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NUTRITION TO SUPPORT THE HORMONAL CHANGES OF PERIMENOPAUSE AND
MENOPAUSE AND CREATION OF A PROTOTYPE COURSE “NOURISHING THROUGH
THE PAUSE”

By

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B.S., Indiana University, 2013

A Master’s Project Submitted to the Graduate Committee in the Department of Nutrition at
Georgia State University in Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

ATLANTA, GEORGIA

2024

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Introduction

The scope of practice for this project is to review existing research on how diet can influence symptoms associated with perimenopause and menopause and develop a framework for a prototype online course targeted to women in this life transition. Each module/lesson of the course will be based on a menopause-related symptom. The course will provide perimenopausal and menopausal women with an overview of why they may be experiencing each symptom physiologically and guide them through science-based nutrition interventions that they can utilize to prevent and reduce the severity of these symptoms while building long-term, sustainable health-forward practices.

Overview: Nutrition and the Midlife Transition

Menopause is a physiological event characterized by an age-dependent loss of ovarian follicles. It is the definitive disappearance of menstruation due to the depletion of ovarian activity.¹ Clinically, this stage of life marks the end of a woman's reproductive ability and is traditionally diagnosed 12 consecutive months after a woman's final menstrual period.² Menopause is associated with a decline in estrogen and progesterone and an increase in follicle-stimulating hormone (FSH) and luteinizing hormone (LH).¹

The phase preceding menopause, known as perimenopause, has been defined as the "menopausal transition." This phase occurs when menstrual irregularities and symptoms associated with decreased estrogen begin to occur.¹ Perimenopause lacks a formal definition and agreed-upon time period in the medical community. Some physicians, researchers, and health professionals consider perimenopause to begin with the first onset of menstrual irregularity and end one year after a woman's final menstrual period.³ Alternative practitioners identify

perimenopause as a process of hormonal changes occurring two to ten years before a woman's last menstrual cycle.^{4,5}

All women will experience perimenopause and menopause in their lifetime. The transition into perimenopause is associated with intense reproductive and hormonal changes and has been described as the "second puberty."^{3,5} It is a process and sequence of hormonal events, not a single event, accompanied by a range of symptoms that contribute to morbidity and decreased quality of life.⁵ Symptoms related to this stage of life include physiological (depressive mood, anxiety, tiredness), somatovegetative (hot flashes, sleep disturbances, muscle, and joint pain), and urogenital (vaginal dryness, sexual problems, bladder issues) disorders.^{1,6} Changes in ovarian hormones are associated with reduced bone density, increased insulin resistance, and adverse changes in blood lipid parameters. The result can be an increased risk of developing obesity, metabolic syndrome, and cardiovascular disease.⁷

Diet appears to be a modifiable risk factor for reducing and managing symptoms and risk factors associated with perimenopause and menopause, but no specific dietary guidelines currently exist.^{1,8} Diets consisting of an increased quantity of fruits, vegetables, chicken and fish, legumes, seeds, low-fat dairy, and nuts have been found to be associated with a lower risk of menopausal symptoms, lower symptom intensity, and increased quality of life.^{6,9} Unhealthy dietary patterns, such as those with high consumption of processed foods, sugars, saturated fats, and sodium, have been associated with an increased prevalence of symptoms and development of different chronic diseases, particularly type 2 diabetes, cardiovascular diseases, and cancer.^{1,6} Research on the relationship between specific diets or nutrients with symptom management and disease risk in women transitioning through perimenopause and menopause is limited, but growing. The dominant literature has explored supplementation with single nutrients as a

nutritional approach for improving age-related parameters in menopausal women, but the evidence is inconclusive. In recent years, nutritional epidemiology has begun to explore the broader perspective of whole diets and dietary interventions that modulate menopause-related health complications.⁷ This literature review will focus on summarizing the existing research surrounding whole diets and dietary interventions, as opposed to single nutrient supplementation, for symptom relief.

Symptoms of Perimenopause and Menopause

Hot flashes and night sweats (vasomotor symptoms) are the most commonly identifiable symptoms of perimenopause and menopause.¹⁰ These symptoms are experienced by up to 80% of the 20 million women of menopausal age (45-54) in the United States and can persist for anywhere from four to ten years.¹⁰⁻¹² Symptoms vary in frequency and severity. These are generally reported in the face, neck, and chest lasting on average for one to five minutes. These symptoms range from multiple times within an hour to every few days.⁵ While the exact mechanisms are unclear, estrogen fluctuations during perimenopause and menopause are thought to narrow the hypothalamic thermoregulatory system that modulates core body temperature. Reduced estrogen levels affect the hypothalamus by altering levels of serotonin and norepinephrine.¹² Greater vasomotor symptom frequency and severity have been linked to cardiovascular disease risk factors.¹⁰

