receptors, enhancing the therapeutic efficacy (17,18).

3.2. Intravaginal rings

Development of intravaginal rings (IVR) constitute a noteworthy advancement within the pharmaceutical sector. The series of processes involved in the manufacturing of IVR is displayed in Figure 2. The vaginal epithelium is highly vascularized, making it simpler for the drug to diffuse through the epithelial layer and enter systemic circulation (19). IVRs are used to relieve symptoms like vaginal atrophy and dyspareunia. Estring is a commercially available IVR that delivers a low dose of estradiol, which needs to be replaced every 90 days. IVRs such as Femring also protect the endometrium, which releases estradiol acetate. IVRs can be further classified based on their drug delivery mechanism as diffusion-controlled and erosion-controlled.

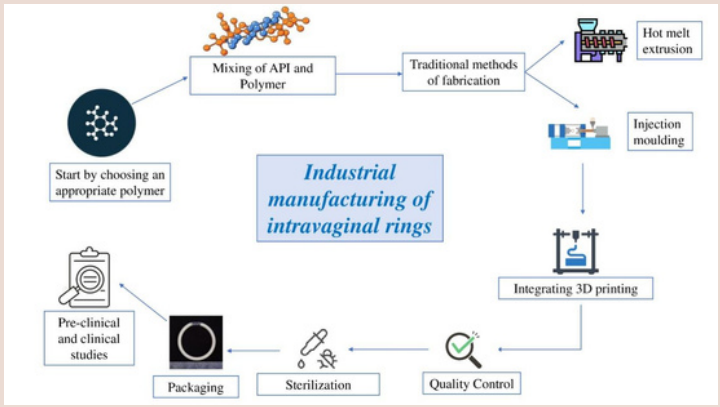

Figure 4. Industrial process for the manufacture of IVR (20)

In diffusion-controlled IVRs, the drug is dispersed in a polymer matrix, surrounded by a membrane. The drug diffuses through the polymer at a controlled rate, driven by the concentration gradient between the IVR and the surrounding tissue. These rings can be used to provide systemic as well as local action. In erosion-controlled IVRs, the drug is integrated within a biodegradable polymer matrix. The drug is released when the polymer undergoes degradation through hydrolysis or enzymatic action. Composition of the polymer is decided based on the rate of degradation required, which affects the rate of drug release. Poly(lactic-co-glycolic) acid (PLGA) is an extensively utilized polymer that is safe and biodegradable. IVRs composed of PLGA are environment-friendly and minimize chances of infection (21).

IVRs that can function on the basis of osmotic pressure are currently being studied to optimize drug delivery applications. The ring comprises of a semipermeable membrane, allowing water to enter, causing expulsion of the drug. The solubility of the drug and the permeability of the membrane affect drug release. These IVRs ensure consistent therapeutic levels of the drug, even for those with a narrow therapeutic index (22). Incorporation of 3D printing (3DP) has made it possible for researchers to develop IVRs with geometric accuracy. IVRs comprising multiple compartments can also be designed, enabling the administration of multiple hormones simultaneously.

NuvaRing was the first USFDA-approved IVR that provided the user with 120 µg of etonogestrel and 15 µg of estradiol per day (23). A more recently developed IVR is Annovera, designed for up to one year of use (24). In general, IVRs must be flexible, transparent and soft to facilitate insertion. They must also be of an appropriate size to prevent expulsion during regular activities (25,26). Certain IVRs possess multipurpose prevention technology, which enable the formulation to have an anti-viral action, especially against HIV (26).

4. Drawbacks of HRT

The application of HRT for perimenopausal symptoms is limited due to several drawbacks. HRT

substantially increases the occurrence of strokes by elevating blood pressure and causing inflammation in the blood vessels, along with other severe cardiovascular conditions. Venous thromboembolism is another prominent issue, which is directly linked with the increased production of clotting factors due to oestrogen. These effects are generally associated with long-term use of HRT (27). Venous thromboembolism is more prominent in oral HRT than transdermal therapies, owing to the lower ratio of estrone and estradiol (28). Clinical reports have also documented the increased susceptibility of women to breast cancer on long-term use of HRT. Combined HRT, especially estrogen and progesterone, aid in the growth of breast cancer cells, and making it challenging to detect the growth via mammography and biopsies (29). Moreover, the risks of breast cancer continue to exist even after the discontinuation of HRT. Furthermore, HRT also subjects women to minor side effects such as mood swings, breast tenderness, nausea, and migraines, among others, which can be managed via symptomatic treatment.

Notably, transdermal patches face a major challenge of drug penetration through the skin barrier, favouring the effective administration of smaller molecules over larger molecules (30). Additionally, patches may also cause inconsistent release of hormones, thus adversely affecting the patient. Another significant limitation includes minimal dose flexibility. Few minor setbacks include skin irritation caused by the patch and improper adhesion due to environmental reasons (31). While some of these challenges can be effectively mitigated through the integration of NPs, this approach also presents its own distinct set of challenges. Hence, it is crucial to navigate the hurdles associated with nanoparticle-integrated patches, prior to being considered as a standard of care. For IVRs, a major challenge is the discomfort and inconvenience associated with their insertion and removal, which can negatively influence patient compliance. Moreover, they may be less effective for systemic symptoms of perimenopause such as, hot flashes and sleep disturbances, hence rendering it incapable of broader management of perimenopause (32).

5. Conclusion

HRT has been a vital approach in the management of perimenopausal symptoms. However, research needs to be continued in order to optimise the therapeutic benefits of treatment and ensuring safety of the patient. It is essential for researchers to prioritize the development of treatment strategies that are tailored to the diverse needs of individual patients. Majority of the drawbacks of HRT can be evaded if the treatment is curated to suit the patient. Understanding the type of estrogen and progesterone that works best for a specific patient will potentiate the effects of the therapy. Artificial intelligence could be an effective tool for developing personalised therapy as it can efficiently analyse patient medical history and map out genetic profiles (33). Moreover, exploring different routes of administration has the potential to maximise the expected therapeutic outcomes of the treatment. As advancements in drug delivery technologies continue to evolve, they hold significant potential to enhance the safety, efficacy, and patient adherence towards HRT for menopause, ultimately improving quality of life for millions of women worldwide.

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Mechanisms and biomarkers of menopausal transition


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Abstract

Transition from perimenopause to menopause is often marked by mood swings, hormonal fluctuations and other biological symptoms such as sleep disturbances, hot flashes and changes in menstrual cycles. Symptoms typically begin during mid to late 40's and can last for 4-5 years. This period can greatly impact quality of life in women; affecting emotional, physical, social well-being and is linked to increased risk of diseases like cardiovascular conditions, diabetes, osteoporosis and obesity. Perimenopause progresses through two main phases namely; irregular menstrual cycles and amenorrhea culminating into menopause. The global prevalence of perimenopausal symptoms varies across regions with vasomotor symptoms of hot flashes and night sweats being more common in certain populations based on ethnicities and geographical locations. The mechanisms behind these symptoms including hormonal fluctuations and their effects on brain and cardiovascular health are complex. Estrogen withdrawal is associated with mood disorders and cognitive changes. Management strategies including hormone replacement therapy (HRT), cognitive behavioural therapy (CBT) and lifestyle modifications are essential in mitigating symptoms and improving overall health in menopausal women. A holistic approach involving proper nutrition, medications, exercise and psychological self-care play crucial role in enhancing well-being during perimenopausal to menopausal transition in women.

Keywords: Perimenopause, menopause, vasomotor symptoms, estrogen, women health

1. Introduction

The last phase of women's reproductive cycle is known as perimenopause which can also be termed as a 'transitional phase'; approaching from reproductive towards the non-reproductive stage. This phase is often marked with varied alterations in the body of women that can be evident as physical or biological changes. Mood swings associated with hormonal changes are the most common visible features during this phase (1). Although menopausal transition or perimenopause often shows decrease in fertility; pregnancy is still possible during perimenopause (2,3). The symptoms of menopause begins during mid or in the late 40's and lasts for about 4-5 years till the stage of menopause occurs. These symptoms greatly affect social, physical, personal and work life having a profound influence on quality of life in perimenopausal and menopausal women. Also during menopausal transition, women experience considerable changes in their bodies which often is the contributing factor to developing a range of diseases like diabetes, cardiovascular diseases, endocrine disorders, obesity, osteoporosis to mention a few (4). There are two phases of menopausal transition wherein the first phase includes irregularity in menstrual cycle or amenorrhoea for at least 3 months. Here, there will be decreased number of ovarian follicles with increase in follicle stimulating hormone (FSH) and this phase is also called as perimenopause. The last phase where complete absence of menses is observed for 12 months is the menopause. These phases are part of natural ageing process in every women's life and therefore management approaches should control the discomfort caused during this transition rather than focussing on the phases (5,6). This topic will thereby cover the overall difficult symptoms, mechanisms, risk factors and managing the transition of perimenopause to menopause.

2. Global prevalence of perimenopause and its symptoms

Perimenopause, an important turning point is frequently accompanied with vasoconstriction and changes in urogenital systems which can significantly impact women's mental health along with physical well-being. The World Health Organization (WHO) predicts that by 2030, there will be more than 1.2 billion menopausal women globally (7,8).According to epidemiological studies, there are significant differences in the symptoms based on the ethnicities and differing geographical regions. Vasomotor symptoms (VMS) such as night sweats/ hot flashes, insomnia and headaches are more prevalent in US-based women accounting for 50-82% as per SWAN (Study of Women's Health across the Nation) (9). However, the prevalence is lower in Northern American (36-50%) and Asian (22-63%) women (10). Another Indian study found that the prevalence of depression was at 40.0%, almost equivalent to Brazil's prevalence of 36.8% while it was lesser among Chinese women (25.99%) (11-13). The general symptoms associated among perimenopausal women's include disturbances in central nervous system (vasomotor, anxiety, depression, sleep disruption, cognitive ability, migraine), musculoskeletal (osteoporosis), urogenital (vaginal dryness, vulva itching or burning, recurrent lower urinary tract infections) weight and metabolic changes (obesity), decreased sexual activity, skin, mucosal and hair damage (1).

3. Potential mechanisms behind cardiovascular and cognitive changes during menopausal transition

Ovaries produce female sex hormone estradiol, a lipophilic steroid that can cross the blood-brain barrier to regulate homeostatic functioning and intrinsic behaviour in females (14). There are three subtypes of oestrogen receptors (ER) which include ER-α, ER-β and G-protein coupled ER. ER-α and β are widely distributed in brain and regulate mood, motor skills, cognition and neuroprotective ability. However during the aging process or menopausal transition, the estrogen levels decrease thereby contributing towards unfavourable neurological outcomes (15,16). Also, hot flashes observed in perimenopausal women is a VMS linked to increased glucose supply to the brain (17,18). Menopause is caused by steady decline of antral follicles in the ovaries leading to reduced production of inhibin B which is a contributing factor for increased levels of FSH during perimenopausal stage (19). Low levels of allopregnanolone (ALLO) have also been linked to mood disorders during menopausal transition phase although the exact mechanism is not well established (20). Estrogen withdrawal also disrupts serotonin system and MAO-A (monoamine oxidase) activity increases during the menopausal transition. Estrogens also have a favourable effect on the norepinephrine and dopamine pathways, which may explain why young women with schizophrenia have a better overall prognosis than men. Finally, while kisspeptin and neurokinin B have been shown to alter both the GnRH (gonadotropin releasing hormone), pulse and thermoregulation; little is known about kisspeptin's role in mood management during the menopausal transition (Figure 1) (21). Endogenous estrogen exposure throughout the reproductive years protects women from cardiovascular diseases, which is lost approximately ten years following menopause. Women with vasomotor symptoms during menopause appear to have a worsened cardiometabolic profile. However, menopausal transition trajectory varies from woman to woman; suggesting that range of clinical and biochemical indicators indicate personal mode of transition that may serve as predictors of future cardiometabolic risk (22).

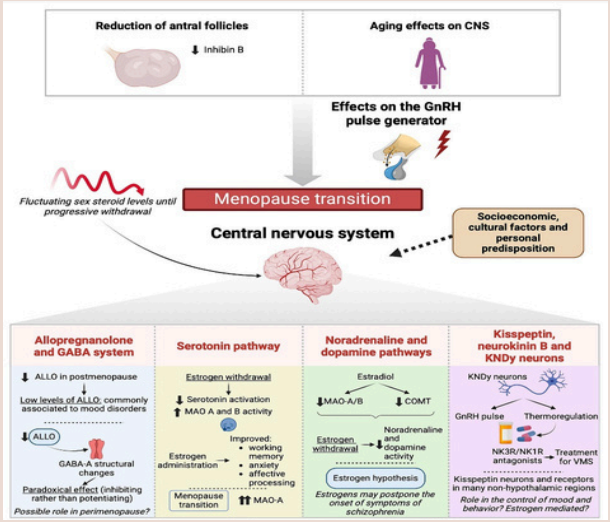

Figure 1. Neuroendocrine changes contributing to mood swings in women's during menopausal transition phase (21).

4. Biomarkers for menopausal transition

Despite the advocacy of World Health Organization's (WHO) for menopause care as part of universal health coverage; menopausal management remains inadequate even in developed nations. One major challenge is the difficulty in diagnosing menopausal status with many women experiencing delays and requiring multiple medical visits. Timely diagnosis is essential for managing menopause and preventing chronic diseases; highlighting the need for objective diagnostic methods. Ferritin and transferrin have emerged as promising biomarkers due to their cost-effectiveness and accessibility, potentially aiding in earlier detection and more effective health measures. Their relevance extends beyond menopause, as iron-related biomarkers have been linked to cardiometabolic conditions, underscoring the urgency of integrating such tools into menopausal healthcare strategies (23). Menopause marks permanent cessation of menstruation due to loss of ovarian follicular activity, typically occurring in women between their late 40's and early 50's, though individual variations exist. This transition is characterized by declining fertility and hormonal changes that contribute to climacteric symptoms. Key hormones involved in this process include estradiol (E2), follicle-stimulating hormone (FSH), inhibin B and anti-Müllerian hormone (AMH). Among these, AMH and inhibin B levels decline significantly during early menopausal transition with AMH being a particularly reliable biomarker of ovarian functions. As women approach the late menopausal transition, AMH levels become undetectable in many individuals, whereas FSH levels increase steadily, followed by a rapid rise in FSH and decline in E2 around the final menstrual period. Understanding these hormonal fluctuations is crucial for assessing reproductive aging and guiding healthcare interventions (24). Alghanim et al. (2024); developed pipeline to integrate multiomics data for classifying menopause status in female breast cancer, aiming to identify biomarkers that reflect molecular changes in breast cancer tissues. Using gene expressions, copy number alteration (CAN) and DNA methylation data, classification models were tested with Random Forest achieving the highest area under the receiver operating characteristic curve (AUCROC) of 0.962 and Support Vector Machine with a Gaussian Radial Basis Function (SVM-RBF) demonstrating the best accuracy (89.53%). To address class imbalance, the Synthetic Minority Over-sampling Technique (SMOTE) was applied. The pathway analysis linked selected genes to cancer pathways, including the ErbB signaling pathway associated with menopausal syndrome. Survival analysis confirmed distinct differences between premenopausal and postmenopausal breast cancer patients. The key genes (RUNX1, PTEN, MAP3K1, and CDH1) were identified as critical in distinguishing the two groups, reinforcing their established links to breast cancer and menopause (25). Ovarian cancer has the highest fatality rate among gynaecological cancers, largely due to diagnostic delays caused by non-specific symptoms. Davenport et al. (2022) evaluated the accuracy of different diagnostic test combinations, including menopausal status, ultrasound scans (USS) and biomarkers like CA125 and HE4 in both premenopausal and postmenopausal women. Results of the study showed that traditional methods like the Risk of Malignancy Index (RMI) have poor sensitivity particularly in premenopausal women. Alternative models such as risk of ovarian malignancy algorithm (ROMA), LR2, and ADNEX demonstrated higher sensitivity though often at the cost of specificity. ADNEX showed highest sensitivity in postmenopausal women but with reduced specificity (26). Neuroimaging studies reveal significant changes in brain structure, connectivity and metabolism across menopausal transition stages, distinct from chronological aging. While brain biomarkers stabilized post-menopause; gray matter volume (GMV) recovery and mitochondrial ATP production correlated with preserved cognitive functions, indicating adaptive compensatory processes. However, peri and postmenopausal women with APOE-4 genotype showed increased amyloid-β deposition, highlighting potential risk for Alzheimer's disease (27). Long term effects of untreated VMS is also been recognized as a biomarker for chronic diseases in menopausal women. Hence, managing chronic diseases in postmenopausal women begins with recognition that VMS may signal future health risks, emphasizing the need for proactive and effective management strategies (28).

5. Management of risk factors of menopausal transition

The management of menopausal symptoms requires holistic and effective approaches for overall well-being in women. VMS in women are most common and the possible risk of mental health disorders during menopausal transition impact mental well-being. Women with more negative attitudes toward menopause may have unhelpful cognitive appraisals of VMS. This may result into increased feelings of anxiety further amplifying these effects on mood and functioning. In contrast, positive coping tactics may reduce impact of VMS on mood swings. There are significant global variances in attitudes toward

menopause which may explain the disparity in associated symptoms between countries (29). Hence, cognitive behaviour therapy (CBT) has been shown to be useful for depression and anxiety as well as for sleep disturbances and vasomotor symptoms. The UK National Institute for Health and Care Excellence (NICE) recommendations expressly prescribe CBT for depression during menopause (30).

Hormone replacement therapy (HRT) is another approach to control the symptoms associated with menopause. HRT includes estrogen which may be with or without progestogen and occasionally testosterone for the relief of menopausal symptoms. However, there are various risk factors associated with HRT which include breast cancer and mortality. According to UK Committee on Safety of medicines, HRT should not be the first line of treatment for women older than 50 years suffering from osteoporosis (31). However, for treating VMS and genitourinary symptoms during menopausal transition, HRT is the first line of therapy while non-hormonal therapy including paroxetine and venlafaxine can also be effective (32). The study of Leitao *et al.* (2024) highlights the importance of healthy dietary habits and psychological self-care contributing towards weight management during menopausal transitions (33). Hence, proper nutrition, exercise or movement routines and stress reduction strategies can assist women towards maintaining best health throughout perimenopause. Ayurveda too offers management of these symptoms through Panchakarma, Rasayana, Yoga, Pranayama, and diet. Menopause is linked to Vata dosha which negatively affects various physiological systems and their functioning. Ayurvedic therapies including Rasayana herbs, Vata-balancing treatments etc. can help women navigate menopause smoothly and maintain positivity for overall well-being (34). Thulasi V. *et al*. (2022) evaluated the effects of *Guduchi satva*, an Ayurvedic Rasayana with *ksheera* in managing perimenopausal symptoms. Women aged 40–50 were given 1g *Guduchi satva* twice daily with 25 ml boiled milk for 30 days. Assessments at 0, 31, and 60 days showed significant reduction in symptoms with p-value <0.001, proving its effectiveness. This suggests that Ayurvedic management, particularly *Guduchi satva* can offer relief from perimenopausal symptoms naturally (35). Also, studies have revealed the benefits of dietary supplements such as flaxseeds, soy isoflavones, probiotics and nuts in improving metabolic health. Additionally, protein supplementation especially whey and milk-based proteins showed potential in supporting muscle and bone health and can be useful in menopausal transitions (36).

6. Conclusion

Perimenopause marks a significant transitional phase in woman's life, leading to menopause. This phase is characterized by various physical, biological, hormonal and emotional changes that can have a profound impact on quality of life in women. Symptoms like hot flashes, mood swings and sleep disturbances are common and can significantly affect daily functioning. Moreover, this transition can contribute to the development of health issues such as cardiovascular diseases, diabetes and osteoporosis. While the trajectory of the menopausal transition varies among women; understanding the clinical and biochemical indicators that predict future health risks is crucial. Effective management strategies include hormone replacement therapy (HRT), cognitive behavioural therapy (CBT), lifestyle modifications with alternative treatments like Ayurveda playing a crucial role in mitigating symptoms and reducing the risk of associated diseases. The experience of menopausal transition in each woman is unique and management approaches should be individualized. A holistic, multidimensional approach that incorporates medical, nutritional and psychological interventions is essential in supporting women through this critical stage of life for smooth transition, ultimately enhancing quality of life and long-term health outcomes.

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Navigating perimenopausal hot flashes: Pathophysiology, risk factors and management

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Abstract

Perimenopausal hot flashes exhibit vasomotor symptoms that are driven by neuroendocrine changes, particularly fluctuations in estrogen levels, which disrupt hypothalamic thermoregulation. Treatment strategies range from lifestyle modifications and behavioral interventions to pharmacologic therapies, including hormone replacement therapy (HRT) and non-hormonal alternatives such as selective serotonin reuptake inhibitors (SSRIs), gabapentinoids, and newer neurokinin receptor antagonists. Complementary therapies, including acupuncture, cognitive-behavioral therapy, and phytoestrogens, also show promise in symptom relief. This article explores the symptoms, pathophysiology underlying perimenopausal hot flashes, identifying key risk factors, helping researchers and patients navigate this transitional phase effectively.

Keywords: Estrogen, SSRI, SNRI, vasodilation, lifestyle

1. Introduction

Menopause is the complete termination of a woman's menstrual cycle. It reflects gonadal steroid reduction and oocyte depletion. It is typically found in women aged 45 to 55 and is a natural biological process. Perimenopause is the menopausal transition period that begins a few years before menopause. It causes slow loss of oocytes, abnormal menstrual cycle, hormonal changes, and impaired gonadal steroid feedback reactivity. It is typically encountered by women in their forties. The prevalence of HFs varies somewhat by race and ethnicity, with Japanese and Chinese women reporting the lowest prevalence and Caucasian women reporting the highest (1). The menopausal transition is a key factor in the development of numerous symptoms. It may also cause osteoporosis and cardiovascular issues (2).

2. Symptoms of perimenopause

Menopause and perimenopause both have similar symptoms but vary in intensity. The common symptoms observed are:

2.1. **Irregular menstrual cycle:** Before menopause, the menstrual cycle can be irregular in frequency and flow. During perimenopause, periods can be heavier, longer, or lighter than usual.

2.2. **Hot flashes (HFs):** Hot flashes are the most prevalent menopausal symptom. They include abrupt feelings of heat and sweating, which are frequently accompanied by anxiety.

2.3. **Mood changes:** Due to hormone level fluctuations, mood swings result in emotional ups and downs, depression, memory and concentration issues or "brain fog" and increased irritability.

2.4. **Weight gain:** Due to changes in metabolism, women experiencing menopause tend to gain weight and increased abdominal fat.

2.5. **Sleep disturbances:** Night sweats due to hot flashes lead to disturbed sleep and insomnia (2).

3. Hot flashes

Hot flashes (HFs) are seen in more than 80% of women and are thus considered the most prevalent symptom of menopause and perimenopause. It can be defined as the sensation of heat which causes sweating, flushing, and anxiety for a short period. Despite causing a great deal of discomfort, they are frequently overlooked because they are innocuous. The intensity and severity of HFs are seen as high during the early perimenopausal phase with maximum severity during the late menopause transition and decreases gradually (3).

3.1. Pathophysiology of HFs

HFs cause excessive peripheral vasodilation to dissipate heat, resulting in an aberrant hypothalamic thermoneutral zone. Unlike women not suffering from HFs who activate heat loss mechanisms when their core body temperature rises by 0.4°C, women with HFs start vasodilatory responses at significantly lesser increase in their core body temperature. Peripheral vasodilation causes excessive sweating and the sense of acute heat (4).

Major areas of the body experience hyperthermia and an increase in blood flow during HFs. Although the sensations of hot flashes are most severe in the upper body (head, neck, and upper chest), the greatest temperature increase is in the fingers and toes, where the temperature can rise from the typical range of 20°C to 33°C. Peripheral vasodilation causes heat loss, which lowers body temperature and eliminates flushing. The chills that follow HFs are the body's attempt to bring the lowered core body temperature back to normal (2).

HFs are frequently associated with oestrogen withdrawal during menopause; however, oestrogen alone is not responsible for HFs because the oestrogen levels are not seen to change significantly between symptomatic and asymptomatic women. Furthermore, HFs terminate during menopause, when oestrogen levels drop even further. The rate of drop in oestrogen level, rather than the actual fall, may be more important in the development of HF. Anomalies in hypothalamus thermoregulatory mechanisms are thought to be the primary cause of HF.

Several authors have proposed role of serotonin in HFs. Oestrogens increase the formation of serotonin and endorphins. After menopause, there is a 50% fall in serotonin levels due to decreasing oestrogen levels. A decrease in serotonin causes a rise in norepinephrine, which disrupts the hypothalamic thermostat. Several indirect data indicate that serotonin and norepinephrine play a role in the development of HFs which includes favourable reaction of hot flashes to (i) selective serotonin reuptake inhibitors (SSRIs); (ii) elevated plasma levels of norepinephrine, a key brain chemical during HFs and (iii) Clonidine which is an α2 adrenergic antagonist that lowers brain norepinephrine levels. An α2 adrenergic agonist, Yohimbine, that raises brain norepinephrine levels, may also provoke HFs (5).

Calcitonin gene-related peptide (CGRP) may also play a role in HFs. It is the most effective vasodilator in the human body, localised to sensory fibres. Animal studies imply that CGRP plays a function in HFs. CGRP's vasodilatory function is not dependent on histamine, prostaglandin, bradykinin, and epinephrine. HFs do not respond to their antagonist compounds. The distribution of CGRP in the skin corresponds to the distribution of sensory nerves, which is why flashes are seen to mostly affect the head, neck, and upper chest. CGRP, present in cholinergic sympathetic neurons of sweat glands, can augment methacholine-induced sweating in a dose dependent manner (2).

3.2. Treatment and management of HFs

Table 1. Various treatment regimens adopted for HFs in literature

S.No.	Treatment Regimes	Benefits	Current status	Side Effects/ Contraindications	Ref.
1	Oral oestrogen combined with micronized progestin or transdermal oestrogen. Marketed transdermal oestrogen products: **Climara, Menostar, Minivelle**	Effective for moderate to severe hot flashes	First choice for treatment	Stroke or breast cancer, active liver disease, coronary artery disease, unexplained vaginal bleeding, venous thromboembolic event, active gallbladder disease	(6)

2	SSRIs (Paroxetine and Escitalopram). Marketed products: **Lexapro, Cipralex, Nexito**	Effective for moderate to severe level hot flashes	For women unable to tolerate hormone therapy, this is the first line of treatment.	Paroxetine contraindicates tamoxifen	(6)
3	SNRIs (Venlafaxine)	Effective for moderate to severe level hot flashes and in women who cannot tolerate SSRIs	Definite option for nonhormonal treatment	-	(6)
4	Gabapentin **Brand name: Neurontin**	Effective for hot flashes occurring at night	Option for non-hormonal treatment	Can cause sedation	(6)
5	Depomedroxyprogestr oneacetate 500mg i.m **Brand name: Depo-Provera**	Comparatively more effective than venlafaxine	Option for non-hormonal treatment	Suitable for women with contraindications to estrogen therapy.	(2)
6	Tibolone **Brand names: Livial, Tibofem, Ladybon**	Synthetic drug used in Europe for hot flashes, also improves bone metabolism	Option for non-hormonal treatment	High chances of stroke	(2)
7	Conjugated Estrogen + Bazedoxifene	In theory, this combination exerts an antagonistic effect on the endometrium and an agonistic effect on bones.	Requires further studies	-	(2)
8	Oral contraceptive pills	Effective for perimenopausal women with heavy bleeding and desire for contraception	Definite option for non-hormonal treatment	Same as oral oestrogen combination therapy	(2)
9	Clonidine	Recommended for treating hot flashes	meta-analysis of 10 trials involving clonidine found that 50% of the trials showed a benefit with the use of clonidine, when compared with placebo	Dry mouth, constipation and drowsiness	(7)

In addition to the above-mentioned treatments some other traditional methods are use of cognitive behavioural therapy, progesterone creams, weight loss, evening primrose oil, plant-based therapies, flaxseed, ginseng, wild yam, black cohosh, and medicinal Chinese herbs. Acupuncture has long been used to treat menopausal HFs, but there is little data to support its effectiveness (2,3).

3.3. Herbal remedies for management of HFs

Black cohosh and foods rich in phytoestrogens show promising results in treating menopausal symptoms. These foods are not seen to have major side effects however mild nausea, upset stomach and skin rashes have been reported (8). Homeopathic remedies made of malagueta peppers (fruits of *Capsicum frutescens L., Solanaceae*) are effective in relieving menopausal hot flashes (9). Studies also show promising results with the administration of liquorice roots in decreasing the severity of hot flashes (10). Evening primrose oil is another herbal remedy that is seen to decrease the severity of night sweats. Minor side effects like nausea and stomach pain have been reported. Soybeans are a rich source of isoflavones. They are structurally similar to the hormone oestrogen and may thus exert weak oestrogenic effect in perimenopausal women. Several typical menopausal symptoms are linked to a decrease in the oestrogen formation and thus soy is said to ease menopausal symptoms because of its oestrogen like characteristics (11). Another structurally similar compound to oestrogen are flax seeds. They are a naturally rich source of lignans. They help alleviate menopausal symptoms including HFs and bone loss due to their structural similarity to oestrogen (12).

3.4. Risk factors associated with HFs

Cigarette smoking and consumption of alcohol can worsen hot flashes (13). A significant amount of evidence indicates that nicotine affects oestrogen metabolism and vascular function, increasing the risk of hot flashes. Alcohol can trigger vasodilation, exacerbating hot flashes (14).

Certain meals and beverages, such as hot and spicy foods, caffeine, and high sugar diets can lead to HFs. A few studies have also found certain medications like Niacin and history of oral contraceptives as a trigger for HFs (15).

Studies have also shown a correlation between sedentary lifestyle and HFs. According to research, women who exercise were found to have lesser HF incidents as exercise can help regulate thermoregulation (16).

Single nucleotide polymorphisms (SNPs) in the intronic sections of the tachykinin receptor 3 gene, which encodes the neurokinin B neuropeptide receptor (NK3R), were found to be strongly linked with vasomotor symptoms during menopause (2).

Hyperthyroidism or other endocrine imbalances can contribute to thermoregulatory instability. Metabolic dysfunction can influence vasomotor symptoms by affecting blood sugar regulation and vascular health.

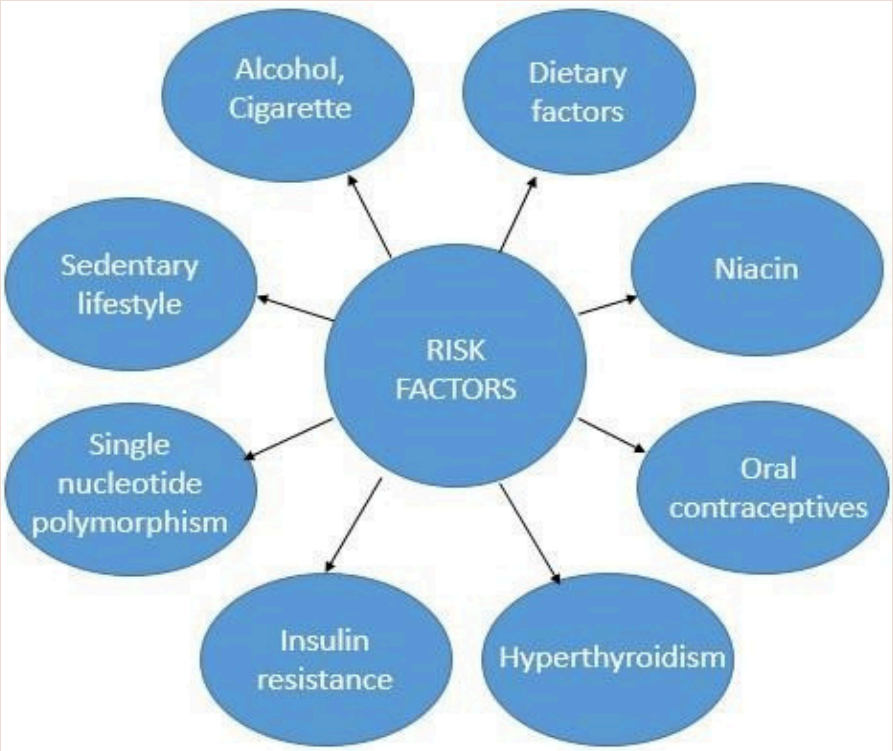

Figure 1. Risk factors associated with HFs

4. Conclusion

HFs are a common and often distressing symptom, particularly among menopausal women, with a complex pathophysiology involving thermoregulatory dysfunction, estrogen decline, and neurochemical changes. Various risk factors, including genetics, lifestyle, and comorbid conditions, influence their severity and frequency. Effective management strategies range from lifestyle modifications and non-hormonal therapies to hormone replacement therapy (HRT). As research continues to refine our understanding, a personalized approach to treatment remains essential in improving quality of life for those affected by hot flashes.

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Early inflammatory changes in perimenopause: A risk for neurodegeneration

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Abstract

Perimenopause is a natural transition into menopause which is often characterized through fluctuating estrogen levels, and associated with age-related increase in the risks of neurodegenerative diseases. A decline in estrogen hormone levels disrupts immune regulation and leads to impaired neuroinflammation and mitochondrial function, which eventually results in poor cognitive function. Estrogen receptor ER-β seems to play a neuroprotective role in modulating inflammation and oxidative stress. However, reduced activation during perimenopause promotes neurodegeneration. Hormone Replacement Therapy (HRT) is primarily employed to ameliorate menopausal symptoms and enhance cognitive function. However, it bears potential risks, including augmenting the risk of cardiovascular disease and cancers. Dietary interventions and antioxidants exhibits neuroprotective potential and supporting the pharmacological strategy of inflammation management. Regular physical activities and stress management contribute to countering systemic inflammation with effective brain health. Hence, an integrated approach incorporating hormonal balance, lifestyle changes, and targeted therapy toward neuroinflammation is critical to enhancing women's long-term health outcome. Understanding the mechanisms of neurodegenerative processes induced by perimenopause can create a valuable basis for producing effective interventions to manage cognitive function and overall health in peri-and post-menopausal women. This review emphases the significance of addressing systemic inflammation in perimenopause to improve health and quality of life for women.

Keywords: Perimenopause; Systemic inflammation; Estrogen regulation and Neurodegeneration.

1. Introduction

Menopause is the process of variable hormonal regimes leading to disturbed cycles and ultimately complete cessation of menstruation for at least one year. This transition may impair ovarian function because of a decrease in estrogen and progesterone levels. Hormonal imbalance causes several signs and symptoms, including mood changes, hot flashes, sleep disturbances, and increased systemic inflammation. The understanding of this transitional phase helps significantly to determine healthcare interventions to control the symptom and prevent the long-term health risks (1). Alteration of hormone in perimenopause trigger natural biological transitions that produce significant influences on manifold body systems. Moreover, various studies reveal that decreasing

estrogen levels may produce inflammatory conditions that leads a woman's risks for Alzheimer's disease (AD), Parkinson's disease (PD), and vascular dementia (VD) (2). The determination of this connection is essential for effective prevention of interventions. The maximum women characteristically experience perimenopause between the age of 40 and 50. As per the epidemiological research findings the prevalence of perimenopausal symptoms influences about 80% of women, but variations may be occurred due to genetic, life-style and environmental factors (3). The estrogen-regulated pathways may be impaired due to decreasing level of estrogen during the phase of the reproductive years, mainly that associated with neuroprotection, immune modulation and mitochondrial function (4). Estrogen is a regulatory hormone, acts via estrogen receptor (ER) subtypes, alpha (ER-α) and beta (ER-β). Mainly, ER-β provide a pivotal role in controlling neuroinflammatory processes by regulating the inflammasome, i.e. a prime component of the innate immune response (5). As the level of estrogen declines, this regulation is reduced, which causes to increased neuroinflammation, mitochondrial dysfunction and oxidative stress that led to neuronal damage and impair the cognitive function (6). This review exhibits that after perimenopause, a systemic inflammatory condition occurs, and acts as risk factors for neurodegenerative disease (ND) (7).

2. Menopausal transition and associated disorders

The decreasing the estrogen level during menopause transition, significantly alter the various physiological activities and also increase the risk of chronic disease progression. The most common health issue is cardiovascular disorder, as estrogen helps in maintain the cholesterol level that promote vasodilation and reduced the oxidative stress. The deficiency of estrogen leads to higher level of low-density cholesterol, atherosclerosis, and increases the risk of hypertension, and heart disease (8,9). Moreover, the estrogen plays a prime role in inhibiting the bone resorption, therefore, during the menopause, its decreases and accelerates bone loss. This also decrease the bone mineral density and increases the risk of osteoporosis and fractures, particularly in the wrist, spine and hips (10). Metabolic variations mat be occurred and many women facing increased visceral fat accumulation, dyslipidemia and insulin resistance. It may also be contributing to metabolic syndrome and a higher risk of developing type 2 diabetes (11). Additionally, decreasing level of estrogen may triggers chronic inflammation, which can lead to autoimmune conditions like rheumatoid arthritis and osteoarthritis (12). These inflammatory responses may be extended to the brain, enhancing the risk of cognitive decline and NDs like AD (13). In addition, most women report mood swings, depressions, anxiety, and insomnia, affecting their cognitive and emotional well-being (14).

Most of the abovementioned risks need to be reduced by different preventive measures. Exercise, lifestyle modification through weight reduction, and smoking cessation can be effective for the improvement of general health. Nutritional support in the form of calcium, omega-3 fatty acids, vitamin D, and phytoestrogens helps maintain bone and cardiovascular health (15). In some cases, hormone replacement therapy (HRT) could be supported to improve severe symptoms and prevent long-term complication. Additionally, regular health checks such as bone density examinations, blood glucose analysis, cardiovascular screening, could assure early detection and management of health risks, thereby enhancing the overall health outcomes for the menopause women (16).

3. Potential therapeutic interventions

3.1. Hormone replacement therapy (HRT)

HRT majorly with the use of estrogen can be looked upon widely for its neuroprotective potentials in postmenopausal women. Estrogen is known to influence cognition, reduce oxidative stress, and increase synaptic plasticity, thus possibly acting to reduce the risk of neurodegenerative disorders. Several studies suggest that estrogen regulates neurotransmitter action, enhances blood flow to the brain, and possesses properties that combat inflammation, these mechanisms contribute to brain health (16).

Apart from these benefits, HRT is associated with some side effects, such as an increased risk of stroke, venous thromboembolism, and certain cancers, which may inhibit its prevalent clinical application. The risk-benefit ratio may be depended on the factors such as the characteristics of individual patients,

duration of therapy and onset timing etc. Early initiation of HRT, mainly in the "critical window" hypothesis, leads that therapy starting earlier to menopause may give significant cognitive effects while reducing risks (16). Furthermore, studies are required to optimize HRT procedures, ensuring maximal neuroprotection while mitigating adverse effects.

3.2. Nutritional interventions for hormonal and neurological health

Nutritional interventions exhibit a prime role in maintaining hormonal balance, to reduce inflammation, and promote neuroprotection, predominantly in postmenopausal women undergoing HRT. As level of estrogen levels decreases with menopause, women suffer an increased risk of cognitive impairment, ND, and metabolic disturbances. A balanced diet, rich in minerals, vitamins, fats, antioxidants, carbohydrates, and protein nutrients, can serve as a complementary approach to mitigate these risks and enhance the benefits of HRT.

3.3. Phytoestrogens: Natural estrogen modulators

Plant-derived compound having estrogen-like activity is known as phytoestrogen, mainly present in soy products-isoflavones, flaxseeds, quercetin, naringenin, and legumes etc. These compounds may be attached to estrogen receptors and provide mild estrogenic effects, significantly improving menopausal symptoms and supporting cognitive activity. Epidemiological findings suggested that individuals consuming high amounts of soy-based foods, have a lower occurrence of menopausal symptoms and NDs. Though, the efficacy of phytoestrogens differs among individuals, depending on gut microbiota composition and metabolic activity (17).

3.4. Omega-3 fatty acids: protecting brain function

Long-chain omega-3 fatty acids, including eicosatetraenoic acid (EPA) and docosahexaenoic acid (DHA), play a critical role in brain health by reducing inflammation, enhancing synaptic plasticity, and supporting neuronal membrane integrity. These essential fatty acids, found in fatty fish (salmon, mackerel, sardines), flaxseeds, and walnuts, are particularly beneficial for postmenopausal women, as they counteract estrogen-related neuroinflammation and oxidative stress. Clinical studies indicate that omega-3 supplementation may reduce the risk of cognitive decline and improve mood regulation, which is crucial in menopause (18).

3.5. Antioxidants and polyphenols: Combating oxidative stress

Oxidative stress and chronic inflammation are key contributors to neurodegeneration and hormonal imbalances. Antioxidant-rich foods, such as green leafy vegetables (spinach, kale), berries, turmeric, and dark chocolate, provide polyphenols, flavonoids, and vitamins C and E, which neutralize free radicals and support mitochondrial function. Curcumin, the active compound in turmeric, has demonstrated neuroprotective effects by reducing beta-amyloid plaques associated with Alzheimer’s disease. Incorporating these foods into daily diets can enhance the neuroprotective effects of HRT (19).

3.6. B Vitamins and magnesium: Supporting neurotransmitter function

Vitamins B, particularly B6, B9 (folate), and B12, play essential roles in neurotransmitter synthesis and homocysteine metabolism. Elevated homocysteine levels are linked to cognitive impairment and an increased risk of neurodegenerative diseases. Green leafy vegetables, whole grains, eggs, and dairy products provide an adequate supply of these essential vitamins. Similarly, magnesium, found in nuts, seeds, and legumes, supports brain plasticity, reduces stress, and helps regulate estrogen metabolism, making it crucial for menopausal health (20).

3.7. Vitamin D and Calcium: Hormonal and bone health

Vitamin D is essential for calcium absorption, immune regulation, and brain health. Estrogen plays important role in metabolism of vitamin D, and postmenopausal women exerts high risk of both vitamin D deficiency and osteoporosis. Exposure of sun light, curd, milk fortified dairy products, vitamin, minerals and food supplements can help maintain ideal levels, supporting both neurological and skeletal health of menopausal women (21).

3.8. Exercise and stress management

Lifestyle changes such as regular exercise, yoga, meditation and stress management are vital that may help to significantly reduce inflammation and support cognitive health. Regular physical activities, particularly aerobic exercises, have been revealed to minimize systemic inflammation by regulating immune responses and reducing the production of inflammatory cytokines. Moreover, workout promotes neuroplasticity by alleviating levels of brain-derived neurotrophic factor. It is a protein used vital for neuron growth, and helps to enhance neurogenesis in the hippocampus that improve the memory and learning (22). Muscle training also helps to lowering chronic inflammation and maintain muscle mass. Additionally, chronic stress increases cortisol levels, when it occurs for long period, can lead to inflammation and cognitive decline. Stress management therapy, such as meditation, reduce cortisol levels and exerts lower inflammatory responses like C-reactive protein (CRP) and interleukin-6 (IL-6), and helps to protecting against physical and mental health challenges. Also, these therapies improve cognitive function, enhance concentration, and boost memory and also giving a protective effect against stress-related cognitive impairment (23).

4. Conclusion

Perimenopause signifies a critical phase in women's health, mainly for brain function and overall neurological health. In this phase, the body experiences significant hormonal changes that can directly impact on cognitive health. The most significant factors are systemic inflammation which influenced the NDs, is a regulating risk that can be addressed through targeted interventions. To determining inflammation as a significant factor to long-term neurological decline, it becomes essential to prioritize research into personalized strategies for reducing this risk. Advancing these approaches will not only empower women to manage their health proactively during perimenopause but also help mitigate the long-term neurological consequences associated with this transformative life stage.

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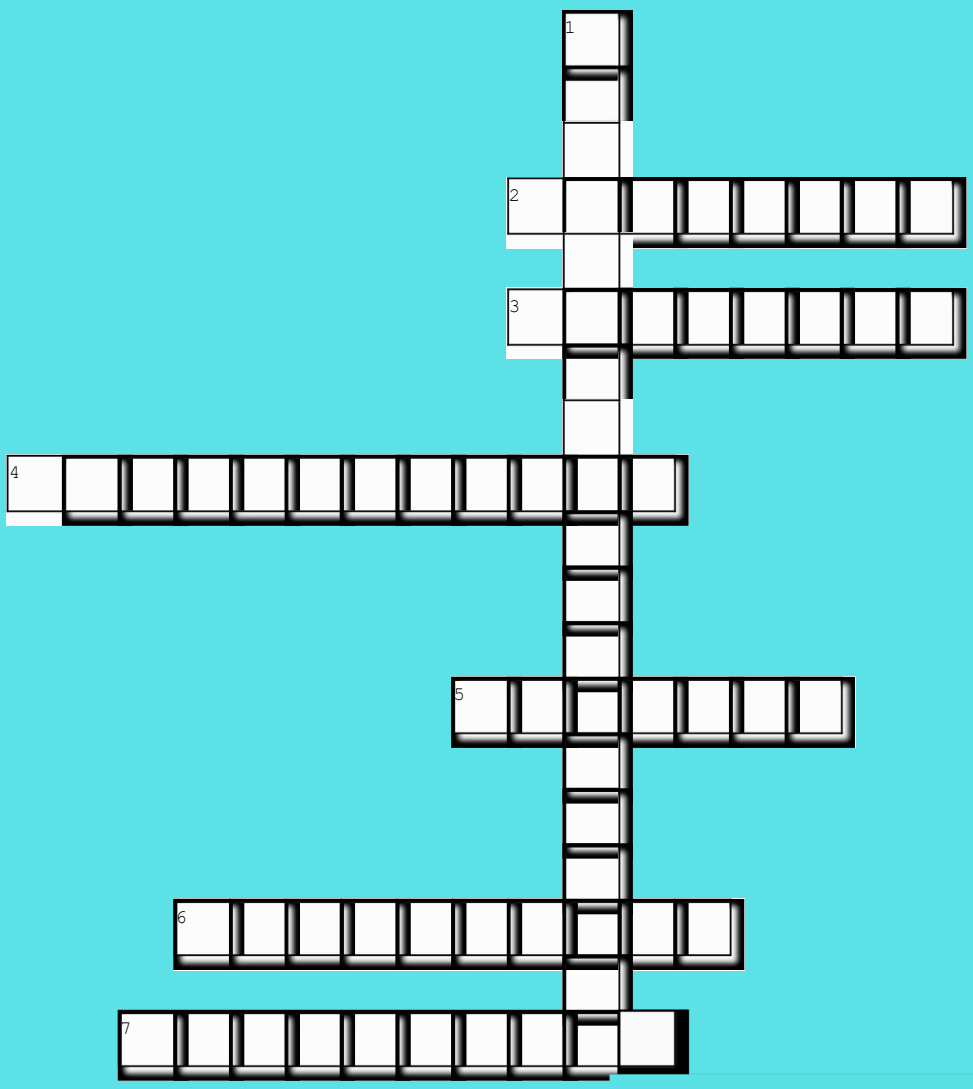
Name:_____

Symptoms of Perimenopause and Menopause

Complete the crossword puzzle below



Across

Sleep problems
Feeling mentally unclear
Sensation of rapid or irregular heartbeat
Mental and physical exhaustion
Fluctuations in mood
Sudden feelings of intense warmth

Down

1. Feeling mentally unclear

Answers are on page no: 81

The genetic influence on premenopausal and menopausal health: Implications for aging and disease risk



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Abstract
Menopause timing is influenced by genetic, environmental, and lifestyle factors, with significant implications for aging and risk for disease. Genome-wide association studies (GWAS) have identified genetic variants affecting age at natural menopause (ANM), highlighting pathways related to DNA repair, immune function, and ovarian aging. Rare genetic variants in genes like BRCA1, BRCA2, and PALB2 are linked to earlier menopause and increased cancer risks. Additionally, earlier menopause is associated with osteoporosis and cardiovascular disease, while later menopause raises risks for breast and endometrial cancers. Epigenetic studies suggest menopause timing correlates with biological aging. Understanding genetic determinants of menopause offers insights into aging mechanisms and potential interventions for disease prevention. Future research integrating genetics, epigenetics, and environmental factors may lead to personalized approaches for promoting women's health during aging.