Sleep disturbances, both falling and staying asleep, during perimenopause and menopause are caused by a combination of hormonal changes, vasomotor symptoms, and psychiatric disorders such as stress, depression, and anxiety.^{13,14} Perimenopausal women are 40% to 56% more likely to report sleep issues compared to 31% of premenopausal women.¹⁴ Drops in melatonin, progesterone, and estradiol disrupt the sleep centers of the brain, altering circadian

rhythm.^{5,13} Obstructive sleep apnea (OSA) and restless leg syndrome may also contribute to changes in sleep patterns in this population.¹³

Increased frequency of headaches and migraines are commonly associated with this transition of life. There is strong evidence linking migraines with a woman's hormonal status.¹⁵ While the underlying mechanisms are unclear, headaches during perimenopause and menopause are believed to be primarily caused by high-amplitude fluctuations in ovarian function, estrogen levels, and histamine, coupled with the loss of progesterone.^{2,5} The "estrogen withdrawal hypothesis" suggests that estrogen insufficiency triggers migraine attacks, as well as symptoms of depression.^{14,16} Migraines are reported in 10-29% of menopausal women and have been associated with a higher incidence of mood disorders, poor sleep, irritability, and difficulty concentrating.^{2,15} Research is conflicting on whether migraines improve once a woman becomes postmenopausal.¹⁵

The hormonal shift during this life transition is a time of particular risk for mood disorders and symptoms, including anger, irritability, anxiety, forgetfulness, poor concentration, and other signs of cognitive impairment.⁵ Menopausal women report a high prevalence of depression, stress, anxiety, and mood disorder.¹⁷ Estrogen and progesterone, the key players in hormonal fluctuations in perimenopause and menopause, affect serotonin and neural networks responsible for mood. Loss of these hormones, especially progesterone, alters the brain and nervous system, reducing an individual's ability to cope with stress.^{14,18} An association between a previous history of depressive disorder or bipolar disorder and relapse during the menopause transition has been established. It has been theorized that the correlation between perimenopause and mood disorders can be attributed to hormonal changes, inflammatory markers, diet, and structural brain changes.¹⁴

The perimenopause and menopause transition increases an individual's predisposition to weight gain and obesity due to decreases in estrogen and progesterone.^{5,19} Weight gain primarily depends on an individual's age, hormonal imbalance, and social and behavioral factors such as physical activity and diet.¹ This change in body composition is associated with increased fat mass, decreased lean body mass, loss of skeletal muscle mass, and increased weight circumference, consequently increasing the risk for cardiometabolic diseases, sarcopenia, and osteoporosis.^{7,19,20} The transition period may also be accompanied by metabolic changes causing an increased prevalence of abdominal obesity, hypertension, dyslipidemia, and insulin resistance. Such changes are associated with developing type 2 diabetes and cardiovascular disease.^{1,7,20,21} The prevalence of metabolic syndrome increases in women before, during, and after the menopausal transition.²² A shift to insulin resistance is common because estrogen improves insulin sensitivity, and during perimenopause, estrogen levels frequently fluctuate.⁵

Menopause status has been shown to accelerate cardiovascular disease risk due to metabolic changes that increase low-density lipoproteins and triglycerides and decrease high-density lipoproteins.^{20,22,23} These metabolic alterations are also associated with weight gain and correspond to increased incidence of hypertension and diabetes.²³ In 2020, for the first time, the American Heart Association recognized the menopausal transition as a sex-specific event that significantly impacts future cardiometabolic health.²² The US Study of Women's Health Across the Nation identifies perimenopause as "a critical window of opportunity for prevention" of onset heart disease.²⁴ Studies show that endocrine changes and menopausal symptoms, specifically vasomotor symptoms, sleep disorders, and mood changes, are related to unfavorable alterations in cardiovascular health independently from chronological aging. Menopausal hormone therapy is the sole intervention that has been recognized as an effective preventive

strategy to decrease the risk of cardiovascular disease and diabetes in healthy women at midlife.²²