Keywords: Epigenetics, menopause, ovarian aging, genetic determinants

1. Introduction
Menopause is a significant biological transition marking the end of a woman's reproductive years. It usually happens between the ages of 45 and 55, although variances exist due to genetic, environmental, and lifestyle factors. This phase is characterized by a reduction in ovarian function, which leads to declined levels of estrogen and other reproductive hormones. The onset of menopause is not merely a reproductive event; it is a complex process that has profound implications for overall health, including cardiovascular function, bone density, and cognitive well-being. The timing of menopause varies widely among women, with some experiencing it earlier than expected, known as premature or early menopause, while others undergo menopause later in life. Understanding the genetic basis of menopause timing is essential, as it provides insight into broader health implications, including aging and disease susceptibility.

Recent research has identified key genetic factors that regulate ovarian function and influence the timing of menopause. These genetic determinants are associated with risks for age-related illnesses such as cardiovascular disease, osteoporosis, and various cancers. Studies have shown that menopause timing is influenced by multiple genetic loci, particularly those involved in DNA repair and cellular aging. By examining the interplay between genetic factors and menopause, researchers can uncover critical pathways involved in aging and develop strategies for disease prevention and management. As research in genetics advances, personalized medicine approaches may offer new avenues for predicting menopause onset and tailoring interventions to reduce health risks associated with early or late menopause (1,2).

2. Genetic determinants of menopause timing

Recent research has identified numerous genetic variants associated with the age at natural menopause (ANM). A meta-analysis of genome-wide association studies (GWAS) involving 3,493 early menopause cases and 13,598 controls revealed that early menopause shares a genetic etiology with normal menopause timing (3,4). The study found that 17 variants previously linked to ANM were also associated with early menopause and primary ovarian insufficiency, suggesting a shared genetic basis. Notably, the combined effect of these common variants accounted for approximately 30% of the variance in early menopause, highlighting the significant role of genetics in determining menopause timing (5).

Further research has uncovered rare genetic variants with substantial impacts on menopause timing. An analysis of genetic sequencing data from over 106,000 post-menopausal women identified rare variants in nine genes associated with ANM. Four of these genes (ETAA1, ZNF518A, PNPLA8, PALB2) were newly implicated and found to influence menopause timing by two to five-and-a-half years earlier than average. These results offer more understanding of the molecular processes behind ovarian ageing and point to possible intervention avenues (6).

3. Genetic links between menopause timing and disease risk

Menopause timing is strongly linked to various health outcomes, with early and late menopause carrying different risks. Research suggests that genetic variants affecting menopause timing also influence the risk of developing age-related diseases. Figure 1 indicates the genetic linkup between perimenopausal and menopausal health and possible interventions.

3.1. Cancer risk

Women experiencing early menopause have a reduced risk of estrogen-sensitive cancers such as breast and endometrial cancer due to lower lifetime estrogen exposure. However, they face an increased risk of other conditions such as osteoporosis and cardiovascular disease. Conversely, late menopause extends estrogen exposure, elevating the risk of hormone-related cancers. Genetic studies indicate that BRCA1 and BRCA2 mutations not only increase cancer risk but also contribute to earlier menopause onset (7). These insights highlight the complex relationship between menopause timing and cancer susceptibility (8).

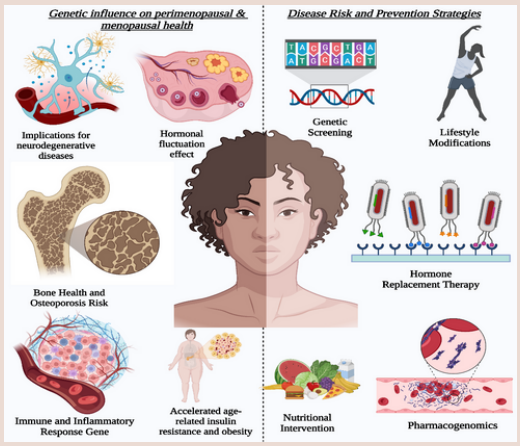

Figure 1. Genetic link between perimenopausal and menopausal health and possible interventions

3.2. Cardiovascular disease and osteoporosis

Early menopause has been associated with a heightened risk of cardiovascular disease. The preventive function of estrogen in preserving vascular health, and its decline during menopause can lead to increased arterial stiffness, hypertension, and lipid imbalances. Genetic studies have linked menopause timing to cardiovascular health, with certain genetic markers predicting a higher predisposition to heart disease in women who undergo menopause earlier than average. Similarly, osteoporosis is a major concern for postmenopausal women, as estrogen deficiency accelerates bone loss. Genetic variants influencing menopause timing, such as those in the LRP5 and ESR1 genes, have been implicated in bone mineral density regulation. Women with earlier menopause are at greater risk for fractures and osteoporosis-related complications, making genetic research crucial for developing targeted prevention strategies (9).

3.3. Immune and inflammatory response gene

The immune system undergoes significant changes during the transition from the perimenopause to menopause including significant hormonal changes influencing the immune system by modulation through estrogen receptor genes like ESR1 and ESR2. Estrogen plays a major role into the modulation of the immune function and its decline during menopause results in enhanced systemic inflammation, immune dysregulation, and high risk of inflammatory diseases. Other key immune and inflammatory genes like tumor necrosis factor alpha gene, interleukin -6 gene, interleukin 1- beta gene, C reactive protein gene are involved in the regulation of inflammatory response and chronic inflammation in menopause (10). The human leukocyte antigen genes, transforming growth factor beta gene, Nod like Receptor Pyrin Domain Containing 3 gene is responsible for autoimmune diseases, immune suppression, regulation of tissue remodelling and inflammasome activation (11).

3.4. Implications for neurogenerative diseases

Neurodegenerative disorders, including Alzheimer's disease (AD), often exhibit sex-specific differences in incidence and progression. Research indicates that aging and the female sex are strongly associated with a higher prevalence of AD. Current literature suggests that decline in progesterone, estrogen and insulin-like growth factor 1 (IGF-1) contribute to neurodegenerative processes in AD. These hormonal changes are linked to increased neuroinflammation, impaired amyloid-beta (Aβ) clearance, and reduced neuroprotection, exacerbating disease progression (12). Estrogen and IGF-1 enhance Aβ clearance by upregulating the expression of Aβ-degrading enzymes such as neprilysin and insulin-degrading enzyme. IGF-1 also promotes microglial phagocytosis of Aβ. These hormones support neuronal survival, synaptic plasticity, and mitochondrial function. Declining levels of these hormones during menopause reduce Aβ clearance, leading to its accumulation and may accelerate neurodegeneration and cognitive decline (13).

4. Genetic makeup, aging, environmental, lifestyle, and disease risk

Reproductive aging is closely intertwined with overall biological aging, with menopause serving as a key indicator of an individual's aging trajectory. Genetic factors influencing menopause also impact aging processes at the cellular level (14).

4.1. DNA repair mechanisms and aging

Several genes involved in menopause timing are also crucial for DNA damage response and repair. The gradual accumulation of DNA damage contributes to aging, and compromised DNA repair mechanisms can accelerate ovarian aging (15). For example, mutations in genes such as CHEK2, ATM, and XRCC1, which regulate DNA damage repair pathways, have been associated with early menopause and increased susceptibility to age-related diseases (16,17)

4.2. Epigenetics and menopause

Epigenetic modifications, such as DNA methylation and histone modifications, influence gene expression and play a role in reproductive aging. Studies have shown that early menopause is associated with specific DNA methylation patterns linked to accelerated biological aging (18). This suggests that genetic and epigenetic factors collectively contribute to menopause timing and its effects on aging-related diseases. Recent findings indicate that specific lifestyle elements, including stress reduction, exercise, and nutrition, can influence epigenetic regulation of genes involved in menopause. Understanding these interactions could open new avenues for personalized health strategies aimed at delaying menopause and reducing disease risks associated with aging (19).

4.3. Environmental and lifestyle influences on disease risk

Lifestyle and environmental factors also play a role in menopausal transition through epigenetic modifications. Chronic stress is another environmental factor that can alter epigenetic regulation,

particularly through modifications in glucocorticoid receptor genes. Persistent exposure to high levels of cortisol has been shown to induce hypermethylation of the NR3C1 gene, which encodes the glucocorticoid receptor. Furthermore, exposure to endocrine-disrupting chemicals (EDCs), such as bisphenol A (BPA) and phthalates, can lead to epigenetic changes that accelerate ovarian aging. Studies have shown that BPA exposure can induce hypomethylation of genes regulating estrogen signaling, potentially leading to an earlier onset of menopause and increased risk of hormone-related cancers (20).

5. Future directions and implications

Ongoing research in genetics and menopause is paving the way for potential interventions to modulate menopause timing and mitigate health risks. Advances in precision medicine and genetic testing may allow for early identification of women at risk for early or late menopause, enabling proactive healthcare measures. Hormone replacement therapy (HRT) tailored to an individual's genetic profile may also provide safer and more effective treatment options (21-23). For example, genetic variations in estrogen metabolism genes such as CYP1A1, CYP1B1, and COMT influence how a woman processes and responds to estrogen therapy (23-26). Women with certain CYP1B1 variants may metabolize estrogen more slowly, increasing their risk of hormone-related cancers if given standard HRT. In contrast, those with efficient estrogen metabolism may benefit from a customized dosage that optimizes efficacy while minimizing side effects. By incorporating genetic screening into treatment plans, healthcare providers can personalize HRT to maximize benefits and reduce potential risks, ensuring a safer approach for menopausal symptom management. As precision medicine continues to evolve, integrating genetic, epigenetic, and lifestyle factors will be essential in promoting healthy aging and reducing disease burden in menopausal and postmenopausal women (27).

5.1. Potential interventions

Targeted therapies based on genetic insights could help manage menopause-related health issues. For instance, hormone replacement therapy (HRT) tailored to an individual's genetic profile may offer more effective and personalized treatment options while minimizing risks. Additionally, emerging research on ovarian tissue preservation and regenerative medicine holds promise for extending the reproductive lifespan in women with early menopause predisposition (28). While lifestyle changes may not significantly alter the timing of menopause itself, they can positively impact overall health and potentially mitigate some of the risks associated with earlier menopause (29). Chronic stress can exacerbate menopausal symptoms (30). Techniques like yoga, meditation, and deep breathing can be beneficial. A healthy diet high in calcium, whole grains, fruits, and vegetables can lower cardiovascular risk and promote bone health. Exercise is crucial for maintaining bone density, cardiovascular health, and overall well-being (31).

5.2. Personalized healthcare strategies

With increasing access to genetic screening, women can gain a better understanding of their reproductive health risks and make informed decisions regarding family planning and disease prevention. Integrating genetic data with lifestyle and environmental factors will be crucial in developing comprehensive health management strategies tailored to individual needs.

6. Conclusion

Genetic research has significantly enhanced our understanding of menopause timing and its implications for aging and disease risk. Identifying key genetic variants associated with menopause has provided critical insights into reproductive aging mechanisms and their connections to overall health. Menopause timing is influenced by a complex interplay of genetic, epigenetic, environmental, and lifestyle factors, making it a crucial area of study for developing targeted interventions and personalized healthcare strategies.

Early menopause is linked to an increased risk of cardiovascular diseases and osteoporosis, whereas late menopause is associated with a heightened risk of hormone-related cancers.

Understanding these genetic associations helps anticipate potential health concerns and implement prophylactic measures. Advancements in genome-wide association studies (GWAS) and epigenetics have paved the way for improved predictions regarding menopause onset, enabling healthcare providers to offer better guidance and treatments to women approaching this life stage.

Moreover, emerging research in regenerative medicine and ovarian tissue preservation presents promising avenues for extending reproductive lifespan and mitigating adverse health effects. Hormone replacement therapy (HRT) tailored to an individual's genetic profile may also provide safer and more effective treatment options. Future research should focus on expanding genetic databases, exploring novel gene-environment interactions, and developing comprehensive health strategies to improve quality of life. By leveraging these scientific advancements, we can enhance reproductive health, ensure better disease management, and contribute to the longevity and well-being of aging populations. Identifying key genetic variants associated with menopause has provided insights into reproductive aging mechanisms and their connections to overall health. As scientific advancements continue, integrating genetic, epigenetic, and environmental data will be essential in developing personalized strategies to promote healthy aging and reduce disease burden in menopausal and postmenopausal women. By leveraging genetic insights, researchers and healthcare professionals can work toward optimizing reproductive health and enhancing longevity in aging populations.

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Empowering your menopause journey: From perimenopause to beyond



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Abstract

Menopause is a natural yet complex transition in a woman's life, typically occurring between the ages of 45 and 55, marked by the gradual decline of estrogen and progesterone levels. This phase is often preceded by perimenopause, characterized by irregular menstrual cycles, vasomotor symptoms (hot flashes, night sweats), mood fluctuations, and sleep disturbances. While menopause is a universal experience, its impact varies among individuals, necessitating a personalized approach to management. This review explores strategies to empower women during perimenopause, menopause, and post menopause through lifestyle modifications, medical interventions, and psychological support. Holistic approaches, including balanced nutrition, regular exercise, mindfulness, and stress management, play a crucial role in symptom relief and overall well-being. Hormone Replacement Therapy (HRT) remains a viable option for symptom control, though its risks and benefits require careful evaluation. Alternative treatments such as herbal supplements and non-hormonal medications also provide relief for some individuals. Beyond physical symptoms, menopause can impact cognitive function, bone density, cardiovascular health, and mental well-being. Addressing these long-term health concerns through preventive healthcare, regular screenings, and workplace support initiatives can significantly improve the quality of life. This article integrates recent studies and evidence-based practices to provide a comprehensive guide for managing menopause effectively. By fostering education, awareness, and proactive health strategies, women can embrace this life transition with resilience and improved well-being.

Keywords: Symptom Management, Women's Health, Holistic Well-being, Lifestyle Interventions, Mental Health

1. Introduction

Menopause is a significant biological milestone in a woman's life, marking the cessation of menstruation and the end of her reproductive years. It is officially diagnosed when a woman has gone 12 consecutive months without a menstrual period, typically occurring between the ages of 45 and 55. However, the transition to menopause is not abrupt; it is preceded by perimenopause, a phase lasting several years where hormonal fluctuations lead to various physiological and psychological changes. This period is often associated with symptoms such as hot flashes, mood swings, sleep disturbances, and cognitive changes, which can significantly impact a woman's quality of life (1).

The menopausal transition is influenced by various factors, including genetics, lifestyle, and overall health status. While menopause is a natural biological process, the experience is highly individualized

some women go through this phase with minimal discomfort, while others face severe symptoms that affect their daily activities. The degree of impact depends on the body's adaptation to declining estrogen and progesterone levels, which play critical roles in regulating multiple bodily functions, including bone density, cardiovascular health, and mental well-being. Understanding menopause requires a comprehensive approach that considers not only the physical changes but also the emotional, psychological, and social aspects. Women often encounter societal stigma and misinformation surrounding menopause, leading to unnecessary distress and hesitation in seeking appropriate care. Many women remain unaware of the diverse treatment options available, from lifestyle modifications to medical interventions, that can help ease the transition. This review aims to provide a detailed exploration of menopause, highlighting strategies for symptom management, long-term health considerations, and ways to empower women to take charge of their well-being during this crucial life stage. Additionally, menopause has significant implications for long-term health, increasing the risk of osteoporosis, cardiovascular disease, and cognitive decline. Therefore, proactive healthcare approaches such as regular medical check-ups, dietary adjustments, and exercise routines become essential to maintaining overall health and well-being. The workplace and social environment also play a crucial role in shaping a woman's menopause experience, emphasizing the need for support systems and awareness initiatives that foster a menopause-friendly society (2).

2. Physiological changes (3,4)

2.1. Vasomotor symptoms (hot flashes & night sweats)

- Hot flashes are sudden feelings of heat, often accompanied by sweating and flushing of the skin.
- Night sweats are intense episodes of sweating during sleep, leading to discomfort and sleep disturbances.
- These occur due to fluctuations in the hypothalamus (the body's temperature regulator) in response to hormonal changes.

2.2. Sleep disturbances and fatigue

- Insomnia or difficulty staying asleep is common, often due to night sweats or hormonal imbalances.
- Fatigue results from poor sleep quality and fluctuating cortisol levels, leading to daytime exhaustion.

2.3. Vaginal dryness and decreased libido

- Lower estrogen levels (figure 1) reduce vaginal lubrication, leading to discomfort or pain during intercourse (dyspareunia).
- Reduced blood flow to the genital area can cause a decrease in sexual desire and arousal.

2.4. Cognitive changes (memory lapses & brain fog)

- Many women experience forgetfulness, difficulty concentrating, and slower cognitive processing.
- Estrogen plays a role in brain function, and its decline affects neurotransmitters like serotonin and dopamine, leading to brain fog.

2.5. Increased risk of osteoporosis and cardiovascular diseases

- **Bone Loss:** Estrogen is essential for maintaining bone density. Its decline leads to increased bone resorption, raising the risk of **osteoporosis** and fractures.
- **Heart Health:** Estrogen helps regulate cholesterol levels and maintain blood vessel flexibility. Post-menopause, women have a higher risk of hypertension, atherosclerosis, and heart disease.

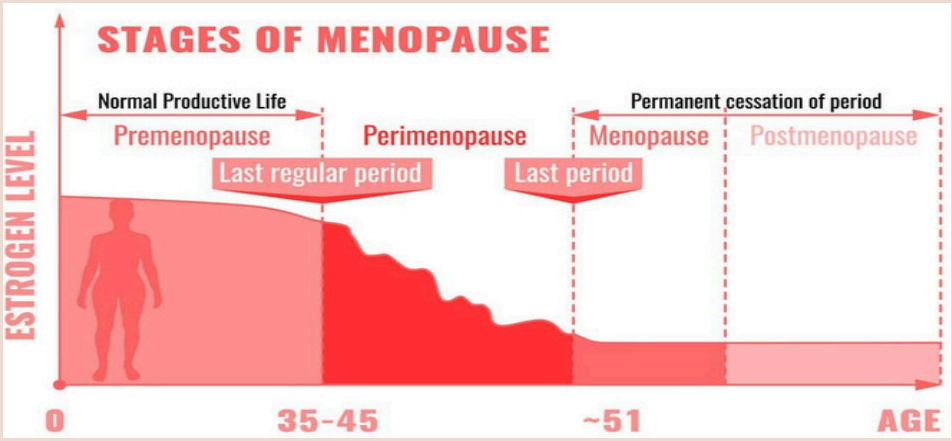

Figure 1. Estrogen level across menopausal stages

3. Psychological changes

3.1. Mood changes, anxiety, and depression

- Fluctuating estrogen and progesterone levels affect neurotransmitters like serotonin and GABA, which regulate mood.
- Many women report increased anxiety, irritability, and episodes of depression, even if they've never experienced them before.

3.2. Increased stress and emotional sensitivity

- Perimenopause can intensify emotional responses, making women more sensitive to stress and external triggers.
- Changes in cortisol levels may contribute to a heightened "fight-or-flight" response.

3.3. Self-image and confidence issues

- Weight gain, hair thinning, and skin changes can affect self-esteem.
- Some women struggle with a sense of aging or loss of youth, leading to psychological distress.

4. Empowering strategies for a smooth menopause transition (5,6)

Navigating menopause can be challenging, but the right strategies can make the journey smoother and more manageable. A combination of lifestyle changes, medical support, and psychological well-being can help women transition through this phase with confidence and vitality.

4.1. Lifestyle modifications

Making adjustments to daily habits can significantly improve physical, mental, and emotional well-being during menopause.

4.1.1. Regular exercise for overall health

- **Yoga and strength training:** Supports bone health, flexibility, and muscle tone.
- **Cardiovascular activities (walking, swimming, and cycling):** Improves heart health, metabolism, and energy levels.
- **Pelvic floor exercises (Kegels):** Help with urinary incontinence and vaginal health.

4.1.2. Nutrition for hormonal balance

- **Calcium and vitamin D:** Essential for bone strength and preventing osteoporosis. Found in dairy, leafy greens, and fortified foods.
- **Phytoestrogens (plant-based estrogens):** Found in soy, flaxseeds, and legumes, these may help balance hormone levels.

- **Healthy fats (Omega-3s):** Found in salmon, walnuts, and flaxseeds, these support brain health and reduce inflammation.
- **Hydration and fiber:** Helps with digestion, weight management, and overall vitality.

4.1.3. Stress management for emotional well-being

- **Meditation and deep breathing:** Reduces anxiety and improves sleep.
- **Mindfulness practices:** Helps with mood swings and emotional regulation.
- **Adequate sleep routine:** Avoid caffeine, limit screen time, and create a calming bedtime ritual.

4.2. Medical and hormonal therapies

For women with moderate to severe symptoms, medical options can provide significant relief.

4.2.1. Hormone replacement therapy (HRT)

- **Benefits:** Helps relieve hot flashes, vaginal dryness, and osteoporosis risk.
- **Risks:** May increase the risk of certain cancers, blood clots, and stroke in some women.
- **Individualized Approach:** Always consult a doctor to evaluate the safety and suitability of HRT.

4.2.2. Non-hormonal medications

- **Antidepressants (SSRIs, SNRIs):** May help manage mood swings and hot flashes.
- **Gabapentin and clonidine:** Used to treat hot flashes and night sweats.
- **Vaginal estrogen creams:** Provide relief for vaginal dryness and discomfort without affecting the whole body.

4.2.3. Alternative and natural remedies

- **Herbal supplements:** Black cohosh & red clover help with hot flashes and night sweats and ashwagandha & maca root support stress reduction and energy levels.
- **Acupuncture and aromatherapy:** Some women find relief through complementary therapies.

4.3. Psychological and social support

Emotional well-being is just as crucial as physical health during menopause.

4.3.1.Therapy and support groups

- **Counselling & cognitive behavioural therapy (CBT):** Helps with anxiety, depression, and self-esteem.
- **Menopause support groups:** Provide a safe space to share experiences and gain advice.

4.3.2. Breaking the stigma

- **Workplace awareness:** Employers can offer flexible schedules, wellness programs, and menopause-friendly policies.
- **Family conversations:** Open discussions help partners, children, and friends understand and support the transition.

4.3.3. Personal growth and hobbies

- Exploring new interests, travel, or creative outlets boosts mental health and self-confidence.
- Maintaining strong social connections helps prevent isolation and loneliness.

Table 1. Common symptoms and management approaches

Symptom	Management approach
Hot flashes	HRT, cooling techniques, dietary changes

Sleep disturbances	Sleep hygiene, relaxation techniques
Mood changes	Counselling, mindfulness, medication
Osteoporosis risk	Calcium, vitamin D, weight-bearing exercise
Vaginal dryness	Estrogen therapy, lubricants

5.Long-term health considerations

Menopause brings about increased risks for various chronic conditions, including cardiovascular diseases, osteoporosis, and cognitive decline. Implementing preventive healthcare strategies is crucial to maintaining overall well-being. Regular medical check-ups, including bone density scans and cardiovascular assessments, can help detect and manage potential risks early. Additionally, adopting a healthy lifestyle with proper nutrition and regular physical activity contributes to long-term health benefits (7,8).

6. Societal and workplace support

Menopause-related symptoms can impact work productivity and quality of life. Organizations should implement policies that support menopausal women, such as flexible work arrangements, awareness programs, and access to healthcare resources. Encouraging open discussions about menopause helps reduce stigma and fosters a more inclusive work environment (9,10).

7. Conclusion

Menopause is a significant life transition, but with the right approach, it can be a period of growth, empowerment, and renewed self-care. By combining healthy lifestyle choices, medical support, and emotional well-being strategies, women can navigate this stage with strength and positivity. Understanding the physical and emotional changes, adopting balanced nutrition and exercise routines, considering medical and alternative treatments, and seeking social and psychological support can make the journey smoother. Since every woman’s experience is unique, it is essential to personalize these strategies to meet individual needs and preferences. With knowledge, support, and self-care, menopause can be embraced as a new chapter of vitality, wisdom, and well-being.

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Holistic approaches to menopausal challenges: Lifestyle, nutrition, and therapeutic advances

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Abstract

Menopause is a natural transition marked by hormonal changes that impact physical, mental, and emotional well-being. Conventional treatments like hormone replacement therapy (HRT) are effective but may have some side effects, leading to growing interest in holistic approaches that integrate lifestyle, nutrition, and alternative therapies for symptom management. This study explores holistic strategies to support women through menopause, emphasizing exercise, stress management, sleep hygiene, balanced nutrition, and emerging therapeutic advances to enhance quality of life and long-term health outcomes. A comprehensive review of scientific literature, clinical studies, and traditional practices was conducted to evaluate the effectiveness of lifestyle modifications, dietary interventions, herbal remedies, and alternative therapies in managing menopausal symptoms. Findings suggest that regular exercise improves bone density and cardiovascular health, stress management techniques reduce anxiety and mood fluctuations, and sleep hygiene practices enhance restful sleep. Nutritional strategies rich in phytoestrogens, essential vitamins, and healthy fats help regulate hormonal balance. A holistic approach combining lifestyle modifications, proper nutrition, and alternative therapies provides a safe and effective strategy for managing menopausal symptoms while improving overall well-being.

Keywords: Lifestyle Modifications, Nutrition, Alternative Therapies, Stress Management, Hormonal Balance

1. Introduction

Menopause significantly affects a person's lifestyle, influencing their physical, emotional, social, and economic well-being. Taking these factors into account, menopausal management calls for an all-encompassing approach (1). To provide menopausal practitioners a framework for dealing with their patients, a number of ideas under the umbrella phrase "holistic approach." When used correctly, these ideas will improve the quality of patient care and include several qualitative facets of healthcare into a unified "holistic" management approach (2). During this time, including dietary changes, lifestyle tweaks, and newly found therapies may greatly enhance general health. By 2030, there will likely be 1.2 billion menopausal women worldwide, and as life expectancy rises, so does the number of these women. A woman is said to have reached menopause when her bleeding ceases within a year of her last menstruation (3,4). Hormonal changes during perimenopause and menopause cause a variety of unique issues. Menopausal symptoms affect 75 to 80 percent of women, with 20 to 30 percent

reporting more severe symptoms. Alongside the physiological changes caused by drop in estrogen levels, dietary modifications should also be a part of a comprehensive menopausal therapy plan. Menopause is linked to higher incidence of osteoporosis, metabolic syndrome, obesity, and cardiovascular disease. Nutritional regulation is a key element in primary chronic diseases prevention (5).

1.1. Understanding perimenopause and menopause

Menopause and perimenopause mark the transition out of the reproductive years. Menopause marks formal end of a woman's pregnancy. Although menopause is a well-known stage of life, there are really a lot of important milestones to recognize and understand (6).

1.2. Understanding menopause and its stages

Menopause is a natural biological process that marks the end of a woman's reproductive years, characterized by the permanent cessation of menstrual cycles. This transition occurs gradually and involves three distinct phases: perimenopause, menopause, and postmenopause.

1.2.1. Perimenopause: The transition phase

Perimenopause, or the menopausal transition, occurs several months to years before menopause, typically between ages 45 and 55, lasting anywhere from three to fourteen years. During this phase, estrogen levels fluctuate, leading to irregular menstrual cycles, hot flashes, night sweats, sleep disturbances, fatigue, mood swings, and anxiety. It is important to distinguish premenopause from perimenopause, as premenopause refers to the entire reproductive phase before any menopausal symptoms appear (7).

1.2.2. Menopause: The official end of menstruation

Menopause is officially diagnosed when a woman has gone 12 consecutive months without menstruation, marking the end of natural fertility. At this stage, the ovaries produce significantly less estrogen, resulting in the permanent cessation of menstrual cycles. Unlike perimenopause, menopause is a specific point in time rather than a transitional phase, and after menopause, natural conception is no longer possible (8).

1.2.3. Postmenopause: The life stage after menopause

Postmenopause begins after menopause and lasts for the remainder of a woman’s life. While some menopausal symptoms, such as hot flashes, may lessen over time, postmenopausal women face an increased risk of osteoporosis, cardiovascular diseases, and metabolic changes that may contribute to weight gain. Understanding these stages is essential for effective symptom management through lifestyle adjustments, medical interventions, and holistic approaches (9).

2. Lifestyle modifications for a smooth transition

2.1. Importance of physical activity and exercise

Regular exercise is crucial for controlling menopausal symptoms since it improves cardiovascular health, metabolic function, and bone density. Exercises like yoga, strength training, walks, and outdoor workouts help people maintain a healthy weight, reduce hot flashes, and feel happier by releasing endorphins (10).

2.2. Stress management and mental well-being

Menopause can cause mood swings, anxiety, and cognitive changes due to hormonal fluctuations. Stress management techniques like meditation, deep breathing, and therapy help maintain emotional stability. Yoga, by integrating movement, breath control, and relaxation, is particularly beneficial in reducing anxiety and improving mental well-being. Regular physical activity and cognitive behavioral therapy (CBT) further aid in stress reduction. Incorporating these holistic approaches can enhance mental resilience and overall quality of life during menopause.

2.3. Sleep hygiene and relaxation techniques

During menopause, getting enough sleep is crucial, but sleep problems may be brought on by hormonal changes and night sweats. Having a peaceful sleeping environment, cutting less on internet and coffee

before bed, & establishing a regular sleep schedule may all significantly enhance quality of your sleep (11).

3. Nutritional strategies for hormonal balance

Diet plays a crucial role in managing the physiological changes associated with menopause. As estrogen levels decline, women become more susceptible to osteoporosis, cardiovascular diseases, weight gain, and metabolic disorders. A well-balanced diet rich in essential nutrients, phytoestrogens, and functional foods can help alleviate menopausal symptoms, support hormonal balance, and reduce the risk of chronic conditions such as diabetes, heart disease, and certain cancers.

3.1. Essential nutrients for menopausal health

During menopause, nutrient-rich foods are essential to counteract hormonal fluctuations. Some key nutrients and their benefits include:

- **Calcium and vitamin D:** Essential for bone health to prevent osteoporosis. Found in dairy products, fortified plant-based milk, leafy greens, and fish (e.g., salmon and sardines).
- **Omega-3 fatty acids:** Help reduce inflammation, improve heart health, and support cognitive function. Found in fatty fish (salmon, mackerel), flaxseeds, walnuts, and chia seeds.
- **B Vitamins (B6, B12, folate):** Support energy production, brain function, and nervous system health. Found in whole grains, eggs, poultry, and fortified cereals.
- **Magnesium:** Helps in reducing anxiety, improving sleep quality, and supporting muscle relaxation. Found in nuts, seeds, dark chocolate, and leafy greens.
- **Vitamin K:** Important for bone density and cardiovascular health. Found in broccoli, spinach, kale, and fermented dairy (12).

3.2. Role of phytoestrogens and functional foods

Phytoestrogens are plant-based compounds that mimic estrogen in the body, helping alleviate hot flashes, night sweats, and hormonal imbalances. Some key sources include:

- **Soy products (tofu, tempeh, soy milk, edamame):** Contain isoflavones, which may help regulate estrogen levels.
- **Flaxseeds and sesame seeds:** Rich in lignans, which support hormonal balance.
- **Legumes (chickpeas, lentils, beans):** Provide phytoestrogens and protein for metabolic health.

Functional foods also play a significant role in maintaining hormonal stability and metabolic health:

- **Whole grains (quinoa, oats, brown rice):** Help in regulating blood sugar and improving digestion.
- **Nuts and seeds (almonds, chia seeds, sunflower seeds):** Provide healthy fats, fiber, and essential minerals.
- **Fermented foods (yogurt, kimchi, sauerkraut, kefir):** Enhance gut microbiome health, which is linked to hormonal regulation.

A diet rich in phytoestrogens and functional foods may naturally reduce the severity of menopausal symptoms and promote overall well-being (13).

3.3. Hydration and gut health

Proper hydration is essential during menopause as it helps with:

- Regulating body temperature and preventing hot flashes.
- Reducing dryness associated with lower estrogen levels.
- Supporting metabolism and weight management.

Women should aim to consume at least 8–10 glasses of water daily and include hydrating foods such as watermelon, cucumber, celery, and citrus fruits. Gut health also plays a role in hormonal balance. A diet rich in probiotics and prebiotics supports digestion and nutrient absorption:

- Probiotic-rich foods (yogurt, kefir, miso, kimchi, kombucha) help in digestive health and immune support.
- Prebiotic foods (garlic, onions, bananas, asparagus, oats) feed good bacteria and aid in nutrient absorption (14).

3.4. Hormone replacement therapy (HRT) and nutrition

While nutrition can significantly help in managing menopausal symptoms, HRT remains a widely used medical approach for women experiencing severe hormonal imbalances. HRT involves supplementing

estrogen and/or progesterone to reduce symptoms such as hot flashes, mood swings, and osteoporosis risk.

There are two main types of HRT:

- **Estrogen-only therapy (ET)** – Typically prescribed for women who have had a hysterectomy.
- **Combined estrogen-progesterone therapy (EPT)** – Recommended for women with an intact uterus to protect against endometrial cancer.

However, HRT has potential risks, including an increased likelihood of blood clots, stroke, and breast cancer in some women. To complement HRT, it is essential to maintain a healthy diet that supports hormonal function, such as:

- Antioxidant-rich foods (berries, green tea, dark chocolate) to counteract oxidative stress.
- Calcium and Vitamin D to support bone density since estrogen deficiency increases the risk of osteoporosis.
- Healthy fats (avocados, olive oil, nuts) to maintain cardiovascular health.

Women considering HRT should consult healthcare professionals to weigh the benefits and risks based on their medical history. A balanced diet rich in essential nutrients, phytoestrogens, and hydration can significantly alleviate menopausal symptoms and support long-term health. Combining nutritional strategies with lifestyle modifications and medical interventions like HRT provides a comprehensive approach to managing menopause effectively (15).

4. Therapeutic advances and alternative medicine

Traditional methods like HRT are still in use, even though natural and organic alternatives are offered by herbal, Ayurveda, and mind-body therapies (16).

4.1. Hormone replacement therapy (HRT) and newer trends

HRT is a long primary menopausal symptoms treatment including hot flashes and night sweats by replacing depleted ovarian hormones (17). HRT has focused on bioidentical hormones, which are chemically similar to the body's natural hormones and provide a more customized and maybe better method (18).

4.2. Herbal and Ayurvedic remedies

Herbal and Ayurvedic treatments support hormonal equilibrium and general well-being, offering natural ways to treat menopausal symptoms. Phytoestrogens, such as those found in red clover, flaxseeds, and soy, can control estrogen levels and lessen hot flashes and night sweats. Black cohosh is commonly used to alleviate vasomotor symptoms, while the Ayurvedic herbs ashwagandha and licorice root support stress relief, emotional balance, and hormonal regulation (19). Ginseng and ginkgo biloba improve mental and cognitive performance, while evening primrose oil eases breast pain and supports healthy skin.

4.3. Role of acupuncture, yoga, and mindfulness

Mind-body treatments like acupuncture, yoga, and mindfulness are becoming more popular because of their ability to improve sleep, lessen menopausal symptoms, & improve general quality of life. Studies suggest that acupuncture may help reduce anxiety, night sweats, and hot flashes while also promoting better sleep and biological balance (20).

5. Empowering women through awareness and support

Even though menopause is a normal life change, societal attitudes and misunderstanding cause emotional, social, and physical challenges for many women. If women are aware of menopausal symptoms, lifestyle changes, and available treatments, they may be better equipped to handle this time. Promoting self-care, emotional wellbeing, and proactive health management is crucial to ensuring that women feel empowered rather than alone throughout this period of life (21).

Importance of routine health checkups: Routine health tests and examinations are crucial for the early detection and prevention of menopause-related health issues such osteoporosis, cardiovascular diseases, and hormone imbalances (22).

6. Conclusion

Menopausal symptoms can be safely and effectively managed with a "holistic" approach that includes innovative therapies, a nutritious diet, and lifestyle changes. Regular exercise, stress management, and sound sleeping practices all contribute to improved physical and mental wellness. Complementary therapy and nutritional interventions maintain hormone balance and enhance overall health. Among the cutting-edge treatments that could displace conventional therapy are herbal remedies, bioidentical hormones, and mind-body methods. To provide women the confidence and better quality of life they need to manage menopause, it is imperative to raise awareness, encourage community support, and push for routine health checkups.

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Embracing the unspoken: Redefining the menopausal journey


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Abstract
Menopause, a natural phase of life for half the global population, unfolds uniquely for each woman. Perimenopause serves as the transitional stage preceding menopause, typically manifesting in a woman's 40s but occasionally earlier. Fluctuating estrogen levels give rise to symptoms such as irregular periods, hot flashes, mood swings, and sleep disturbances. While some navigate this phase with ease, others encounter significant challenges that impact their well-being. Despite advancements in scientific understanding, the menopausal transition remains a complex journey, often overshadowed by a lack of awareness, leaving many women grappling silently. The medicalization of menopause has been criticized for marginalizing women's perspectives, leading to an incomplete comprehension of their experiences. This review offers insights into the shift from perimenopause to menopause, emphasizing that menopause is not a conclusion but rather a fresh start a chance to reevaluate priorities, embrace transformation, and embark on a path rich with wisdom and resilience.

Keywords: Menopause, perimenopause, empowerment

1. Introduction
For centuries, menopause remained shrouded in mystery, seldom openly discussed or comprehended. Aristotle speculated it occurred at 40, yet the term wasn't coined until 1821. In the 1930s, it was perceived as a deficiency ailment, prompting unconventional treatments like testicular juice. The 1970s marked the full medicalization of menopause, with estrogen therapy assuming a central role. However, cultural perceptions varied significantly—hot flashes in the West, shoulder pain in Japan, and low vision in India (Table 1). While Hormone Replacement Therapy (HRT) became commonplace in the Western world, many in India embraced menopause as a natural and inevitable phase of life (1).

Menopause can be succinctly described as the cessation of ovarian function, typically confirmed by the absence of menstrual bleeding or amenorrhea for a year. On the other hand, perimenopause signifies the transitional phase leading up to the final menstrual cycle (2) (Figure 1). Research indicates that factors such as increasing age, lower socioeconomic status, later onset of menarche, and higher body mass index (BMI) are correlated with more pronounced menopausal symptoms. According to the United Nations, as of 2020, approximately 985 million women globally have surpassed the age of 50, with projections estimating this number to escalate to 1.65 billion by the year 2050 (3).

While some women transition through menopause with relative ease, the majority encounter challenges due to a lack of understanding about the phases and symptoms of this natural process (Figure 2). The widespread prevalence of menopausal symptoms adds to the complexity of managing this phase. Historically, physicians often downplay menopausal symptoms as there is no standard set of symptoms that apply universally. Consequently, healthcare providers frequently prescribe mood stabilizers without addressing the underlying root cause of menopausal symptoms.

Table 1. Menopausal perspectives: Contrasting experiences of Indian women and their western counterparts

Experiences	Indian context	Western context
Factors		
Age of onset	46-49 years	51years
Symptoms	High prevalence of somatic symptoms such as joint pain	Vasomotor symptoms like hot flushes are high
Cultural factors	Take it in a more positive sense: They will be liberated from societal judgments and misconceptions, no longer deemed impure by the patriarchal norms.	Anticipation of aging finds it hard to accept it as a natural transition.
Healthcare	Indian women may encounter barriers to accessing healthcare services, potentially leading to a reduced likelihood of seeking treatment for menopausal symptoms.	Western women generally have greater health awareness, which enables them to pursue medical interventions at an earlier stage (4).

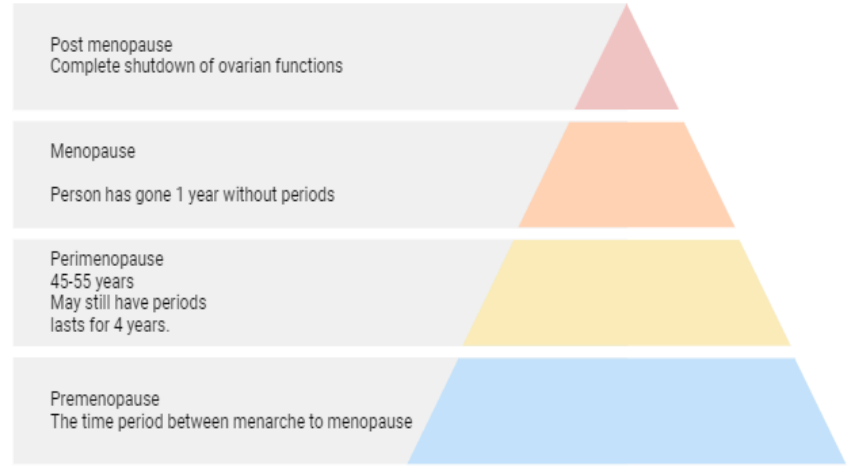

Figure 1. Various stages of menopause

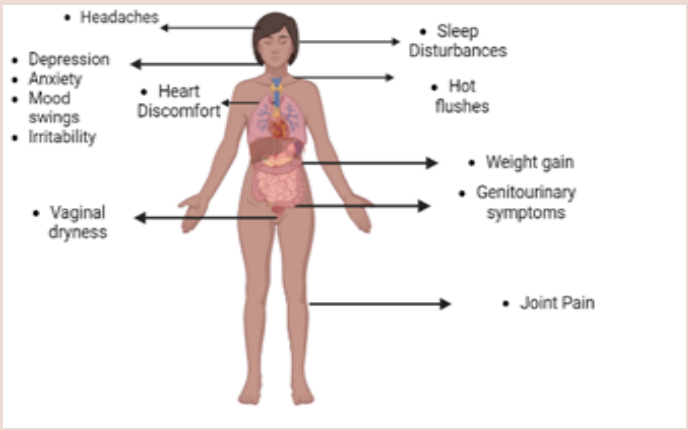

Figure 2. Signs and symptoms associated with menopause

2. Unveiling the silent impact of the perimenopause to menopause transition

2.1. Menopause and mental strength

During perimenopause, individuals often encounter a range of symptoms including muscular discomfort, hot flashes, cognitive issues, and sleep disturbances. Recent literature suggests that women in perimenopause may be at increased risk for developing psychiatric conditions such as major depressive disorder, schizophrenia, and bipolar disorders (5). Furthermore, menopause brings a range of psychological symptoms such as mood swings, anxiety, and cognitive alterations. These symptoms can create a sense of disconnect with one's body, prompting individuals to contemplate their identity. Consequently, they may withdraw from communities that do not address their needs, further complicating the transition for other women due to a lack of representation and support.

2.2. The stereotype of menopause and work competence

Identity plays a significant role in an individual's life. As individuals progress through life, the definition of identity evolves from aspirations for the future to their present reality, often intertwined with their work and societal roles. The societal emphasis on youthfulness as a standard of beauty influences perceptions in the workplace, contributing to the marginalization of older women and fostering ageist attitudes. The unpredictable nature of menopause can lead women to feel disconnected from their bodies, impacting their confidence and prompting them to conceal symptoms to align with an idealized image of a worker. This behaviour can influence other women to follow suit, perpetuating ageist norms in the workplace. This collective experience contributes to menopause being regarded as a problem rather than a natural phase of a woman's life (6). Policymakers are urged to create a more inclusive and supportive work environment for women experiencing menopause (Figure 3).

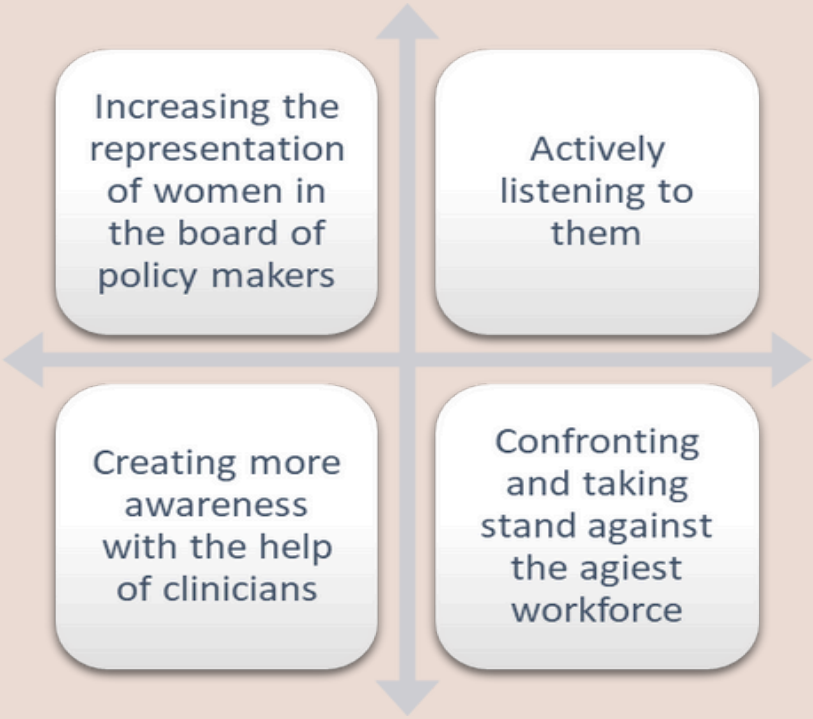

Figure 3. Strategies for a menopause friendly work-place

2.3. Breaking the silence: Addressing female sexual health concerns during menopause

Female sexuality and its associated challenges have historically been considered taboo, despite the WHO recognizing it as a fundamental human right. The hormonal changes during menopause, including decreases in estrogen and androgen levels, can impact sexual well-being by affecting neurotransmitter networks and creating an imbalance between excitatory and inhibitory signals. The genitourinary urinary syndrome can also contribute to a decrease in libido (7). Unfortunately, these concerns are often left unaddressed when discussing them with healthcare providers due to fears of judgment. An inclusive and non-judgmental approach from healthcare professionals can help alleviate the burden and stress associated with these issues. There are various treatment options available, ranging from Cognitive Behavioural Therapy (CBT) to Hormonal Therapy, non-hormonal therapies, vaginal moisturizers, and lubricants.

3. Thriving through transition: Embracing menopause through self-care and understanding

Recognizing menopause as an unavoidable stage with its inherent unpredictability serves as a foundation. The menopausal journey is individualized, and ensuring widespread access to evidence-based and pragmatic information can aid individuals in navigating this transition effectively. Beyond the commonly acknowledged symptoms like hot flashes and night sweats, it is essential to acknowledge and address the full spectrum of symptoms associated with menopause (Figure 4).

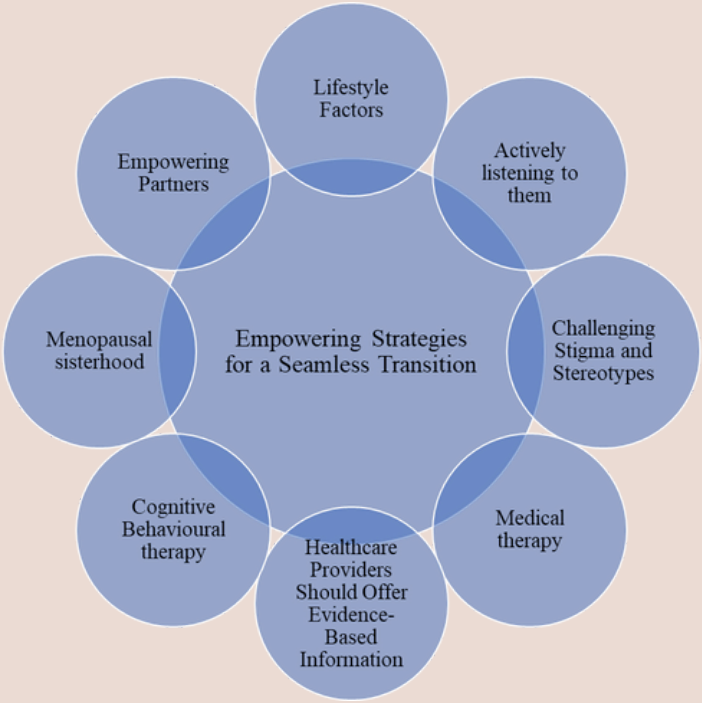

Figure 4. Empowerment mode

3.1. Sisterhood in menopause: Navigating the journey together

The "Menopause Sisterhood" represents a supportive and understanding bond among women navigating the complexities of menopause together. It serves as a safe space where individuals can openly discuss their experiences, offer advice, and derive solace in the knowledge that they are not alone in their journey. This sisterhood naturally forms among friends, colleagues, or within support groups, akin to the connections established during pregnancy or motherhood. Women rely on one another for support, contributing to the destigmatization of menopause, a subject that is often taboo. While some individuals find strong networks within their workplaces or social circles, others take the initiative to initiate conversations, ensuring that no one faces this transition in solitude (8).