Nutrition and Age of Menopause Onset

Research suggests a woman's diet is associated with the age at which she naturally enters menopause. Dunneram et al. (2018) found women who regularly ate refined pasta and rice transitioned earlier, while women whose diets focused more on oily fish, beans, and other legumes began menopause at a later age. High intake of oily fish fresh legumes, and plant proteins was associated with an average 3.3 year delayed onset of natural menopause. Refined pasta and rice consumption was associated with earlier menopause, an average of 1.5 years. They hypothesize that refined carbohydrates increase the risk of insulin resistance, thus interfering with hormone production. Additionally, the study suggests that, due to their antioxidant properties, higher intakes of vitamin B6 and zinc may be associated with later age of natural menopause.²⁵ Low or moderate alcohol intake may delay the onset of menopause.²⁶ Purdue-Smithe et al. (2017) found a modest inverse association of early menopause with dietary dairy foods, calcium, and vitamin D.²⁷ A 20-year prospective study evaluated the association of plant-based diet index with early onset natural menopause. This diet is characterized by a low intake of animal foods and higher intake of fruits, vegetables, whole grains, legumes, nuts and seeds, as well as various micronutrients, including vitamin B12, folic acid, and iron. Researchers found that adherence to a plant-based diet was not related to the timing of menopause, but an unhealthy plant-based diet might be associated with an increased risk of early natural menopause.²⁶

Symptom Management Through Nutrition

Vasomotor Symptoms and Sleep Disturbances

Vasomotor symptoms cause habitual discomfort and reduced quality of life. Diet and lifestyle interventions have been shown to aid in symptom regulation. Higher consumption of vegetables is associated with decreased intensity of vasomotor symptoms, while intake of ultra-processed foods is associated with increased intensity of vasomotor symptoms.^{8,9} To relieve hot flashes, insomnia, palpitations, and irritability, individuals are encouraged to consume iron and magnesium-rich foods. Iron-rich foods include whole cereal and pulses, lean meat, egg, spinach, nuts, and seeds. Magnesium-rich foods include green leafy vegetables, nuts, seeds, and legumes.¹⁷ It is recommended that perimenopausal and menopausal women avoid stimulants and trigger foods, such as alcohol and spicy foods, as they can exacerbate vasomotor symptoms.^{5,17}

Barnard et al. (2023) found that dietary intervention consisting of a plant-based diet, minimal oils, and daily soybeans reduced the incidence and intensity of hot flashes.²⁸ Increasing the consumption of fiber, whole grains, fruits, and vegetables while limiting dietary fat has been proven to support weight loss while decreasing vasomotor symptoms.^{8,13,29} Dormire & Howharn (2007) demonstrated that the timing and content of dietary intake are related to hot flash frequency. Hot flash prevalence is suppressed after eating, while symptoms are exacerbated when blood glucose levels fall between meals. Nutrition intervention should support steady glucose levels and negate insulin resistance to lower the risk of vasomotor symptoms.^{11,13} Greater adherence to a Mediterranean Diet has been shown to be inversely associated with vasomotor symptoms and night sweats.⁶ Higher fiber intake and lower glycemic foods are associated with lower rates of hot flashes and night sweats during menopause.³⁰ Magnesium supplementation may be recommended, as deficiency is common during perimenopause and menopause and has been shown to reduce the frequency and severity of hot flashes, promote estrogen metabolism,

reduce the risk of heart disease, and decrease insulin resistance.³¹⁻³³ Vitamin E supplementation has also been shown to decrease hot flash severity and frequency.²

In a recent pilot study, Shon et al. (2023) investigated the benefits of meal-based diet intervention in menopausal women by developing a meal plan enriched with target nutrients of isoflavone, omega-3, fiber, and calcium. Vasomotor symptoms and sleep quality improved after dietary intervention. Additionally, decreased body weight and body fat, improved blood lipid parameters, and decreased fasting insulin were observed.⁷ Consuming dietary sources of tryptophan, a precursor of melatonin, including turkey, chicken, fish, eggs, pumpkin seeds, beans, peanuts, cheese, and leafy green vegetables, have been shown to improve sleep parameters.^{13,34,35} Magnesium and taurine supplementation are recommended for perimenopausal and menopausal women experiencing sleep disturbances.⁵

Weight-training exercise has been shown to reduce menopausal hot flashes and night sweats. It is additionally essential for women in this phase of life to incorporate resistance training, as hormonal fluctuations accelerate decreases in muscle strength, bone mineral density, and basal metabolic rate.³⁶ A 2019 meta-analysis on the efficacy of yoga for menopausal symptoms demonstrated moderate evidence that the movement practice could relieve menopausal symptoms like vasomotor and physiological symptoms.³⁷

Phytoestrogens

Phytoestrogens are plant-derived compounds with a chemical structure like estrogen. The structure similarity is believed to provide an estrogenic effect. Isoflavones and lignans, the two major classes and primary dietary sources of phytoestrogens can be found in soybeans, legumes, vegetables, fruits, flaxseed, and whole grains. Phytoestrogens' efficacy in treating menopausal symptoms is widely debated, partly because research shows women living in Asian countries, a

culture whose diets are rich in phytoestrogens, have a lower incidence of menopausal symptoms compared to women in America or Europe.^{13,38}