3.2. Cognitive behavioural therapy (CBT)

CBT is frequently employed to address a wide range of mental health concerns, such as anxiety and depression, which may intensify during menopause. Research indicates that CBT has significantly enhanced insomnia and sleep quality among postmenopausal women (9).

3.3. Taking control of menopause

Table 2. Therapies for menopause

Hormonal therapy	Involves the administration of estrogen or a combination of estrogen and progestin to alleviate symptoms such as hot flashes and vaginal dryness. This therapy not only addresses menopausal symptoms but also promotes bone health and may lower the risk of heart disease, particularly if initiated near the onset of menopause (10) .
Non-hormonal therapy	Incorporating lifestyle changes, dietary modifications, and medications like selective serotonin reuptake inhibitors (SSRIs) and gabapentin can effectively alleviate symptoms without necessitating hormone therapy (10).

3.4. Creating a menopause-supportive work environment

Menopause significantly affects women's experiences in the workplace, influencing their well-being, job performance, and interactions with colleagues. Many women struggle with whether to disclose their symptoms, often fearing stigma or misunderstanding. Despite these challenges, they develop their coping strategies to maintain productivity. However, workplace policies frequently fall short of providing adequate support. Employers should foster an environment where menopausal women feel understood and supported. This includes implementing inclusive policies, offering flexible work arrangements, and promoting open discussions about menopause. By doing so, organizations can help women navigate this phase with dignity while continuing to thrive in their careers (11).

3.5. Empowerment allies: Enhancing support and strength together

Supportive allies can significantly ease the transition, promoting awareness and fostering a positive environment. Menopause impacts both women and their partners, yet with empathy and transparent communication, it has the potential to strengthen relationships. Partners who educate themselves, listen attentively and demonstrate patience offer invaluable support. Implementing minor lifestyle adjustments, such as adopting healthier eating habits and engaging in physical activities together, can also contribute to well-being. Embracing menopause as a shared journey cultivates profound connections and resilience within relationships (12).

4. Conclusion

While menopause represents a significant and often perplexing life stage for many, proactive measures and awareness can aid individuals in navigating this transition successfully. Some contend that the medicalization of menopause has marginalized women's voices, leading to a limited comprehension of their experiences. By actively listening to their apprehensions and empathetically acknowledging their emotional well-being, society can play a pivotal role in facilitating a smoother transition through menopause.

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Connecting through change: Finding support during perimenopause and menopause


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Abstract

A woman's perimenopause and menopause are life-changing stages. Hormonal changes during the multi-year transition known as perimenopause affect mood, sleep patterns, bone health, and other aspects of life. A change in the body's cycle is indicated by menopause, which is defined as a 12-month period-free period. Hot flashes, nocturnal sweats, mood swings, sleep issues, and cognitive problems are typical symptoms. A healthy diet, consistent exercise, stress reduction, and strong social support are all essential for managing this stage holistically. Strength training, mindfulness, plant-based diets, and expert advice can all help reduce symptoms and enhance well-being. Developing relationship with those going through this process promotes emotional fortitude. Menopause and perimenopause should be confidently accepted as periods to focus on self-discovery and wellness. Women can be empowered to flourish rather than just get through this stage of life by comprehending and assisting this shift.

Keywords: Perimenopause, menopause, hormonal changes, mindfulness, mood swings.

1. Introduction

A significant and often misunderstood chapter in women's life is perimenopause and menopause. We're not calling it "the change" as if it's an ending, but rather "the change" as in a powerful transition, an opportunity for growth, and a time to prioritize well-being. The article equips and also shares the valuable knowledge, understanding, support, and resources needed to deal this journey with strength, grace, and a deep understanding of body. This isn't just about surviving this phase; it's about thriving through it (1).

2. Understanding the symphony of change

Perimenopause is like a symphony of hormonal fluctuations (figure 1), a prelude to menopause. It's a transitional phase that can last several years, as ovaries gradually produce less estrogen and progesterone levels. These mentioned hormones play vital & important roles in various bodily functions, from regulating menstrual cycle to influencing mood, sleep, bone health, and more (1). As their levels fluctuate and decline, women may experience a range of physical and emotional changes. Menopause itself is a single point in time marked by 12 consecutive months without a menstrual period signalling the natural end of reproductive years.

3. The body's whispers: Recognizing the signs

Every woman's experience is unique, but some common "whispers" from the body during this time include:

- **The inner radiator:** Hot feel, those undefined sensations of intense heat, associated with sweats, a flushed face & sometimes even chills. They can range in intensity and frequency, and their duration can vary from a few seconds to several minutes (2).
- **Night sweats:** Hot flashes that occur during sleep drench and disrupt rest. These can significantly impact sleep quality and lead to daytime fatigue.
- **The mood rollercoaster:** Emotional ups and downs, including irritability, anxiety, depression, or difficulty concentrating. Remember, these feelings are valid and often linked to hormonal shifts. Don't dismiss them as "just part of getting older."
- **The sleep thief:** Difficulty in sleeping due to disturbance in the sleep cycle, conscious sleep, or restless and inappropriate sleep. Hormonal changes, night sweats, and anxiety can all contribute to sleep problems (3).
- **The dry spell:** Vaginal dryness, which can cause discomfort during intercourse, itching, burning, or increased susceptibility to infections.
- **The libido lull:** Changes in sexual desire, which can be influenced by hormonal fluctuations, vaginal dryness, and emotional factors.
- **The mental fog:** Cognitive changes like memory lapses, difficulty focusing, or feeling "fuzzy-headed." These can be frustrating, but they are often temporary.
- **Aches and pains:** Joint and muscle aches and pains can become more common due to hormonal changes and the natural aging process.
- **Changes in body composition:** Some women may notice changes in their body shape, including weight gain or a redistribution of fat.
- **Changes in hair and skin**: Thinning hair, dry skin, or changes in skin elasticity may occur (4).

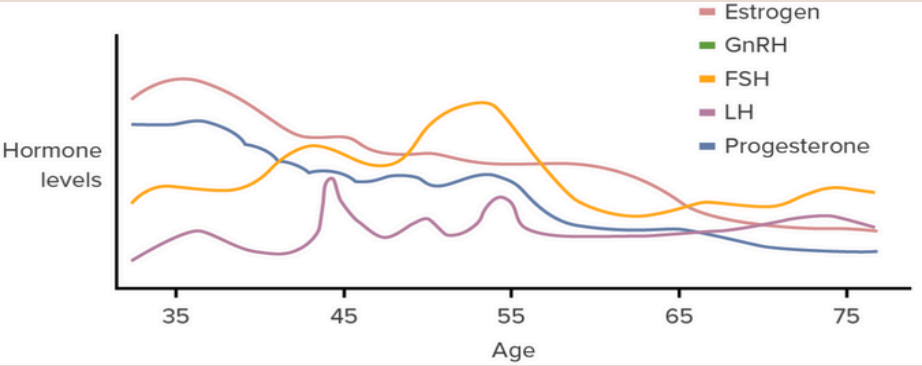

Figure 1. Level of hormones at different stages: The primary hormonal changes seen in perimenopause/menopause are a decrease in estrogen and progesterone and an increase in FSH (follicle-stimulating hormone), LH (luteinizing hormone), and GnRH (gonadotropin-releasing hormone)

4. Easing the transition: A holistic toolkit

Managing perimenopause and menopause isn't about fighting the change, but about working with body. Here's a holistic toolkit to help women navigate this phase:

4.1. Nourishing the body: Food as medicine

- **The power of plants:** Embrace a diet rich in fruits, vegetables, whole grains, and legumes. These provide essential vitamins, minerals, antioxidants, and fiber, which are crucial for overall health and can help manage symptoms. Aim for a colorful array of fruits and vegetables to maximize nutrient intake (5).

- **Healthy fats:** Don't fear fats! The right kinds of fats are essential for hormone production and overall health. Choose healthy options like avocados, nuts, seeds, olive oil, and fatty fish (salmon, tuna). These can help improve mood, reduce inflammation, and support brain function (6).
- **Hydration is key:** Drink plenty of water throughout the day. Dehydration can worsen symptoms like hot flashes, vaginal dryness, and fatigue. Carry a water bottle and sip throughout the day.
- **Limit the triggers:** Reduce or eliminate processed foods, sugary drinks, excessive caffeine, and alcohol, as these can exacerbate symptoms like hot flashes, mood swings, and sleep disturbances. Pay attention to how the body reacts to different foods and make adjustments accordingly.
- **Gut health matters:** A healthy gut microbiome is essential for overall well-being, including hormone balance. Include probiotic-rich foods like yogurt (with live cultures), kefir, sauerkraut, and kimchi in diet (7).

4.2. Moving with intention: Exercise as your ally

- **Find joy:** Engage in regular physical activity that you enjoy, whether it's walking, dancing, yoga, swimming, cycling, hiking, or gardening. The key is to find something you love and stick with it. Aim for at least 30 minutes of moderate-intensity exercise most days of the week (8).
- **Strength training:** Incorporate strength training exercises at least two to three times per week. This is crucial for maintaining bone density, muscle mass, and preventing osteoporosis, which is a concern for women during and after menopause. Use weights, resistance bands, or your own body weight for exercises like squats, lunges, push-ups, and planks.
- **Mindful movement:** Practices like yoga and tai chi can improve balance, flexibility, and mental well-being. These practices often combine physical postures with deep breathing and meditation, which can be particularly beneficial for managing stress and anxiety (9).

4.3. Taming the stress beast: Prioritizing mental and emotional health

- **Deep breathing:** Practice deep, diaphragmatic breathing to calm nervous system and reduce stress. Even a few minutes of deep breathing throughout the day can make a difference.
- **Mindfulness meditation:** Even a few minutes of daily meditation can help quiet the mind, reduce anxiety, and improve focus. There are many guided meditation apps and resources available online (10).
- **Creative outlets:** Engage in activities that bring you joy, like painting, writing, playing music, or spending time with loved ones. These activities can help you relax, express yourself, and boost your mood (11).
- **Healthy Boundaries:** Tom minimize the stress level, you have to ready for saying ‘No’. Prioritize your needs, moods, requirements & well-being.
- **Seek Professional Support:** If you're struggling with significant mood changes, anxiety, or depression, don't hesitate to seek help from a therapist or counsellor. Therapy can provide you with valuable tools and strategies for managing your emotions and coping with the changes you're experiencing (12).

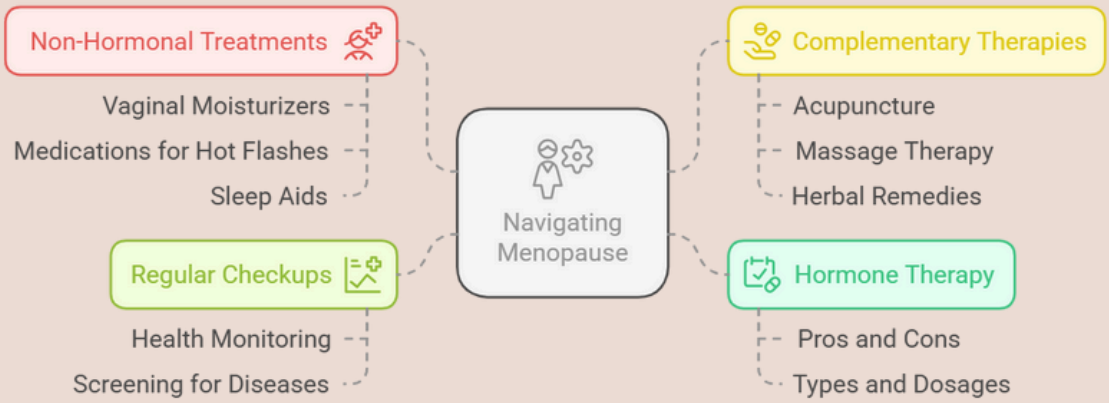

Figure 2. Navigating menopause: Treatment and management options

4.4. The power of connection: Identifying your tribe and creating your supportnetwork (13,14)

- **Share story:** Discussing about your experiences can be incredibly helpful and can help reduce the stigma surrounding menopause. *Specific Tip:* Share your story with a trusted friend, family member, or partner. You can also consider writing about your experiences in a journal or blog (15).
- **Find tribe:** Connecting with other women who understand what you're going through can be incredibly validating and supportive. *Specific Tip:* Search for online forums or support groups specifically for women in perimenopause and menopause. Attend local events related to women's health (16).
- **Professional support:** Don't hesitate to seek professional help if you're struggling with emotional or relationship challenges (17). *Specific Tip:* A therapist or counselor can provide a safe and supportive space for you to explore your feelings and develop coping strategies (18).

5. Word of encouragement: Embracing this new chapter with confidence

Remember, you are not alone in this journey. Perimenopause and menopause are a natural and inevitable part of life, a transition, not a destination. Embrace this new chapter with self-compassion, resilience, and a focus on your overall well-being. This is a time to prioritize your needs, to rediscover yourself, and to celebrate your strength and wisdom (19).

6. Conclusion

Menopause and perimenopause are significant life transitions for women, but they should not mean the end of vitality or well-being. Women should welcome this stage as an opportunity for personal development, rejuvenation, and self-care rather than just surviving it. Women may traverse this shift with strength and confidence if they are aware of the indications, understand the physiological changes, and take a holistic approach that includes regular exercise, healthy eating, stress management, and strong social support. This is a path of empowerment rather than constraint. Women may reframe menopause as a time of knowledge, self-discovery, and rejuvenated purpose by placing a higher priority on their physical, emotional, and mental health. Although each woman’s experience is different, no one must go through this change alone. Perimenopause and menopause may be transformed from uncertain times into opportunities for flourishing with the help of support, education, and self-care. Knowing that this new chapter is a discovery to a life full of power, equilibrium and revitalized energy, embrace it with bravery.

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Management options

W C T N U I C S C O Y V L X J B S R X Q
M O A R U P L N G Q L H L Q M B E A C B
N B D U O Z O P U K X K N B B L T F W X
X T N A T E N I L O Z E F A G C G O H O
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V I O V B G E D D K O E X E G F X T R H
X Z K Z E E Z Y S P X S P P Y Z H Y P Z
H I I T J N Q X Y B V K P R H Q Q N Q S
D N I M A T I V D R L W Q E J X U I C B
K I Z C S H R A P A B G X S M A C N A L
R F A I D E S C K E H P N S C I R V M M
H M N I M R A R M Y L J X A G X F M K G
K Q I F S A Z G A B A P E N T I N E C L
D V H I H P R O F Z Q F C T V N N F N H
W H I V J Y D V V U B K N I R W T M D E
N U C C M T V P I F W C X L V F R U D C
T V Y B G B S K W V X W X T V X A L W F

ESTROGENTHERAPY
CLONIDINE
VITAMIND
GABAPENTIN
FEZOLINETANT
OSPEMIFENE
ANTIDEPRESSANT
OXYBUTYNIN

Answers are on page no: 82

Body composition analysis: A vital health assessment tool during perimenopause and menopause


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Abstract

A majority of women experience a variety of physiological changes during perimenopause and menopause. Such and other hormonal, psychological changes can heavily impact a woman's quality of life. A Body Composition Analysis serves as an invaluable clinical instrument integrated into the health evaluation for vibrant women navigating the perimenopausal phase. It can be utilized to investigate the linkage between body composition and cardio-metabolic profile. The metabolic rhythm of a woman's body experiences a notable decline during menopause, leading to a cascade of health transformations. It is advised that maintaining and achieving a normal nutritional status and body composition in women should be the goal. Body Composition Analysis supplemented with other predictors observed in perimenopausal and menopausal women can be helpful to healthcare providers.

Keywords: Body Composition Analysis, women's health, metabolic syndrome, weight gain

1. Introduction

The onset of menarche, the transitional phase of perimenopause, and the culmination of menopause are all intrinsic chapters in the narrative of a woman's existence. Menopause is characterized as the final episode of menstrual flow that remains absent for a full year and is devoid of any underlying medical issues. The initial stage of perimenopause is marked by sporadic menstrual cycles intertwined with shifting hormones, while the later stage of perimenopause signifies a complete halt in menstruation lasting sixty days or beyond, paving the way to the postmenopausal era (1). Perimenopause is a transitional phase that lasts for 4-5 years, and the complete ending of menstruation follows it. Biologically, perimenopause is the period when a woman experiences fluctuation of follicle-stimulating hormones (FSH) and luteinizing hormones (LH). During this phase, women pass through various hormonal, physiological, and psychological fluctuations ascribed to the irregularity of menstrual cycles. The physiological changes experienced during perimenopause include night sweats, hot flashes, and vaginal dryness, while the psychological changes generally seen are depression, irritability, mood swings, and anxiety. Hormonal changes like estrogens deficiency can also trigger various physical changes, such as altered metabolism, weight gain, irregular periods, and reduced fertility (2).

2. Signs and symptoms associated with menopause

According to the World Health Organization, perimenopause denotes the gradual transition from consistent menstrual cycles to the end of menstruation. Throughout this stage, there is a steady decline in ovarian follicles, leading to decreased estrogen levels, which significantly disrupts normal bodily functions, including issues related to sexual health, affecting connective tissues, soft tissues, physical activity, and alterations in body composition (3). The alterations consist of unpredictable and intense menstrual cycles, mental cloudiness, reduced cognitive abilities, sudden temperature sensations, fluctuations in mood (such as feelings of depression and anxiety), difficulty sleeping, exhaustion, decreased sexual desire, vaginal dryness, and painful intercourse (4). Brain fog affects women's capabilities and cognitive functions in the workplace, leading to a diminished capacity to perform daily activities. Mood swings and irritability can harm personal relationships. Concurrent feelings of fatigue and weight gain in women can significantly lower their energy levels, self-worth, and overall mood. Vaginal dryness and dyspareunia may influence libido and intimacy (5). Some genitourinary and vasomotor indications, along with other symptoms like night sweats, disturbed sleep, hot flashes, genitourinary discomfort, cognitive deviations, bone loss, growth of abdominal fat, and slow and inefficient metabolism can occur in any sequence, pattern, intensity, or combination.

3. Changes in body composition of women during perimenopause and menopause:

3.1. Weight gain in women during menopause:

According to the WHO, menopause typically occurs around the age of 50 and is linked to various changes in both the physical and mental health of a woman. It has been observed that 60-80% of women will encounter vasomotor symptoms (VMS), such as hot flashes and night sweats, during this transition (6). A gradual decline in ovarian hormonal function occurs, leading to shifts in the hormonal system (estrogen deficiency) and modifications in a woman's body composition.

3.2. Cardio-metabolic risk in menopausal women

Estrogens play a pivotal role in maintaining energy homeostasis and promoting metabolic health and overall well-being. Throughout the perimenopausal phase, estrogen levels steadily decline, which correlates with alterations in women's energy consumption and dietary intake. These changes are observed as body weight gain and altered body fat distribution at various body organs. Fat usually gets deposited on the abdomen area and makes the woman prone towards cardio-metabolic risk through insulin resistance in the body.

4. Body composition analysis

Body composition analysis is an invaluable clinical instrument in inpatient and outpatient environments. It is straightforward, economical, and practical and delivers insights regarding basal metabolic rate, body mass index, and skeletal mass, fat mass, and fat percentage. This approach is integrated into health assessments for healthy women during perimenopause. It can be employed to explore the relationship between body composition and cardio-metabolic profiles, as the onset of menopause and the decrease in estrogen levels lead to a decline in the basal metabolism of the female body, resulting in various health changes (7).

Body composition analysis can be integrated with alterations in fat distribution that occur during perimenopause. The fat distribution study employs dual-energy X-ray absorptiometry (DEXA) measurements to evaluate body composition. It proves more advantageous due to its lower inter and intra-individual variance. Additional tools such as magnetic resonance (MR) and computed tomography (CT) are also employed as clinically acceptable methods for Body Composition Analysis. Women typically undergo a reduction in their basal metabolic rate and simultaneously experience a decline in lean muscle mass during perimenopause and menopause, which heightens the likelihood of weight gain and obesity. The onset of sarcopenia is frequently noted in women experiencing menopause. This occurs due to an imbalance between muscle protein synthesis and its degradation. The quality of body muscle is defined as the ratio of muscle strength to muscle mass. Research findings suggest that muscle strength and quality are inversely related to the intensity of menopausal symptoms, which arise from decreasing levels of sex hormones. The levels of sex hormones are inversely associated with the degree of oxidative stress. For postmenopausal women, chronic

systemic inflammation, elevated oxidative stress, increased abdominal visceral fat, dyslipidemia, sarcopenia, and a lack of physical activity are significant risk factors for metabolic syndrome. The occurrence of metabolic syndrome has risen in Asian nations, including India (8). The prevalence of metabolic syndrome differs among various populations, with rates ranging from 13.8% in pre-menopausal women to 60% in postmenopausal women (9).

Studies show that in the case of postmenopausal women, as changes in lipid metabolism occur due to reduced levels of estrogen, CVD and metabolic syndrome are more common compared to pre-menopausal women. A research study revealed that weight-adjusted lean body mass and skeletal muscle area protect against weight-related insulin resistance and metabolic disorders in women (6). It has been proposed that women with reduced muscle mass and a lower number of estrogen receptors face an elevated risk for metabolic issues. A decrease in 'lean body mass' has been identified as the most significant factor influencing metabolic changes in postmenopausal women. The 'lean body mass' is linked to decreased whole-body fat oxidation and energy expenditure, which are connected to increased abdominal fat mass and reduced insulin sensitivity. As women transition into menopause, maintenance of adequate levels of muscle mass contributes significantly to minimizing risks of sarcopenia and obesity.

Table 1. Body composition analyzers in women during perimenopause and menopause

Indicator of Body Composition	Unit for measurement	Acceptable (normal) range
Weight (Body mass)	kg	50-70
Body Mass Index	kg/m2	18.5 kg/m2 to 24.9 kg/m2
Basal Metabolic Rate	calories per day	25 - 27
Body Fat	(%)	23–33% (age 40-59 years)
Total Body Fat	kg	25-31%
Visceral fat	kg	10% of body fat
Waist circumference	inch	35 inches <0.8 = Risk-free
Mid-upper arm circumference	cm	13.5-23.5 cm
Osseous mass	kg	15% of total body fat
Fat Mass Index	kg/m2	25-31%
Fat-Free Mass	kg	70-85% of total body weight
Fat-Free Mass Index	kg/m2	14.6-16.8

Skeletal Muscle Index	kg/m2	Above 5.67
Waist Hip Ratio	%	0.85 or less
Metabolic age	years	less than or similar to chronological age
Water content & Water content (%)	kg	45-60%of total body weight
Phase angle	degrees	5.1-6.4
Bone mineral density	g/cm2	T-score (-1 or higher)
Weight to height ratio	-	< 0.5

5. Bio-electrical impedance analysis (BIA)

BIA measurements have proven to be reliable for forecasting body composition in women who are perimenopausal, menopausal, and postmenopausal (10). It is inexpensive and can be used effectively in out-patient set-ups. This technique hinges on gauging the velocity of a one-quarter volt electrical pulse as it journeys between electrodes situated on the feet and those arranged across the hand's knuckles. The fat-free mass is composed of proteins, water, and electrolytes; its conductivity surpasses that of fat mass. Resistance and reactance are harnessed to approximate total body water, fat, lean, and bone mass.

6.Body weight gain in women and impact of physical activity during perimenopause and menopause

The rise in body weight, fat accumulation, and obesity is notably more common among women experiencing perimenopause and menopause. A study examining dietary interventions revealed that moderate and high yoghurt intake significantly reduced the risk of obesity. Increased milk consumption was linked to a somewhat significant rise in the likelihood of obesity. A greater intake of total dairy and elevated physical activity led to a 28% reduction in obesity risk. Nevertheless, most of this risk reduction stemmed from increased physical activity rather than total dairy consumption among women (11). It was also noted that active women who consumed less yoghurt experienced only a 19% lower risk of obesity, whereas active women with higher yoghurt intake saw a 48% lower risk than the reference group. Numerous similar studies support the positive effects of consistent physical activity, exercise, and other factors, particularly for enhancing women's health. Regular physical activity benefits bone density, femoral neck strength, and knee tibial cartilage in menopausal women. Exercise offers various advantages for bones, cardiovascular health, metabolism, diabetes, cancer, longevity, psychological well-being, and the overall quality of life for menopausal women and women in general. Therefore, women must remain physically active throughout the menopausal transition and beyond.

7. Conclusion

It has been reported that over 50% of women in the perimenopausal stage experience significant changes that make it challenging to maintain a regular life. A study related to postmenopausal women indicated that the occurrence of vitamin D deficiency ranged from 0 to 92%, and Vitamin D deficiency and inadequacy might be associated with earlier age at menopause (12). Many women are anaemic during the perimenopause phase (13). The journey through menopause and the passage of time, accompanied by various physiological challenges such as diabetes, obesity, and sarcopenia, render this demographic a pivotal focus for health professionals and researchers who aspire to enhance their quality of life during this significant chapter. This article focuses on the health

concerns of women experiencing the menopausal transition. This population is particularly susceptible to several physiological, psychological, and hormonal changes, as well as unfavourable weight alterations and their consequences on natural health and attributes of life. A symptoms-driven and individualized treatment approach can ensure improvement in the health and quality of life of menopausal women. The vulnerable females and related menopausal symptoms demand more holistic consideration by healthcare providers. It is essential to guarantee that women receive relevant health information and services to support healthy ageing and maintain a high quality of life before, during, and after menopause. As advised by the WHO, menopause should be viewed as a significant chance to evaluate a woman's health, lifestyle, and aspirations. Body composition analysis tools are optimal for assessing nutritional status (14). It is recommended that the aim should be to sustain and attain a normal nutritional status and body composition in women. Body Composition Analysis supplemented with other predictors observed in perimenopausal and menopausal women can help assess the severity of symptoms and make informed decisions and interventions during this challenging phase of women's life.

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From perimenopause to menopause: Science, self-care, and support for a healthier you


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Abstract

Menopause, a natural biological transition, significantly impacts women's health due to declining estrogen levels. This hormonal shift contributes to metabolic syndrome, cardiovascular disease, osteoporosis, vasomotor symptoms, mood disturbances, sleep disorders, and sexual dysfunction. Management strategies include menopausal hormone therapy (MHT), nonhormonal medications, and lifestyle interventions. While MHT remains the most effective treatment, risks such as breast cancer and thromboembolism necessitate individualized approaches. Emerging treatments, including estetrol and neurokinin 3 receptor antagonists, offer promising alternatives. Comprehensive care involving screening, symptom tracking, and risk assessment is crucial for improving postmenopausal quality of life.

Keywords: Menopausal Hormone Therapy (MHT), Vasomotor Symptoms, Osteoporosis, Nonhormonal Treatment, Estetrol, Neurokinin 3 Receptor Antagonists

1. Introduction

Aging leads to reproductive decline in vertebrates, but certain whales and humans experience menopause and live for years post-transition. Menopause, confirmed after 12 months without menstruation (1), brings physiological changes affecting long-term health. In the U.S., it typically occurs between 45 and 51 years, lasting 7 to 14 years. Women experiencing menopause before 42 have double the risk of stroke (2), and postmenopausal women face higher risks of stroke and cardiac arrest, contributing to cognitive decline (3). Estrogen decline during menopause is linked to mild cognitive dysfunction and may indicate early Alzheimer's disease (AD) (4). It also triggers chronic inflammation, accelerating ovarian and brain aging (5). Studying menopause is challenging due to genetic, lifestyle, and environmental factors (6). Since rodents do not naturally undergo menopause, models are used to simulate conditions.

Progesterone and estrogen (estrone [E1], 17β-estradiol [E2], and estriol [E3]) levels decrease during menopause, but follicle-stimulating hormone (FSH) and luteinizing hormone (LH) levels rise (7). This increases the risk of heart disease, osteoporosis, diabetes, stroke, and Alzheimer's disease (8), as well as extra fat in the abdomen, cholesterol, and body mass index (9). Hormone replacement therapy (HRT) trials, such as the Women's Health Initiative (WHI), Heart and Estrogen/Progestin Replacement Study (HERS), and Women's Estrogen for Stroke Trial (WEST), show no significant reduction in stroke or cognitive decline risks (10), and are associated with cardiovascular disease and breast cancer, despite estrogen's anti-inflammatory benefits (11).

2. Menopausal transition process

The American Society for Reproductive Medicine's Stages of Reproductive Aging Workshop (STRAW) divides a woman's reproductive life into seven stages, ranging from menarche to postmenopause (1). In the U.S., 1.3 million women reach menopause annually, with the transition lasting up to 14 years. Given that women's life expectancy exceeds 80 years, many spend one-third of their lives postmenopausal, facing immune, metabolic, and neurodegenerative risks (12). Additionally, 1% experience premature menopause before 40. Genetics play a crucial role, and sex chromosome abnormalities may contribute to ovarian failure (13,14).

Immune function, bone health, and cognition are all impacted by estrogen decline, whether it is natural or the result of oophorectomy (15). Amenorrhea, elevated gonadotropins, and estrogen deficiency before the age of 40 define premature menopause, which increases the risk of early mortality, neurological diseases, sexual dysfunction, mood disorders, osteoporosis, ischemic heart disease, and infertility (14). Environmental xenoestrogens such as Bisphenol A (BPA) and phthalates disrupt estrogen activity and promote inflammation in the central nervous system (16). These substances mimic or block hormones, resulting in epigenetic changes that deplete ovarian reserves and shorten reproductive lifespan (17).

3. Systemic changes

3.1. Metabolic changes

- Estrogen promotes fat breakdown, while testosterone encourages visceral fat accumulation.
- Menopause increases free testosterone and abdominal fat while decreasing sex hormone-binding globulin (SHBG).
- This change increases the risk of diabetes, heart disease, and stroke by promoting insulin resistance and metabolic syndrome (18).

3.2. Vasomotor symptoms

- Hot flushes cause sudden warmth, palpitations, and sweating, leading to distress and sleep disturbances.
- Prevalence increases from 6–13% premenopause to 79% postmenopause (19).
- A more powerful indicator is elevated follicle-stimulating hormone (FSH) levels rather than estradiol withdrawal (20).
- Influenced by race, BMI, smoking, depression, and alcohol intake.

3.3. Mood and psychiatric changes

- Psychological distress peaks in early menopause (28.9%) and declines postmenopause (22%) (21).
- Major depressive episodes affect weight, sleep, and cognition, often going undiagnosed.

3.4. Sleep disturbances

- Sleep issues include difficulty falling asleep, early awakenings, and interruptions.
- Factors include vasomotor symptoms, mood swings, stress, obesity, and metabolic syndrome.

3.5. Sexual concerns & contraception

- Low estradiol leads to vaginal dryness; fluctuating testosterone affects libido (22).
- Combined oral contraceptives (COCs) help manage symptoms but increase cardiovascular risks (23).

3.6. Genitourinary symptoms

- Vaginal dryness increases from 3% (reproductive stage) to 47% (postmenopause).
- Estrogen decline weakens pelvic structures, causing infections, incontinence, and prolapse.

3.7. Skeletal symptoms

- Menopause accelerates bone loss, increasing fracture risk.

- FSH and gonadal peptides influence bone density (24).
- Vitamin D and calcium supplementation are recommended.

4. Managing menopausal symptoms

Managing menopausal symptoms requires assessing overall health, symptoms, and risks for conditions like heart disease and osteoporosis. Screening and preventive measures are essential. Tracking menstrual history during perimenopause is crucial for identifying abnormal bleeding before considering menopausal hormone therapy (MHT). Treatment includes lifestyle changes, medications (hormonal and non-hormonal), and contraception assessment if needed.

Premature ovarian insufficiency increases health concerns for women and requires extensive management. Until the typical menopausal age, MHT is advised (unless contraindicated) to lower the risk of osteoporosis and heart disease (25). After weighing the advantages and disadvantages, MHT is the most successful treatment and is usually safe (26). In women under 60, estrogen treatment also aids in the management of osteoporosis or reduced bone density (27).

4.1. Non-pharmacological approaches

Lifestyle changes such as regular exercise, weight control, and alcohol reduction increase overall well-being but may not directly reduce symptoms. Hot flashes can be controlled and sleep quality enhanced using cognitive behavioral treatment (CBT) (28).

4.2. Menopausal hormone therapy (MHT)

MHT improves mood, sleep, and cognitive function while successfully lowering hot flashes. The MHT regimen consists of the following:

- Estrogen-only therapy (for post-hysterectomy women to prevent endometrial problems).
- For women who have uterus, combined estrogen-progestogen therapy:
    - Cyclic MHT: Intermittent progestogen and continuous estrogen.
    - Continuous combined MHT: Daily administration of both hormones.
- Tibolone: Good for postmenopausal ladies, especially those who don't have much libido.

Women should be informed about potential side effects like nausea and breast tenderness. A follow-up after 6–12 weeks allows dosage adjustments, with annual reviews ensuring treatment suitability (29). Cyclic MHT may cause regular vaginal bleeding, which typically stabilizes. Persistent heavy bleeding after six months requires evaluation. MHT duration is individualized, with counseling on long-term risks (Australasian Menopause Society).

4.2.1. Estrogen in MHT

The main component of MHT, estrogen, usually consists of conjugated equine estrogens or estradiol (30). Estradiol comes in oral, transdermal, and gel formulations and is recommended because it resembles natural estrogen. A low-to-medium dosage is used at the beginning of treatment and is modified according to symptoms. Genitourinary problems like vaginal dryness and urinary tract infections are successfully alleviated with estrogen(31). Although systemic MHT takes care of these problems, some women need extra low-dose vaginal estrogen (tablets, pessaries, creams), meaning progestogen is not necessary (30).

4.2.2. Progestogens and combination therapy

Progestogens inhibit endometrial hyperplasia in women who have uterus. MHT type depending on menopause status:

- Cyclic MHT: A progestogen given every 12–14 days for perimenopausal women.
- For postmenopausal women, continuous combined MHT entails taking both hormones every day.

Cyclical MHT is recommended prior to switching to continuous medication after a year since perimenopausal women on continuous MHT may develop irregular bleeding. There are other progestogens with different characteristics, such as norethisterone, dydrogesterone,

drospirenone, and micronized progesterone (32). Compared to previous progestogens, micronized progesterone and dydrogesterone may have a lower risk of breast cancer (33).

Progestogens, which contain norethisterone and estradiol, are sold as transdermal patches, oral tablets, and capsules. An alternative is the levonorgestrel-releasing intrauterine device (IUD), which provides contraception and relief from heavy bleeding and can be used with estrogen for up to five years. Combination hormonal contraception, which relieves symptoms and regulates the cycle, may be an option for women under 50.

4.2.3. Tibolone

Postmenopausal women with reduced libido benefit from using tibolone, a synthetic steroid with estrogenic, progestogenic, and androgenic properties. The usual dosage is 2.5 mg per day; lesser dosages can prevent bone fractures. Because of the danger of bleeding, tibolone should be started a year after menopause. Due to the risk of stroke, it is not advised for women over 60 and contraindicated in those with a history of breast cancer (34).

5.The risk of cardiovascular disease and MHT

Menopause raises the risk of cardiovascular disease. According to the "timing hypothesis," which postulates that there are cardiovascular advantages to commencing MHT early, women who begin MHT before the age of 60 or within ten years after menopause had lower rates of heart disease risk and mortality (35,36). MHT helps women with premature ovarian insufficiency but is not advised for major heart disease prevention.

5.1. Contraindications to MHT

MHT is unsuitable for women with:

- Unexplained vaginal bleeding
- Breast or endometrial cancer history
- Recent cardiovascular events (e.g., heart attack, stroke)
- Blood clot disorders

Transdermal estrogen is a safer alternative for women with:

- Atherosclerotic heart disease
- Migraine with aura
- Hypertension or high cholesterol
- Increased blood clot risk
- Liver disease

This individualized approach minimizes risks. Other contradictions for MHT are given in Table 1.

5.2. MHT-related risk

MHT hazards are minimal and exceeded by advantages for the majority of women under 60 or within ten years after menopause (29). Table 1 lists the circumstances for which caution is advised while prescribing MHT.

Table 1. Menopausal hormone treatment (MHT) precautions

MHT contraindications	Situations in which using MHT with caution is advised
• Hormone-dependent malignancies, such as endometrial and breast tumors [NB1]. • Unidentified vaginal hemorrhage • Acute venous thromboembolism [NB2] • Acute cardiovascular event • Porphyria tarda cutanea • Severe liver damage	• Previous myocardial infarction, transient ischemic attack, or stroke [NB3] [NB4] • Venous thromboembolism risk is high [NB3]. • Liver disease in progress [NB3] • Aura-accompanied migraine [NB3] • Hypertriglyceridemia [NB3] • Diseases of the liver and kidneys [NB3] • Age over 65 and no history of MHT use • High risk of breast cancer1

NB1: Patients who have had stage 1 endometrial cancer treated can usually safely utilize MHT.
NB2: If the patient is anticoagulated, think about using transdermal estrogen for MHT.
NB3: Transdermal estrogen is recommended for MHT; use cautious when taking oral estrogen.
NB4: Using MHT is not contraindicated in cases of treated hypertension.

5.3. Breast cancer risk

A higher incidence of breast cancer was associated with the combined MHT (medroxyprogesterone acetate + conjugated equine estrogens) in the Women's Health Initiative studies. A decreased risk was observed with estrogen-only therapy, indicating the role of progestogens (37). Higher risk is correlated with longer MHT use (32). Micronized progesterone and dydrogesterone may be less likely to cause breast cancer than older progestogens, according to observational research (33).

5.4. Blood clot risk

The liver's processing of oral estrogen raises the generation of clotting factors, which increases the risk of venous thromboembolism (VTE) by two to three times while the absolute risk is still modest. More research is required to determine whether the newer estrogens, such as estetrol and estradiol, have a lower risk of clotting. Transdermal estrogen (patches, gels) is advised for women with a high cardiovascular risk because it does not raise the risk of clots (38).

6. Nonhormonal treatment options

Nonhormonal drugs can treat symptoms in women who are unable or unwilling to take MHT; however, they may have negative effects and do not provide the heart and bone benefits of estrogen.
Table 2. Provides a list of typical dosages for nonhormonal drugs used to treat menopausal vasomotor symptoms.

Table 2. Nonhormonal medications for symptoms related to vasomotor

Medication [NB1]	The dosage	Negative consequences
Serotonin and Noradrenaline Reuptake Inhibitors (SNRIs)		
Desvenlafaxine	25–150 mg taken once a day	nausea, vertigo, and sexual dysfunction
Venlafaxine	37.5–150 mg taken orally each day	
Selective Serotonin Reuptake Inhibitors (SSRIs)		
Citalopram	10 to 20 mg taken orally each day	nausea, vertigo, and sexual dysfunction
Escitalopram	5 to 20 mg taken orally each day	
Paroxetine [NB2]	10 to 25 mg taken orally each day	
Other Medications		
Clonidine [NB3]	25 to 75 mg orally administered twice a day	feeling faint, fatigue, and constipation
Gabapentin	100 to 900 mg taken orally per day in three separate doses	fatigue, feeling faint, and probable withdrawal symptoms
Oxybutynin [NB4]	2.5 to 5 mg taken twice a day orally	weakened visual abilities, sleepiness, and dry mouth
NB1: Clonidine is the only medication in the table that is not approved by the Therapeutic Goods Administration to treat vasomotor symptoms. NB2: Tamoxifen and paroxetine shouldn't be used together as this reduces the effectiveness of tamoxifen by inhibiting cytochrome P450 2D6. NB3: Due to the negative effects of clonidine, it is no longer advised to take it. NB4: Oxybutynin may have positive effects for overactive bladder symptoms, but it may also have negative consequences, especially on cognitive decline in older adults (28).		

7. New & Emerging Treatments

- Estetrol: A naturally occurring estrogen that may have less of an impact on the liver and breast (39).
- Nonhormonal remedies for hot flashes include neurokinin 3 receptor antagonists. The fezolinetant trial conducted in 2023 demonstrated good tolerability and efficacy (40).

8. Conclusion

A variety of health issues arise during menopause, necessitating specialized management techniques. Although MHT relieves symptoms, it is important to assess risk factors including cardiovascular hazards, thromboembolism, and breast cancer to guarantee safety. Nonhormonal substitutes, such as gabapentin, clonidine, selective serotonin reuptake inhibitors (SSRIs), and serotonin-norepinephrine reuptake inhibitors (SNRIs), provide extra symptom alleviation but do not have the preventive effects of estrogen. Overall well-being is enhanced by lifestyle changes like stress management, exercise, and food. New treatments like estetrol and neurokinin 3 receptor antagonists have the potential to be safer and more efficient. Optimizing health outcomes for women going through menopause requires a patient-centered approach that includes routine screening and individualized care.

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The menopause experience: A study of symptom management


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Abstract
Menopause, typically occurring around the age of 50, is not just a natural aspect of aging for women. While it may alleviate menstrual issues such as PMS, it can also bring about hidden health problems. This stage offers an important opportunity to implement preventive measures that can enhance overall quality of life and decrease mortality rates. There is a worldwide demand for easily accessible, evidence-based information and safe treatment options to manage menopausal symptoms and related health conditions. By prioritizing proactive health strategies during menopause, women can more effectively oversee their health and protect against potential health challenges that may emerge during this significant transition. There remains a pressing global need for straightforward access to evidence-based information and safe, effective treatment alternatives for those in need of assistance.

Keywords: Menopause, PMS, Asymptomatic

1. Introduction
The period marking the shift from reproductive to climacteric life in women is known as the menopausal transition. The perimenopausal phase, leading up to menopause, can bring about physical and emotional changes that may require adaptation and self-care. The processes of chronological aging and ovarian aging are closely related and occur simultaneously, influencing the rate and length of the transition. As menopause approaches, it marks the end of one chapter and the start of a new one, offering opportunities for self-discovery and empowerment. By embracing this natural progression with openness and awareness, women can navigate the challenges and joys that come with this stage of life. It is a time to focus on health, well-being, and personal fulfilment, allowing for a positive transformation and a renewed sense of purpose in embracing the next chapter of life (1). There are some common terms that are used to explain this stage are given in table 1.

Table 1. Various aspects and stages of menopause

Terminologies	Definition	Ref.
Menopause	The final menstrual period or the permanent cessation of ovarian function	(2)
Early menopause	Menopause occurring at 40 to 44 years of age.	(3)
Premature ovarian insufficiency	Menopause occurring before 40 years of age; women may experience oligo menorrhoea and amenorrhoea during this time.	(4)
Perimenopause	From when the menstrual cycle starts	(5)
Post menopause	Changing until 12 months after menopause	(2)

The timeline of reproductive and hormonal changes associated with the menopausal transition can indeed provide valuable insights into the experiences of women during this phase. By understanding these changes, healthcare providers can offer more targeted support and interventions to help manage symptoms effectively. Table 2 shows different types of symptoms visible in this phase.

Table 2. Types of symptoms

Type	Symptoms	Ref.
Perimenopausal or menopausal symptoms	menstrual cycle changes in length (longer or shorter) and flow (heavier or lighter)	(2)
Vasomotor symptoms	hot flushes, night sweats mood changes cognitive concerns (‘brain fog’) sleep disturbance	(6)
Musculoskeletal symptoms	low libido formication (sensation of insects crawling under the skin)	(3)
Genitourinary symptoms	vaginal dryness, dyspareunia, urinary urgency, urinary frequency, recurrent urinary tract infections)	(7)

During the menopausal transition and post-menopause, women commonly experience a range of symptoms that can persist for a significant period. Vasomotor symptoms are frequently most severe in the first few years but can endure for more than ten years. Other important symptoms include hot flashes, night sweats, sleep issues, and discomfort in the genitourinary area. Genitourinary symptoms may worsen gradually. In addition to these, women may also encounter mood swings, cognitive changes, decreased sexual drive, lowered bone density, increased abdominal fat, and altered metabolic health. These symptoms may present in various combinations or orders, sometimes making it challenging to attribute them directly to menopause (8). For older patients aged 45 and above exhibiting menopausal or amenorrheic symptoms, routine laboratory tests and imaging are generally unnecessary unless an alternative diagnosis is suspected. However, it is crucial to confirm that pregnancy is not a factor for sexually active individuals not using contraception.

In contrast, clinicians should assess follicle-stimulating hormone (FSH) levels for those under 45 with irregular or absent menstrual cycles, acknowledging the wide variability during perimenopause (9). Additionally, it is vital to rule out endocrine disorders like hyperprolactinemia and hypothyroidism, as well as pregnancy, as potential causes of secondary amenorrhea. A difference of seven days or more in the length of successive menstrual cycles is indicative of the early menopausal transition. This transition phase can vary in duration, with younger women generally experiencing a longer early and total transition period. A woman enters the late menopausal transition when she has an amenorrhea (absence of menstruation) period of 60 days or more, which tends to last about one to three years. The early postmenopausal stage is determined retrospectively, starting after twelve months have passed since the last menstrual period. At this point, ovarian reserve is extremely low, often undetectable, while follicle-stimulating hormone (FSH) levels rise and estrogen levels decline, take more than 30 months to stabilize (10).

2. Menopausal health and relief of symptoms

During the end of a women's reproductive years, understanding and managing the physical and emotional changes are issue of concern. There is no need to treat menopause. The goal of treatment is to reduce symptoms and avoid or control chronic illnesses that may arise with aging. So, overall health screening is essential to manage as shown in figure 1 and based on individual symptoms treatment can be decided. The treatment options may consist of both nonpharmacological and pharmacological methods (including hormonal and nonhormonal treatments) (14).

2.1. Hormonal treatments

Hormone therapy (HT) that is based on estrogen. This is the most effective option for reducing vasomotor symptoms (VMS) and genitourinary syndrome of menopause (GSM). Women who undergo significant sleep or mood issues during the menopausal transition may also find relief through HT.

These treatments are regarded as safe and effective for women who are considered low-risk those without a prior history of coronary heart disease or breast cancer, who are under 60 years old and fewer than 10 years' post-menopause. The Women's Health Initiative (WHI) determined that women suffering from VMS experienced an 85% reduction in symptoms after receiving a combination of estrogen and progesterone therapy (15).

Women who experience premature or early menopause due to factors such as primary ovarian insufficiency, bilateral oophorectomy, or treatments like chemotherapy and radiation should be evaluated for hormone therapy. This treatment is vital for maintaining cardiovascular, genitourinary, bone, and cognitive health until they reach the average age for menopause. If hormonal replacement is not provided, these women face an increased risk of dementia, Parkinsonism, mood disorders, cardiovascular issues, osteoporosis, sexual dysfunction, and higher overall mortality rates. It is important to understand that they might need higher doses of estrogen compared to those generally given to women closer to the average menopause age, and both combined hormonal contraceptives (CHC) and hormone therapy should be considered (16).