Foods rich in phytoestrogens are recommended to aid in alleviating menopausal symptoms while promoting musculoskeletal and bone health.¹⁷ Morimoto et al (2012) report phytoestrogen consumption during perimenopause can alleviate heavy menstrual flow and support healthy estrogen metabolism.³⁹ In a meta-analysis and systematic review of the efficacy of phytoestrogens for menopausal symptoms, Chen et al. (2015) concluded that phytoestrogens appear to reduce the frequency of hot flashes and alleviate menopausal symptoms in menopausal women without serious side effects.³⁸ Rietjens et al. (2017) demonstrate that exposure to phytoestrogens naturally occurring in food is related to decreased risk of cardiovascular disease, obesity, metabolic syndrome, type 2 diabetes, and various forms of cancer but does not relieve hot flashes or other menopause-related symptoms.⁴⁰

Laudisio et al. (2020) report that phytoestrogen consumption is associated with improved sleep in menopausal women, along with fiber and low glycemic foods. The study also concludes that a high intake of foods rich in omega-3 fatty acids, such as fish, seafood, and nuts, reduces the incidence of stress, anxiety, and depression, which may contribute to improved sleep quality.^{6,13} By contrast, randomized controlled trials that have examined the effect of omega-3 supplementation on menopausal symptoms showed no improvements in the frequency and severity of vasomotor symptoms, insomnia severity, sleep quality, and quality of life.⁷

Physiological Symptoms

Although headaches and migraines are commonly reported among perimenopausal and menopausal women, research on dietary interventions to alleviate such symptoms in this specific population is negligible. Kazama et al (2022) reported an inverse relationship between dietary

isoflavones and headaches in peri- and post-menopausal women.⁴¹ Intake of sugar-sweetened beverages and highly processed meats has been found to worsen memory and concentration in postmenopausal women.⁹ Vitamin E supplementation at 400 IU/day has been shown to improve menstrual migraine pain severity. Alternative methods recommended for symptom relief are acupuncture, yoga, and participating in regular exercise.²

Research on the role of whole diets and dietary interventions that modulate mood changes during perimenopause and menopause is also limited. However, studies have shown diet can play an influential role in mitigating the increased anxiety, irritability, sadness, and even rage women experience during this time.^{5,14} Dietary fiber intake is inversely associated with depression in premenopausal women, while added sugars and high glycemic index foods demonstrate a strong relationship with such symptoms.^{30,42} Saturated fatty acids have been shown to impair brain circuits and affect mood regulation. A study of dietary saturated fatty acid intake in perimenopausal women showed a positive association between depression and saturated fatty acid intake.¹⁴ Trans fatty acids are thought to negatively affect mental health, as they are linked to proinflammatory processes and gut dysbiosis. In contrast, omega-3 polyunsaturated fatty acid intake has been shown to be inversely associated with depressive symptoms in perimenopausal women.¹⁷ Dietary intake of foods rich in omega-3 is associated with reduced prevalence of depression in this population.^{13,43} Higher intake of refined cereals and high fat and preserved foods are adversely associated with symptoms of depression and stress in this population.³⁰

Weight Gain and Insulin Resistance

The menopause transition is associated with unfavorable changes in body composition and fat deposition, as well as increased body weight.⁴⁴ Women experiencing perimenopause and

menopause are particularly prone to insulin resistance due to metabolic adaptations related to fluctuations in adrenal, thyroid, and sex hormonal secretions. Insulin resistance can contribute to abdominal weight gain but also adverse long-term health outcomes such as type 2 diabetes, obesity, dementia, heart disease, and osteoporosis.^{5,44} Prioritizing protein during perimenopause and the menopause transition may prevent weight gain.¹⁹ Emerging evidence suggests higher protein intake, specifically 1.0-1.2 g/kg body weight (or 18% of total energy intake), in aging women is associated with a positive impact on lean body mass and skeletal muscle mass, lower fragility, and better physical function.^{20,45,46} Further research on an increased protein range in this population is needed, as the studies do not specify whether this metric is based on actual or recommended body weight.^{45,46} Regular physical activity has been shown to mitigate weight gain and body composition changes accompanying the menopause transition.⁴⁷

The Mediterranean Diet is an approach to eating that prioritizes whole grains, fruits, vegetables, nuts and seeds, beans, and unsaturated fats, especially olive oil.^{1,48} It endorses a low intake of saturated fats, meat, and poultry, a moderate to high intake of fish, and a low to moderate consumption of dairy products.⁴⁸ It is an eating pattern rich in fiber and antioxidant nutrients. High adherence to this eating pattern has been associated with a lower prevalence and risk of being overweight/obese in perimenopausal and postmenopausal women.^{1,6,49,50} There is also consistent evidence that adherence to a Mediterranean Diet reduces the incidence of and mortality from chronic disease.⁴⁸