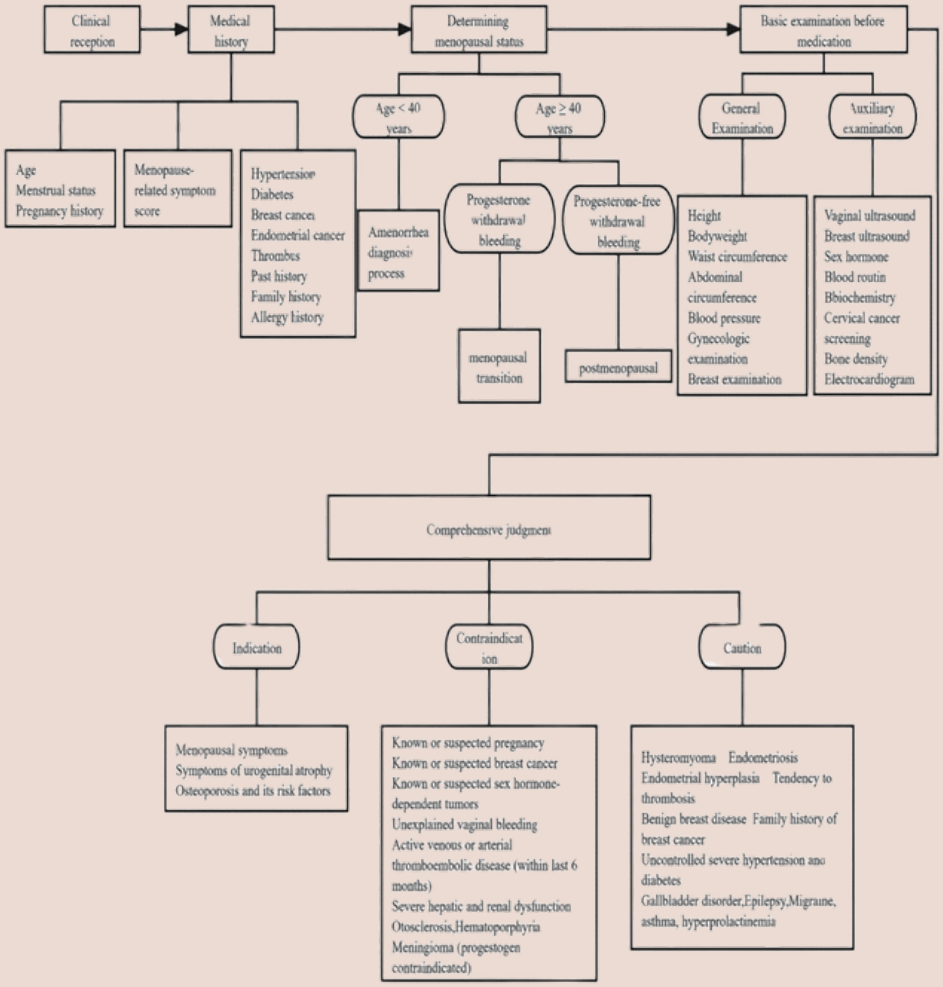

Figure 1. Management of menopause (17)

Women can continue to ovulate during the perimenopausal period until their final menstrual period (FMP) occurs. The need for contraception during this time cannot be overstated, as pregnancies during perimenopause carry heightened risks for both the mother and foetus. When selecting the most appropriate contraceptive method, it is crucial to consider the woman's hormonal status, perimenopausal symptoms, any co-existing conditions, current medications, and personal preferences. Hormone therapy is not an effective contraceptive, as it rarely prevents ovulation or significantly alters cervical mucus (18). For non-smoking women without a history of blood clots or stroke, low-dose combined hormonal contraceptives (CHCs) are suitable. However, CHCs containing ethinyl estradiol carry a higher risk of blood clots and stroke compared to those with estradiol or conjugated equine estrogens (CEEs), which are present in therapy of harmons. There are less limitations with progestin-only techniques, and if vasomotor symptoms are severe, low-dose estradiol can be added. Its appearance is in hypertensive women (19).

2.2. Non hormonal therapy

Table 3. Non hormonal therapy include lifestyle and home remedies (20)

Cool hot flashes	Put cold packs under pillow & turn pillow often so head is on cool side.
Ease vaginal pain	Try a water-based vaginal lubricant (Astroglide, Sliquid, others) or a silicone-based lubricant or moisturizer (Replens, K-Y Liquibeads, others). You can get these without a prescription.
Get enough sleep	Skip caffeine and alcohol
Find ways to relax	Deep breathing, massage, and muscle relaxation
Strengthen your pelvic floor	Pelvic floor muscle exercises, called Kegel exercises, can improve some forms of urinary incontinence.
Eat a balanced diet	Include a variety of fruits, vegetables, and whole grains. Limit saturated fats, oils, and sugars.
Manage weight	Studies show that being obese is linked to having more and worse hot flashes. Losing weight and keeping it off may help ease them.
Don't smoke	Smoking increases your risk of heart disease, stroke, osteoporosis, cancer, and a range of other health problems. It also may increase hot flashes and bring on earlier menopause.
Exercise regularly	Get regular physical activity or exercise on most days to help protect against heart disease, diabetes, osteoporosis, and other conditions associated with aging.

3. When to avoid MHT (Menopausal hormone therapy)

Relative and absolute contraindications for patients suffering from cervical cancer, severe thromboembolic condition and mammary gland nodules are listed in Table 4.

Table 4. Condition for caution (MHT) (21)

Hormone dependent cancer	Conditions where caution is recommended with MHT	Code meaning
Breast and endometrial (NB1)	Past myocardial infarction, transient	NB1: MHT is generally safe to use in patients with treated stage 1 endometrial malignancy.
Undiagnosed vaginal bleeding	Ischaemic attack or stroke [NB3] [NB4]	NB2: Consider transdermal estrogen for MHT if the patient is anticoagulated.
Acute cardiovascular event	High risk of venous thromboembolism [NB3]	NB3: Exercise caution with oral estrogen; transdermal estrogen is preferred for MHT.
Acute venous thromboembolism [NB2]	Active liver disease [NB3]	NB4: Treated hypertension is not a contraindication to MHT use.
Porphyria cutanea tarda	High risk of breast cancer	NB2
Severe liver disease	Age older than 65 years and no prior use of MHT	NB3

4. Risk of harms associated with MHT

Depending on whether hormone therapy is being started for the first time or is being continued, different decision-making processes are used. It is recommended that women under 60 years of age begin hormone therapy within 10 years of menopause. Women may be permitted to continue treatment for more than ten years if therapy is started during this crucial period, provided that there is a clinical basis for doing so. When possible, medical practitioners should prescribe the lowest effective dosage and favour risk-reducing administration techniques including transdermal and intravaginal routes (22). Women who are not receiving systemic hormonal therapy are likely to face the genitourinary syndrome linked to menopause. Even those who are on systemic hormone replacement therapy might need extra local estrogen treatments to relieve urogenital symptoms. Systemic hormone replacement therapy by itself does not significantly reduce the occurrence of recurrent urinary tract infections; however, local estrogen therapy can lower this risk by acidifying the vaginal

environment and enhancing the dominance of lactobacillus in the flora. For atrophic vaginitis, localized estrogen treatments delivered via vaginal rings, creams, or tablets have shown to improve blood flow and reverse vaginal atrophy. Numerous women who cannot take systemic hormonal replacement therapy may still gain advantages from local estrogen treatments without requiring progesterone (23).

Many women are reluctant to seek medical help when they notice symptoms associated with the transition to menopause. There are a number of reasons for this hesitancy, such as a lack of knowledge about what is "normal" in terms of the kind, severity, and duration of symptoms as well as the available treatment alternatives. Additionally, people who did not seek medical assistance for their symptoms often believed that menopause was a natural process, were uneasy about the idea of seeking medical assistance, or preferred non-pharmacological methods like dietary changes, lifestyle modifications, complementary therapies, or over-the-counter remedies over prescription drugs. Women's willingness to seek medical assistance may also be influenced by social views on aging and femininity (24).

5. Conclusion

Developing specialized knowledge, putting strategic practices into place, allocating roles, encouraging strong interprofessional communication, and ensuring coordinated care are all necessary for an effective menopausal management strategy. The delivery of patient-centered care for individuals going through menopause can be enhanced by utilizing the diverse skills of healthcare workers. This will lead to better outcomes and greater teamwork within the healthcare system.

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Treading the transformative path of perimenopause: Navigating


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Abstract
Each woman experiences perimenopause uniquely, with its duration ranging from a few months to up to a decade. Menopause is characterized by the cessation of menstruation due to diminished ovarian follicular activity. It is not a condition that necessitates a cure; instead, it represents a natural and normal phase of life, similar to adolescence or motherhood. Despite this, societal norms have often portrayed menopause as a topic to be shunned or apprehensive about. This review provides valuable insights into the transition from perimenopause to menopause, highlighting that menopause is not an endpoint but rather a new beginning and emphasizing that rather than fearing change, approach it with confidence and grace.

Keywords: Menopause, perimenopause, myths

1. Introduction

Perimenopause, also known as the menopausal transition, signifies a phase characterized by significant physiological changes in a woman's body, culminating in her final menstrual period (FMP) (1). Throughout this period, sex hormones like estradiol and progesterone undergo notable fluctuations, impacting the female biological system and heralding the shift from reproductive to non-reproductive life (2). Perimenopause is linked to biological, psychological, and social transformations within the female body. The menopausal transition unfolds in two distinct stages: the initial phase, marked by mostly regular menstrual cycles with occasional disruptions, and the subsequent stage where amenorrhea becomes more prevalent, persisting for over 60 days until the final menstrual period (3).

While menopause typically occurs between the ages of 45 to 56 years for most women, studies suggest a correlation between aging and menopause and increased risks of conditions such as dementia, cardiovascular issues, and certain cancers like ovarian, breast, and endometrial cancers (4).Vasomotor symptoms (Figure 1) such as hot flashes, can persist for more than seven years, and in some cases, up to a decade post the last menstrual cycle. These symptoms often subside within approximately 7.4 years if left untreated, although severe hot flashes may affect around 10–20% of women (5) .

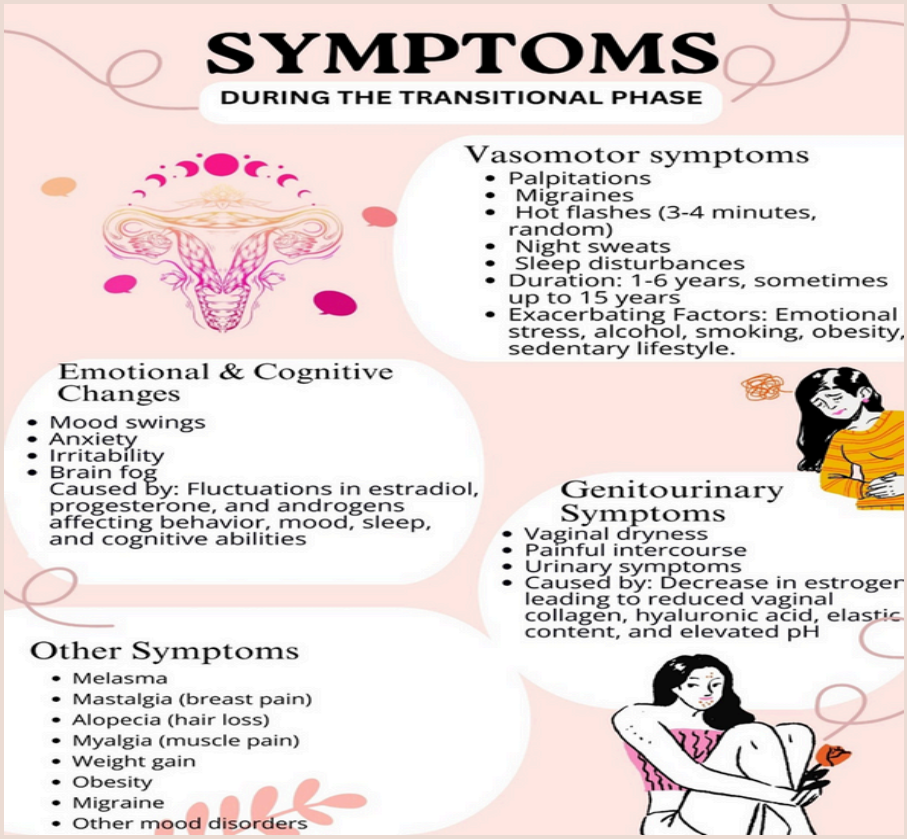

Figure 1. Signs and signals during the transitional phase

2. Key hormonal changes

The menstrual cycle consists of two phases: the luteal phase, also known as the secretory phase, and the follicular phase, or proliferative phase. During perimenopause, there is a notable decline in the number of ovarian follicles, leading to reductions in hormones such as Inhibin B, anti-Mullerian hormone, and ovarian estradiol. This decline subsequently impacts the production of FSH and LH, which play significant roles in manifesting various menopausal symptoms (4) .

3. The power of self-care: Managing the transition

As per the Global Self-Care Federation, an organization supporting the World Health Organization, self-care encompasses the practice where individuals take responsibility for their health and well-being by utilizing available information and knowledge. This approach to self-care is not synonymous with self-indulgence or selfishness; instead, it involves prioritizing one's health to lead a fulfilling life focused on personal priorities. A study was conducted to explore how self-care education, rooted in the individual empowerment model and self-efficacy theory, impacts the quality of life of post-menopausal women. The study yielded positive outcomes, with the primary barrier identified as a lack of knowledge (6).

4. Nourish your body

During perimenopause and menopause, hormonal changes lead to a significant decrease in basal metabolism, reducing by around 250-300 kcal per day. This shift in metabolism is often accompanied by changes in body composition, potentially leading to issues of obesity and overweight. Moreover, hormonal fluctuations during this period can contribute to a decrease in fat-free mass (FFM) and skeletal muscle mass (SMM), increasing the risk of conditions like sarcopenia.

To maintain optimal health during perimenopause and menopause, it is essential to adhere to certain guidelines:

- Maintain a Body Mass Index (BMI) within 18.5-24.9 kg/m² for a healthy nutritional status.
- In cases of overweight or obesity, reduce calorie intake and ensure consumption of 1.2 g of protein per day.
- Establish a balanced diet regimen.
- Avoid simple sugars and fast-acting carbohydrates.
- Incorporate plant-based protein sources like legumes (beans, peas, lentils, chickpeas, soy, etc.) into your diet weekly.

- Ensure adequate intake of essential vitamins (A, B, C, D) and minerals such as calcium and phosphorus (7).

5. Embracing the journey: A holistic approach

In addition to dietary and lifestyle adjustments, research has indicated that mind-body exercises such as Pilates, yoga, tai chi, and mindfulness-based stress reduction can effectively alleviate menopausal symptoms. These practices have been shown to enhance bone mineral density, improve sleep quality, reduce anxiety, depression, and fatigue, offering holistic benefits during the menopausal transition (8).

6. Debunking menopause myths: Separating fact from fiction

Table 1. Busting the myths

Common myths	Quick truths	Ref.
"It starts when my periods end."	Officially entering menopause is defined by the absence of periods for 12 consecutive months. During the perimenopausal phase, irregular periods are common as the body transitions towards menopause.	(9)
"Impossible to get pregnant."	The cessation of periods does not always signify the end of fertility. While the likelihood of conceiving naturally decreases after age 45, even if menstruation continues, there is still a possibility for some women to conceive	(9)
"Your sex life is over."	Hormonal fluctuations during menopause can lead to a decrease in sex drive and an increase in vaginal dryness, potentially impacting your sexual health and intimacy.	(9)
"It makes you irritable."	Menopause alone has no effect on mood. But due to symptoms like night sweats and hot flashes, sleep can be messed up, making the person irritable.	(9)
"You need to take hormones."	Symptoms such as hot flashes and night sweats can be effectively managed through various approaches, including hormone replacement therapy (HRT), which comes with its own set of risks and benefits. Additionally, alternative methods like acupuncture, the use of vaginal lubricants, and lifestyle modifications can also play a significant role in alleviating these symptoms and improving overall well-being during menopause.	(9)
"It makes you gain weight."	While hormonal fluctuations during menopause may play a role in weight gain, it is the natural slowing of metabolism with age that primarily contributes to excess weight gain. Consistent exercise and physical activity can be instrumental in maintaining overall health and managing weight during this stage of life.	(9)
"Men also experience menopause."	Men do experience a decline in the levels of testosterone as they age, which can cause some "changes" but not "symptoms".	(9)

7. A fresh perspective: Finding the silver lining

- Menopause is undeniably a challenging and transformative phase in a woman's life, but it's essential to recognize that it is a natural transition (Table 1). Whether through hormone replacement therapy or positive lifestyle changes, menopausal symptoms can be managed and eventually overcome. Aging brings with it numerous benefits, such as wisdom gained through experience, enhanced intellectuality, and the opportunity to reassess goals for the future (10).
- The impact of mental and physical health issues, along with other changes, can significantly influence women's lives. Engaging in open discussions with healthcare providers is key to unravelling the complexities of symptoms through a holistic approach. By collaborating with doctors, it is possible to gain a comprehensive understanding of your condition, receive personalized treatment recommendations, and access the necessary information and support to manage your health effectively during the menopausal transition.
- Throughout their lives, women often prioritize others over themselves, feeling guilty about self-care and struggling to put their needs first. Menopause can serve as a catalyst for self-awareness and self-worth, prompting women to focus on their bodies, emotions, and aspirations. Rediscovering identity and desires post-menopause can be liberating, as it allows women to shift their focus from caregiving to self-nurturing.

- Menopause acts as a bridge between two life stages for women, presenting challenges but also opportunities for personal growth. Taking a holistic approach can help navigate this transition, with the understanding that each woman's experience is unique yet shared by millions. Embracing change with confidence and grace, understanding one's body, making mindful lifestyle choices, and prioritizing self-care are empowering ways to navigate this phase with resilience and self-assurance.
- Connecting with and seeking support from other women who are either experiencing or have experienced menopause can offer valuable perspectives, shared experiences, and a sense of community. By coming together, women can support each other, ease the transition, and celebrate the strength that emerges from this transformative journey (Figure 2).

Figure 2. Mindful reflections associated with the voyage through menopause

8. When to seek help

While menopause is a distinct and unfamiliar experience for every woman, it can be challenging to recognize when symptoms become concerning or potentially problematic. Therefore, it is essential to be vigilant for specific red flags that may signal the need for medical attention. Upon noticing these warning signs, it is crucial to promptly seek guidance from a healthcare provider to address any potential issues effectively and ensure optimal health and well-being during this transition.

- Heavy and prolonged bleeding
- History of polycystic ovarian syndrome (PCOS)
- Bleeding after sexual intercourse
- Resumption of bleeding after a year without periods
- Being overweight
- Severe mood swings and persistent symptoms (11).

9.Conclusion

Transitions are intrinsic to life. By adopting a broader outlook and welcoming change, we can navigate

it with grace. While every woman experiences the transition to menopause in a unique way, one universal truth is that millions of women around the world go through this transformative phase. By gaining an understanding of the changes occurring in your body, making mindful lifestyle choices, and placing a priority on self-care, you can navigate this stage with a sense of empowerment and control.

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APTI Forum News

1. International Women's Day Celebrations 2025 at Himalayan Pharmacy Institute, Sikkim

Himalayan Pharmacy Institute celebrates International Women's day in association with APTI, Sikkim state branch on March 8, 2025. Welcome address was delivered by Dr. J. P. Mohanty, Convener, Women's forum of APTI, Sikkim State Branch. The program was graced by the virtual presence of Dr. Lopamudra Adhikari, Women's Forum Coordinator, Eastern Region, APTI, who highlighted the importance of women's contributions to society. Furthermore, she emphasised this year's theme, "Accelerate Action", and encouraged people to take decisive steps toward achieving gender equality and empowering women worldwide. It was followed by the active participation of the students and the faculty, who showcased their talents and made the program successful.

2. Prof. Celina Nazareth, Professor, Department of Pharmaceutical Chemistry, Ponda Education Society's Rajaram and Tarabai Bandekar College of Pharmacy, Farmagudi, Ponda, Goa has been bestowed with the prestigious Indian Drug Manufacturers Association (IDMA)-ACG World SCITECH Best Research Paper Award for Pharmaceutical Analysis at the 63rd IDMA Annual Day celebrations held at the Hotel Taj Mahal Palace, Mumbai on February 8, 2025 for her research article titled "A sensitive, economical, bioanalytical LC-MS/MS method for simultaneous analysis of Irbesartan and Hydrochlorothiazide", co-authored by Sanelly Pereira and Dr. Raman Batheja, VerGo Pharma Research Laboratories Pvt. Ltd., Corlim, Goa.

3. Dr. Ganga Srinivasan, Professor, Pharmaceutics, VESCOP and her M.Pharm student Mr. Deepak Shukla's review paper published in Indian Drugs has been awarded the IDMA ACG-SCITECH Best Review Paper Award 2023 & 2024. The citation and the award was presented during IDMA 63rd Year Celebrations to be held on Saturday, February 8, 2025 at Hotel Taj Mahal Palace, Opp. Gateway of India, Mumbai.

4. Dr. Rakhi Khabiya has achieved the prestigious All India Rank 1 in the Faculty Category at the 7th Edition of the Intellectual Property Talent Search Examination (IPTSE). This remarkable achievement comes with a cash prize of ₹35,000, a trophy, and a memento. The awards ceremony took place on November 19, 2024, at the esteemed Indian International Centre, New Delhi.

5. Dr. Supriya Shidhaye, Principal, VES College of Pharmacy (Autonomous), Mumbai, was honoured with the prestigious MS-APTI Pharma HR Society of India's "Principal of the Year Award" at MAHA-APTICON 2025 held on February 15, 2025, in Chhatrapati Sambhajinagar. Dr. Supriya Shidhaye received this distinguished award from Dr. Montukumar M Patel, President of the Pharmacy Council of India (PCI), along with Prof. Dr. Milind J. Umekar, APTI President (National), and Dr. Sohan Chitlange, APTI Vice President (Western Region).

6. Prof. Pratima Tatke, Principal, C. U. Shah College of Pharmacy is the principal investigator and Dr. Minakshi Nehete and Dr. Prachi Mehendale, Assistant Professor at C. U. Shah College of Pharmacy are co-investigators for the project “Promotion of innovative research and development in pharmaceutical sciences and technology received Rs.84,92,000/- from Department of Science and Technology (DST), under the scheme “CURIE Core Grant for Women PG Colleges” for this project.

7. Prof. Pratima A. Tatke, Professor of Pharmaceutical Chemistry and Dr. Rohini Waghmare, Assistant Professor of Pharmacognosy, C. U. Shah College of Pharmacy, received grant of Rs. 10.80 lakhs from National Medicinal Plants Board for Project entitled “Herbal Garden- A treasury of medicinal and aromatic plants.”

8. Ms. Soman Akanksha, 2nd year M.Pharm (Quality Assurance) student, under the guidance of Mrs. Ashwini Wani, Assistant Professor, VESCOP and co-guidance of Mrs. Pradnya Shinde - Korlekar, Assistant Professor, VESCOP has secured the 3rd prize at the 23rd International Symposium on Advances in Technology and Business Potential of New Drug Delivery Systems, Controlled Release Society (CRS) Indian Chapter 2025 for her research project entitled “Development of microneedle patches for enhanced transdermal delivery of vitamins in paediatric population”. A special mention to Dr. Mangal Nagarsenker for her invaluable technical support, which played a crucial role in this achievement.

9. Mrs. Prachitee Ayare, Ph.D student under the guidance of Dr. Rajashree Mayekar Hirlekar, Professor, Pharmaceutics, VESCOP secured 1st place and cash prize of Rs. 10000/- in the National Level Oral Research Presentation Competition at PHARMA AVINYA 2025, organized by NCRD’s Sterling Institute of Pharmacy in association with ASSOCHAM IP Facilitation Centre on February 8, 2025.

10. Prof. Supriya Shidhaye, Principal, Vivekanand Education Society's College of Pharmacy (Autonomous), guided project ‘Aavaran - Your Guardian Against Water Woes’, developed by students Manigandan Thevar, Sneha Krishnan, and Myron D'Souza, secured the 1st Runner-up position at CIIA 4.0 in Pharma/Bio/Chemical Technology category. This remarkable achievement stands out among 700 competing projects, earning the team a reward of ₹50,000/-. VESCOP has also been declared the 1st Runner-up at CIIA Innovation Awards held on February 7, 2025.

11. VESCOP wins state level gold and bronze medals at the prestigious 17th Maharashtra State Inter-University Research Convention Aavishkar 2024-2025 conducted at Dr. Babasaheb Ambedkar Technological University, Lonere (January 12-15, 2025). The gold medal project “Applicare: Healing in pocket” guided by Mrs. Pradnya Shinde Korlekar and Mr. Pratik Barve. The student team members are Ms. Vaishnavi Parab, Ms. Rachel Lasardo, Ms. Maitrayee Mayekar, Ms. Shejal Paik, and Mr. Pratyush Muralidharan. The bronze medal project “Fast acting oral film: A breakthrough solution for period pain relief” guided by Dr. Anita Ayre. The student team members are Ms. Tejshree Jaybhaye, Mr. Shubhankar Jadhav, Mr. Pranay Desai, and Mr. Aayush Umbre.