Disease Risk

Due to the dramatic hormonal shift middle-aged women experience, they are considered a health risk group. Changes in ovarian hormones are associated with reduced bone density, increased insulin resistance, and adverse changes in blood lipid parameters. The result is an

increased risk of developing obesity, metabolic syndrome, and cardiovascular disease.⁷ To minimize complications, this population is encouraged to enhance their health status through physical activity, lifestyle management, and filling their diet with fiber and antioxidant-rich nutrients.^{1,7} Vitale et al. (2018) demonstrated that supplementation with isoflavones, calcium, vitamin D, and inulin improved metabolic parameters, body composition, menopausal symptoms, sexual function, and quality of life.²³ Zhu et al. (2020) reported the severity, not frequency, of vasomotor symptoms to be associated with an increased risk of cardiovascular disease.¹⁰

Bone deterioration is accelerated during menopause. Age-related bone loss strategies are imperative.⁵¹ For the maintenance of bone health, it is generally recommended perimenopausal and menopausal women incorporate foods rich in calcium, such as milk products, nuts, seeds, beans, and green leafy, to maintain bone health. Intake of red meat, carbonated beverages, and foods high in phytates, all of which hinder calcium absorption, should be avoided.¹⁷ A Mediterranean Diet has been associated with a higher bone mineral density and reduced risk of fractures.⁴⁸ The risk of sarcopenia and osteoporosis in postmenopausal women may be attenuated through adequate dietary protein, calcium, and vitamin D intake alongside regular physical activity 3-5 times per week. It is recommended aging women consume 20-25g of high-quality protein at each main meal and prioritize protein near exercise.⁴⁵

The role of calcium and disease management in this population has come under recent scrutiny. Shon et al. (2023) found high calcium supplementation intake to be negatively correlated with cardiovascular disease risk factors in menopausal women.⁷ Research by Bailey et al. (2019) showed calcium supplementation during the menopause transition to be associated with less bone mineral density loss, but did not reduce the risk of bone fracture.⁵² Wallace et al.

(2020) reported dairy food intake was not associated with improved bone mineral density or risk of fractures among women transitioning through menopause.⁵¹

Conclusion

In summary, evidence surrounding the role of whole diets and dietary interventions in alleviating symptoms associated with perimenopause and menopause is a developing field of study. There are gaps in the research regarding effective nutrition interventions for treating such symptoms. This literature review sought to direct future research by highlighting that perimenopause, a critical window of health and opportunity to prevent the onset of new health conditions, requires additional research exploration. Future research should continue to investigate how whole diets, not just individual nutrient approaches, can improve menopausal-related symptoms and reduce disease risk in this population.

NOURISHING THROUGH THE PAUSE

TRACY GREENSTEIN



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PART I

THE FOUNDATIONS

What is perimenopause and menopause, how the hormones in a woman's body evolve during this life transition, estrogen's influences, and more.

PART II

SYMPTOM CHECKLIST

Symptoms of perimenopause and menopause are different for everyone. Use this checklist to understand signs to look out for, track your symptoms, and prepare for a doctor's appointment.

PART III

NUTRITION & AGE OF MENOPAUSE ONSET

Understand how diet can impact the age when a woman naturally enters menopause.

PART IV

DIET'S ROLE IN SYMPTOM MANAGEMENT

Learn how certain foods can lower the risk and intensity of menopausal symptoms while others can make them worse.

PART V

HOT FLASHES

What they are, what causes them, and how to use diet and lifestyle for effective symptom management and relief.

PART VI

FUTURE CONSIDERATIONS

Part I. The Foundations



WHAT IS PERIMENOPAUSE?¹⁻⁴

- Phase before menopause known as the “second puberty”
- Sequence of hormonal changes occurring two to ten years before a woman’s last menstrual cycle
 - Lower progesterone
 - High and fluctuating estrogen
 - Lower estrogen
- Menstrual irregularities and symptoms associated with decreased estrogen start to occur
- Marks a critical period for health when small health problems could become bigger, more permanent health issues later in life if they are not addressed
- A window of opportunity to support the health of your future self

WHAT IS MENOPAUSE?^{1,5}

- Age-dependent disappearance of menstruation due to the depletion of ovarian activity
- Marks the end of a woman’s reproductive ability
- Diagnosed 12 months after a woman’s final menstrual period
- Decline in estrogen and progesterone
- Increase in follicle stimulating hormone (FSH) and luteinizing hormone (LH)

Menopause by the Numbers^{6,7}

1.3M

Number of women in the United States who go through menopause annually

6,000

Women who reach menopause every day



Average age of menopause in the United States



Percentage of women who experience menopause symptoms



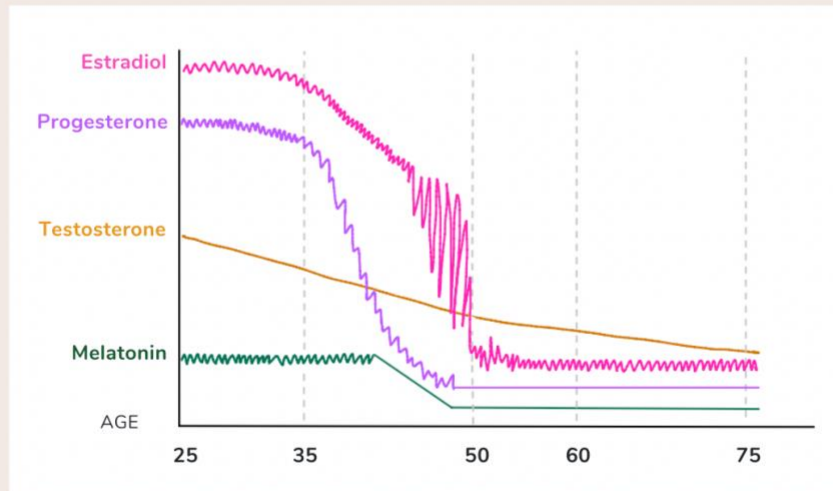
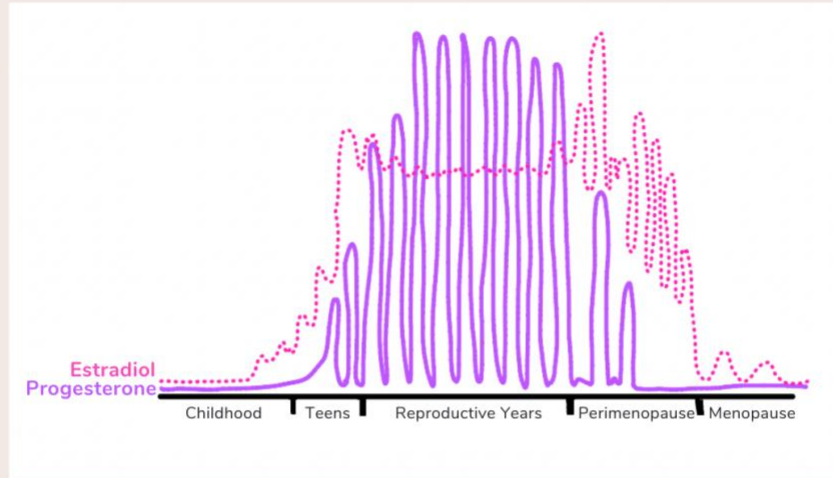
Possible years perimenopause symptoms can last before menopause

Symptoms are burdensome, debilitating, and associated with a lower quality of life.

A woman's life in hormonal stages ^{1,3,5-20}

	Pre-Menopause	Perimenopause	Menopause
Age	Birth through reproductive years	Varies greatly; typically mid-late 30s and early 40s	Average age 51, for most starts between 45-56
Reproductive Hormone Levels (excluding PCOS, endometriosis and on hormonal birth control)	Estrogen and progesterone levels are within normal limits	High and fluctuating estrogen, lower progesterone	Lower estrogen, lower progesterone
Menstrual Cycle	Regular periods	Irregular periods	No period for 12+ consecutive months
Symptoms	No menopause related symptoms	<ul style="list-style-type: none"> • Hot flashes • Night sweats • Weight gain • Decreased libido • Mood changes • Anxiety and depression • Trouble sleeping • Headaches • Bloating • Achy joints and muscles • Poor concentration • Faulty memory • Fatigue • Thinning hair/hair loss 	<ul style="list-style-type: none"> • Same as perimenopause but more intense and more frequent • Increased risk for chronic disease such as osteoporosis, cardiovascular conditions, and cognitive changes

The Hormonal Rollercoaster³



During perimenopause, estrogen levels have gone from a consistent and rhythmic peak and dip to erratically spiking and falling, with a general decline over time. These chaotic spikes and plummets impact how a woman feels and contribute to symptoms such as hot flashes, night sweats, mood swings, headaches, and difficulty concentrating.