12. Dr. Rakhi Khabiya has been awarded Ph.D. degree

For research on “Development of DNA markers for identification and diversity assessment of *Withania species* and comparative evaluation of their pharmacological properties” in December 2024 by School of Pharmacy, Devi Ahilya Vishwavidyalaya, Indore. Her research was conducted under the guidance of Dr. G.P. Choudhary. In addition to her work at the university, Ms. Khabiya carried out a substantial portion of her research at the Centre for Excellence in Biotechnology, Madhya Pradesh Council of Science and Technology (MPCST), Bhopal, under PhD Assistance Scheme. Her research was further supported by the prestigious MPCST FTYS fellowship, during which she worked at the Indian Institute of Technology, Indore. She received ₹25,000/- travel grant from NPTEL, Government of India, under the Support for Conference Scheme; the Second Prize for Oral Presentations at the 26th Annual National Convention of the Association of Pharmaceutical Teachers of India (APTI) and the AICTE-sponsored National Conference in association with the Society for Ethnopharmacology (SFE). Additionally, she was honored with the Individual Social Responsibility Award at the BRNS-sponsored National Symposium highlighting the commitment to impactful and socially responsible research.

13. Dr. R. Prasanthi has been awarded Ph.D. (Pharmaceutical Sciences) degree

For research on “Design formulation and evaluation of Rasagiline mesylate and Selegiline hydrochloride gastroretentive microspheres for Parkinson's disease” in December 2024 by Annamalai University. Her research was conducted under the guidance of Dr. S. Selvamuthukumar, Professor, Department of Pharmacy, Annamalai University, Annamalai Nagar and under co-guidance of Dr. B. Haarika, Professor and HOD, Department of Pharmaceutics, Sarojini Naidu Vanita Pharmacy Maha Vidyalaya, Tarnaka, Hyderabad.

Dr. (Mrs.) K. Divya Laxmi, Assistant Professor, Department of Pharmaceutics has been awarded Ph.D. degree for research on “Formulation and evaluation of bilayered tablets of selected antihypertensive drugs” in December 2024 by Chaitanya Deemed University, Hyderabad. Her research was conducted under the guidance of Dr. Saritha Chukka.

14. Dr. C. V. S. Raghu Kiran, Associate Professor, Department of Pharmaceutics has been awarded Ph.D. degree for research on “Development and evaluation of gastro rententive durg delivery system for controlled release” in March 2025 by Acharya Nagarjuna University, Guntur. His research was conducted under guidance of Prof. C. Gopinath.

15.Dr. Ashwani S. Patil has been awarded Ph.D. degree for research on “Evaluation of mitochondrial targeted polyphenol for anti-parkinson & anti-cancer activity” in February 2025 by Institute of Chemical Technology, Mumbai. Her research was conducted under the guidance of Prof. Sadhan Sathaye.

16. Dr. Monika Jadhav has been awarded Ph.D. (Pharmaceutical Chemistry) degree for research on “Development and evaluation of herbal hepatoprotective antitubercular formulations” in February 2025 by SNDTWU Mumbai. Her research was conducted under the guidance of Dr. Pratima Tatke, Principal and Professor, C. U. Shah College of Pharmacy, SNDTWU Mumbai.

17. Dr. Sindhu Menon has been awarded Ph.D. (Pharmaceutical Analysis) degree for research on “Development and validation of analytical methods for simultaneous estimation of phytomarkers in polyherbal formulations” in February 2025 by SNDTWU Mumbai. Her research was conducted under the guidance of Dr. Pratima Tatke, Principal and Professor, C. U. Shah College of Pharmacy, SNDTWU Mumbai.

18. Dr. Poonam Nilesh Chougule was appreciated by Ashokrao Mane Group And Ashokrao Mane College of Pharmacy, Peth Vadgaon at the event “Inspiring Journeys: Ph.D. Awardees their Remarkable Achievements” on March 14, 2025. Dr. Poonam Nilesh Chougule, Associate Professor and HOD, Pharmacognosy, Ashokrao Mane College of Pharmacy, Peth-Vadgaon, Kolhapur has been awarded Ph.D. degree for research on “Extraction and Phytochemical Evaluation of β-Escin from Horse Chest Nut Extract for Veno protective, Anti-inflammatory and Anti-oedematous Properties” in July 2024 by PRIST University Thanjavur, Tamilnadu. Her research was conducted under the guidance of Dr. Kailasam Koumaravelou, Director of PRIST University, Pondicherry Campus, Puducherry. She has successfully developed an industry-scalable process for the extraction and isolation of β-Escin, a key bioactive compound from Horse Chestnut Extract. She has filed more than 16 Indian patents Publications, 8 Indian Grant Patents, 2 UK Grant Patents and 1 German and 1 African Grant Patent and also has 2 International Books to her credit.

19. Dr. S. Sunitha, Professor and Dean, School of Pharmacy, Vishwakarma University, Pune, Maharastra, has delivered a talk on “From literature to lab: effective topic selection and research execution in pharmaceutical formulation” to faculty and students of M Pharmacy and B Pharmacy on March 5, 2025.

20. COP-BELA achieved 3 star rating in innovation and start up

Amar Shaheed Baba Ajit Singh Jujhar Singh Memorial College of Pharmacy (Autonomous), BELA, has achieved a prestigious 3-star rating in the Institutional Innovation Council (IIC) Activities. This recognition is a testament to the college's outstanding efforts in promoting innovations and start-up programs on campus, as directed by the Ministry of Education, Government of India. According to the college director, Dr. Shailesh Sharma, only a few colleges in Punjab have received this esteemed ranking. He attributed this achievement to the hard work of coordinators Ms. Amnpreet Kaur and Ms. Medha Bhalla, who organized various innovation-related activities on campus.

21. Dr. Shailesh Sharma received appreciation award

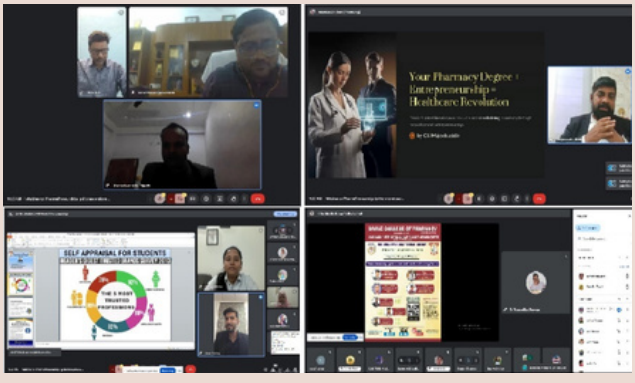
Dr. Shailesh Sharma, Director and Professor of Amar Shaheed Baba Ajit Singh Jujhar Singh Memorial College of Pharmacy, BELA, received the Best Teacher Appreciation Certificate by Sub Divisional Magistrate, Sh. Amrik Singh Sandhu, for his dedicated role in higher technical education at the 76th Republic Day Celebration.

22. PCI sponsored Pharma Anveshan 2025: State-level program at BELA Pharmacy College

Pharma Anveshan 2025, a state-level event organized by Amar Shaheed Baba Ajit Singh Jujhar Singh Memorial College of Pharmacy (Autonomous) Bela, was sponsored by the Pharmacy Council of India, New Delhi. The program coincided with National Pharmacy Education Day marked by the celebration of the birth anniversary of Prof. M. L. Schroff, widely regarded as the father of pharmacy education in India. The chief guest was Sh. Sushil Kumar Bansal, a central council member of the Pharmacy Council of India. Prof. Saranjit Singh, former Dean of NIPER Mohali, was the keynote speaker. Dr. R.K. Goel was the guest of honor. The panel comprised esteemed professionals including Dr. Manish Goswami, Mr Manoj Soni, Mr. Hitesh Chopra, Dr Satwinder Kaur, Dr Ajay Bilandi, Dr Pradeep Goayal, and Dr Dheerender Tayal. The program saw active participation from over 250 industry professionals, pharmacy officers, faculty members, research scholars, and students. Dr. Gulsahan Bansal, Dr. Jagdeep Singh Dua, Dr. Neeraj Chaudary, Dr. Parminder Nain, Dr. Kuljit Singh, and other dignitaries of state were present at this event. Pharma Anveshan 2025 successfully highlighted the importance of fostering innovation, entrepreneurship, and skill development among the future generation of pharmacists, providing them with a platform to engage in meaningful dialogue and collaboration.

23. PharmaPreneurship webinar at Divine College of Pharmacy, Siwan, Bihar in association with APTI-Bihar

Webinar on ‘PharmaPreneurship: Ignite Innovation and start-ups in Pharmacy Practice” was organized by Divine College of Pharmacy (DCOP), Ziradei, Siwan, Bihar in association with APTI Bihar on March 11, 2025. The webinar was inaugurated by Chief Guest Dr. Mihir Kumar Kar, APTI Vice President, Eastern zone, Central Committee and Mr. Bhuneshwar Dutt Tripathi, APTI President, Bihar State Branch graced the session as the Guest of Honour for the webinar. Dr. Shambaditya Goswami, APTI Vice President Bihar state branch & Principal, DCOP was the convener of the session. Dr. Sourabh Kosey (Professor and Head, Department of Pharmacy Practice, ISF College of Pharmacy, Moga), Mr. Junaid Tantray (Vice president, APTI, Jammu & Kashmir & Associate Professor NIMS College of Pharmacy, NIMS University, Rajasthan) Mr. Mujeebuddin Shaik (Founder & CEO ClinoSol Research Private Limited) enlightened the audience with need of Entrepreneurship and start-up opportunities in pharma sector. More than 400 participants attended. The seminar was moderated by Ms. Sadaf Salma (APTI Life member) and Dr. Pragya Pandey A.P. DCOP. Ms. Soumya Pathak, Co-ordinator APTI women forum Bihar (A.P. DCOP) presented introductory speech.



24. Pharmaceutical entrepreneurship “From vision to victory: Building a thriving pharma industry business" expert lecture (on-line and on-site).

Career Point University, Kota, organised expert lecture on December 2, 2024. Ms.Kavita Vijay was the convener and coordinator. Mr. Anil Vyas, Chairman and Managing Director of the Mednext Group of Industries, was the speaker who discussed about the entrepreneurial mindset, market research in the pharmaceutical sector, and about the legal and financial aspects of starting a pharmaceutical business. Organizers have pledged to host more knowledge-sharing initiatives, fostering growth, innovation, and collaboration.

25. Girl’s health awareness program at Divine College of Pharmacy, Siwan, Bihar in association with APTI women forum

Divine college of Pharmacy (DCOP), Siwan, Bihar, in association with APTI Women Forum- Bihar state branch conducted Girls’ Health and Hygiene Awareness Program on February 27, 2025 in the premises of Dhajju Singh Intermediate College, Bharthuigarh, Siwan. The number of participants were 70 in the age group of 11-18 Years. Chief Guest for the awareness program was Mr. Subhash Chand Prasad, Chairman, DCOP and Dr. Shambaditya Goswami, Professor and Principal, DCOP, Siwan, Bihar and Vice-President, APTI, Bihar State Branch. Event Convener Ms. Soumya Pathak, Coordinator, APTI Women Forum, Bihar State Branch along with the Women Development cell (NAARI) members of Divine College of Pharmacy conducted the awareness sessions discussing about nutritional requirements in adolescent girls and menstrual health and hygiene. The event Coordinator was Md. Mannan Ansari, Assistant Professor and Joint Secretary, APTI, Bihar State Branch and Mrs. Sadaf Salma - AP, DCOP, (APTI Life Member), Ms. Manisha Rai - AP, DCOP, Dr. Pragya Pandey - AP, DCOP, Mrs. Naziya Parvin - Lect., DCOP and Mrs. Ratna Kumari - Lect., DCOP.

26. Vidyan Dhara scientific session conducted at PES’s Rajaram and Tarabai Badekar College of Pharmacy, Ponda, Goa

As part of the Vidyana Dhara 2025 initiative, a scholarly session was conducted at PES’s Rajaram and Tarabai Badekar College of Pharmacy on February 18, 2025. The discourse delved into the intricate realm of Pharmaceutical Impurities with Mr. Prasaad R. Tari, a veteran Senior Research Executive from Unichem Laboratories, Goa, serving as the esteemed resource person. Principal Dr. S.N. Mamle Dessai cordially greeted the speaker by presenting a floral bouquet. Dr. Nilambari S. Gurav, the Coordinator for ‘Vidyana Dhara’, proceeded to introduce the speaker to the assembled audience. Mr. Prasaad primarily addressed the impact of impurities on the quality, safety, and efficacy of both the product and API. The session was attended by a total of 178 students (B.Pharm. and M.Pharm.) and was deemed a resounding success.

PHARMA NEWS ROUND-UP

03rd January, 2025: Central Drugs Standard Control Organization (CDSCO) has approved Miqnaf (nafithromycin) an ultra-short course, once-a-day, 3-day monotherapy option for community-acquired bacterial pneumonias Miqnaf is found to be effective against entire range of community respiratory pathogens including pneumococci resistant to azithromycin and amoxicillin/clavulanate. Miqnaf is treatment by multi-drug resistant (MDR) pathogens.

22nd January, 2025: Designed with Hydra-Activ Technology, Kenvue has launched Ready-to-Drink ORS having WHO Osmolarity supporting faster recovery from diarrhoea, mitigating water contamination, and addressing the preparation errors of mothers.

29th January, 2025: US FDA has approved Novo Nordisk's GLP-1 receptor agonist, Ozempic for reducing the risk of kidney failure and disease progression, as well as death due to heart problems in diabetes patients with chronic kidney disease (CKD)

31st January, 2025: With the government's initiatives to bolster the pharmaceutical sector, government of India has proposed initiatives such as the Production-Linked Incentive scheme and the Strengthening of Pharmaceuticals Industry program to promote innovation, accelerate new drug development, and advancements in biopharmaceuticals.

31st January, 2025: USFDA has approved Vertex Pharmaceuticals' first in class non-opioid analgesic, Journavx (suzetrigine) to treat moderate to severe acute pain in adults. The drug exerts in activity by targeting sodium channels based pain-signaling pathway in the peripheral nervous system. The drug is contraindicated for concomitant use with strong CYP3A inhibitors and with food or drink containing grapefruit.

10th February, 2025: Bharat Biotech's Biovet has been granted approval from the Central Drug Standards Control Organisation (CDSCO) to market Biolumpvaxin is the world's only marker vaccine for lumpy skin disease (LSD) in dairy cattle and buffaloes. LSD is associated with loss of lost milk production capabilities as well as death of cattle.

26th February, 2025: Zydus launches India's first Quadrivalent Inactivated Influenza vaccine VaxiFlu-4 vaccine for both influenza A and influenza B strains. The composition is as recommended by WHO and has received clearance from Central Drug Laboratory.

04th March, 2025: USFDA has accepted Biologics License Application for third-generation proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitor, Lerodalcibep. Lerodalcibep is a novel therapy recommended to lower low-density lipoprotein cholesterol in patients high or very high risk with atherosclerotic cardiovascular disease.

04th March, 2025: With the support of Gates Foundation, Zydus Lifesciences has announced it will carry out early-stage development of a combination vaccine against shigellosis and typhoid. Furthermore, the company will undertake animal immunogenicity studies and regulatory preclinical toxicology studies for assessing the safety and efficacy of this combination vaccine.

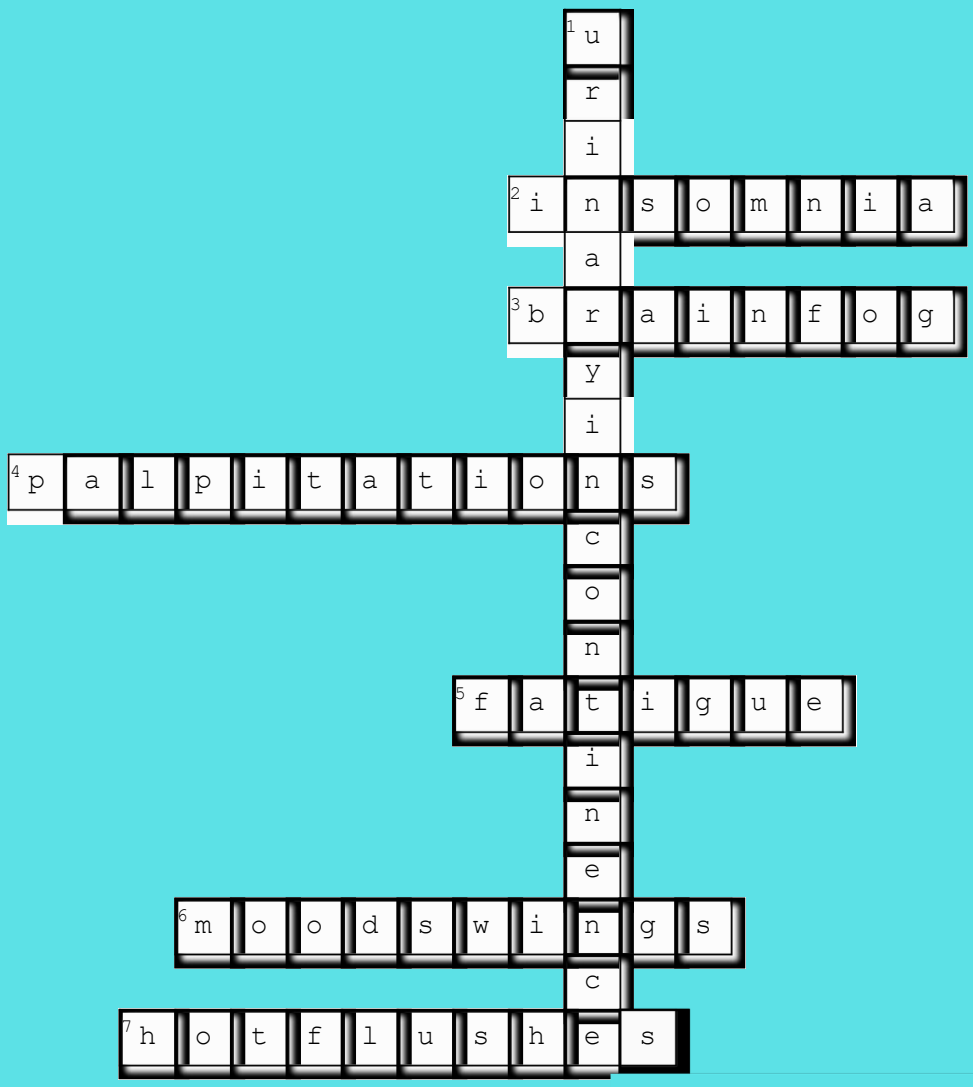
05th March, 2025: Zydus Lifesciences launched a breakthrough medication, Letermovir (ANVIMO), for the prevention of Cytomegalovirus infection for haematopoietic stem cell transplant and kidney transplant patients.

05th March, 2025: India has mandated all clinical research organisations in India will have to get registered on SUGAM portal by April 1. The SUGAM portal facilitates filing of applications for licences, permissions and approvals from the drug regulator. Through this initiative, the drug regulator intends to create a database about the organizations engaged in clinical trials as well as bring more transparency and accountability to the clinical research industry in India.
https://economictimes.indiatimes.com/

Name:_____

Symptoms of Perimenopause and Menopause

Complete the crossword puzzle below



Across

2. Sleep problems (**insomnia**)
3. Feeling mentally unclear (**brainfog**)
4. Sensation of rapid or irregular heartbeat (**palpitations**)
5. Mental and physical exhaustion (**fatigue**)
6. Fluctuations in mood (**moodswings**)
7. Sudden feelings of intense warmth (**hotflushes**)

Down

1. Feeling mentally unclear (**urinaryincontinence**)

Name:_____

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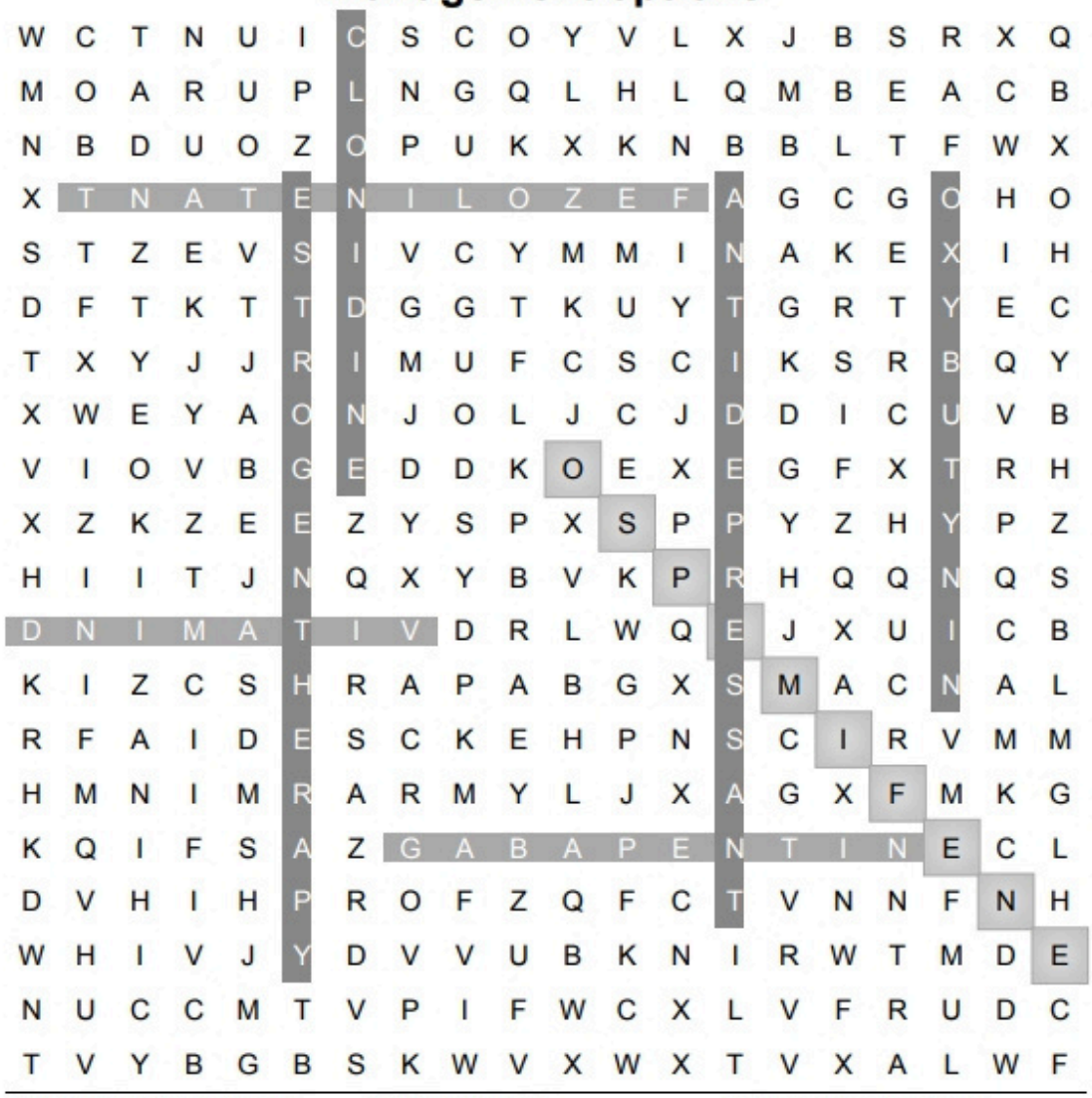
Management options



ESTROGENTHERAPY
CLONIDINE
VITAMIND
GABAPENTIN
FEZOLINETANT
OSPEMIFENE
ANTIDEPRESSANT
OXYBUTYNIN

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LOTUS LOGO STORY

As a lotus is able to emerge from muddy waters un-spoilt and pure it is considered to represent a wise and spiritually enlightened quality in a person; it is representative of a woman who carries out her tasks with little concern for any reward and with a full liberation from attachment. Lotus-woman in the modern sense of women's qualities: she is superbly intelligent, highly educated, and totally committed to individualism. She is politically astute and works incessantly for a better and more humane society. She is exquisite in her taste for music, art and culture, abounds in social graces and performs brilliantly in communication.