Queen Estrogen's Influences ^{3,21}



HEART

Protection from cholesterol



LIVER

Cholesterol production



JOINTS/MUSCLES

Bone mineral density, joint lubrication, muscle strength, and flexibility



SKIN

Supports collagen production and reduces moisture loss

BRAIN

Temperature regulation, glucose uptake, libido, mood regulation, and memory/cognition



BREASTS

Formation of breast tissue and feeding functions



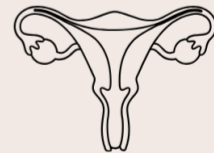
VAGINA

Lubrication and health and integrity of vaginal tissues



UTERUS

Monthly preparation for pregnancy or menstrual cycle



Part II.

Perimenopause & Menopause Symptom Checklist^{1,3,5,7-20}



- | | |
|--|--|
| <input type="checkbox"/> Hot flashes | <input type="checkbox"/> Trouble sleeping |
| <input type="checkbox"/> Night sweats | <input type="checkbox"/> Headaches and migraines |
| <input type="checkbox"/> Anxiety | <input type="checkbox"/> Difficulty concentrating |
| <input type="checkbox"/> Mood swings | <input type="checkbox"/> Muscle and joint pain |
| <input type="checkbox"/> Dizziness | <input type="checkbox"/> Vaginal dryness |
| <input type="checkbox"/> Fatigue | <input type="checkbox"/> Decreased libido |
| <input type="checkbox"/> Irritability | <input type="checkbox"/> Bladder issues |
| <input type="checkbox"/> Weight gain | <input type="checkbox"/> Irregular menstrual cycle |
| <input type="checkbox"/> Hair loss | <input type="checkbox"/> Dry skin |
| <input type="checkbox"/> Insulin resistance | <input type="checkbox"/> Facial hair |
| <input type="checkbox"/> Pain with intercourse | <input type="checkbox"/> Brittle nails |
| <input type="checkbox"/> Breast pain | <input type="checkbox"/> Heart palpitations |

Part III.

Nutrition & Age of Menopause Onset^{3,22-24}

A WOMAN'S DIET CAN IMPACT THE AGE WHEN SHE NATURALLY ENTERS MENOPAUSE. NUTRITION IS A VEHICLE FOR:

- ✓ Helping us reduce inflammation
- ✓ Protect us from disease
- ✓ Support our mental health
- ✓ Support healthy activity levels and body strength
- ✓ Help us thrive

DIETARY COMPONENTS THAT HAVE BEEN SHOWN TO DELAY THE AGE AT WHICH A WOMAN TRANSITIONS INTO MENOPAUSE:

- Oily fish
- Plant proteins
- Beans
- Legumes
- Whole grains
- Fruits & vegetables
- Low-fat dairy
- Low to moderate alcohol intake



NUTRIENTS ASSOCIATED WITH LATER AGE OF MENOPAUSE AND THEIR SOURCES:

- Zinc: red meat, shellfish, dairy, whole grains, eggs, legumes
- Folic acid: liver, dark leafy greens, beans, legumes, lentils, nuts
- Iron: whole grains, dried fruit, red meat, poultry, pumpkin seeds
- Vitamin B6: pork, poultry, bananas, sweet potato, milk, avocado
- Vitamin B12: seafood, red meat, dairy products, eggs, fortified cereal

Part IV.

Importance of Diet in Symptom Management^{11,12,15,17,25-31}

Nutrition is a powerful tool for improving symptoms and putting you and your body on the same team. Certain foods can lower the risk of menopausal symptoms and their intensity and improve quality of life, while others can increase symptoms and risk for disease.**

WHAT TO PUT IN:

- Fruits
- Vegetables (especially dark and leafy ones)
- Lean proteins (i.e., chicken, turkey, fish)
- Omega-3s (i.e. salmon, chia seeds)
- Eggs
- Legumes (i.e. lentils, chickpeas, beans)
- Seeds (i.e. pumpkin)
- Low-fat dairy
- Nuts (i.e. walnuts, cashews, almonds)
- Dietary fiber
- Phytoestrogens

WHAT TO REDUCE AS MUCH AS POSSIBLE:

- Processed foods
- Sugar
- Saturated fats
- Trans fats
- Excess sodium

**No specific dietary guidelines currently exist, but diet appears to be a modifiable risk factor for reducing and managing symptoms and risk factors associated with perimenopause and menopause ^{1,32}

411 on Phytoestrogens^{3,8,11,15,25-27,33,34}

WHAT ARE THEY?

Plant-derived compounds with a chemical structure similar to estrogen. They can mimic estrogen's effects, which may be beneficial in managing estrogen imbalances by raising low estrogen levels (during menopause) or helping to lower high estrogen levels (during perimenopause).

WHAT ARE THE BENEFITS OF EATING THEM?

- Reduce menopause-related symptoms like hot flashes, sleep disturbances, and mood fluctuations
- Promotes bone health
- Alleviate heavy menstrual flow
- Support healthy estrogen metabolism
- Decreased risk of disease

FOOD SOURCES HIGH IN PHYTOESTROGENS

- Soybeans
- Flax seeds
- Cruciferous vegetables
- Tofu
- Garlic
- Fruits (apples, pomegranates, peaches, cherries)
- Wheat
- Sprouts
- Celery
- Carrots
- Sweet potatoes
- Rice



Part V. Symptom Management

Hot Flashes^{3,6,9,10}

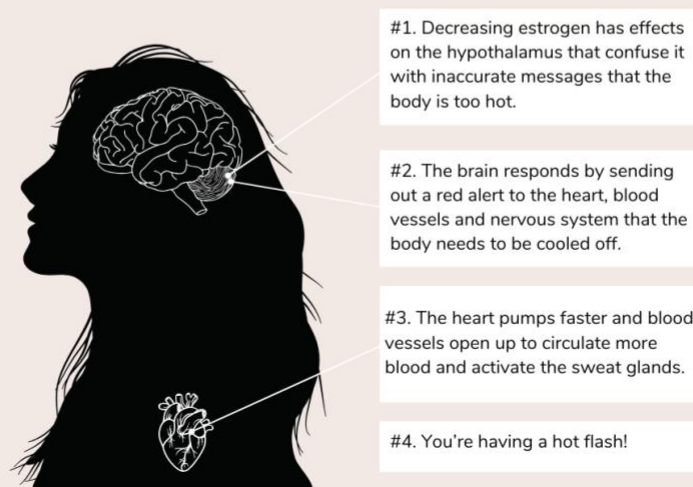
WHAT ARE VASOMOTOR SYMPTOMS (HOT FLASHES AND NIGHT SWEATS)?

- The most recognizable symptom of both perimenopause and menopause, experienced by up to 80% of women during the transition years
- Feeling of intense heat, tingling, red or flushed face, sweating, or burning skin
- Generally reported in the face, neck, and chest, lasting on average for one to five minutes
- May last anywhere from four to ten years
- Symptoms vary in frequency and severity

WHAT CAUSES THEM?

During perimenopause and menopause, the body has lower and fluctuating estrogen levels that affect a part of the brain called the hypothalamus. The hypothalamus acts as the body's thermostat, and these hormone fluctuations disrupt the way the body regulates its internal temperature. The hypothalamus mistakenly senses a woman's body temperature as too warm, setting off internal processes to cool the body down with shivering or sweating.

ANATOMY OF A HOT FLASH



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Hot Flash Tool Kit

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I. PRIORITIZE FOOD SOURCES THAT CAN REDUCE HOT FLASH SEVERITY AND FREQUENCY^{3,11,15,25,26,28,31,32,35}

FIBER

Soluble

- Oats
- Barley
- Beans, peas & legumes
- Fruits

(i.e. citrus, apples, blackberries)

- Vegetables

(i.e. carrots, beets, brussel sprouts)

- Psyllium husk
- Nuts & seeds

Insoluble

- Whole grains
- Brown rice
- Potatoes (skin on)
- Fruits (skin on)

(i.e. strawberries, raspberries, pear)

- Vegetables

(i.e. green beans, cauliflower, leafy greens)

- Flax seeds
- Nuts & seeds

PHYTOESTROGENS

- Soybeans
- Tofu
- Sprouts
- Cruciferous vegetables
- Dried fruit
- Legumes
- Flaxseed
- Whole grains

OMEGA 3'S

- Wild salmon
- Sardines
- Brussel sprouts
- Avocado
- Seeds (i.e. hemp, flax, chia)
- Walnuts

MAGNESIUM-RICH FOODS

- Alaskan salmon
- Cooked leafy greens
- Avocado
- Plantains
- Greek yogurt
- Beans (i.e. navy, black)
- Dark chocolate

IRON-RICH FOODS

- Meat (i.e. liver, beef, pork)
- Seafood (i.e. oysters, clams)
- Tofu
- Spinach
- Dried fruit
- Pumpkin seeds
- Fortified breakfast cereal

LOW GLYCEMIC FOODS

- Leafy greens
- Root vegetables
- Fruit
- Legumes
- Bread: whole grain, multigrain, rye, sourdough
- Breakfast cereals: steel-cut oats, bran
- Rice: basmati, long grain, brown
- Grains: quinoa, barley, buckwheat

II. BUILD NOURISHING PLATES

1 Pick a protein

Poultry
Eggs
Meat
Seafood
Tofu/tempeh



2 Add starchy carbs & grains

Brown rice
Quinoa
Barley
Beans/legumes
Squash
Sweet potato

3 Include a healthy fat

Olive oil
Butter/ghee
Avocado
Nuts
Seeds

4 Add a variety of vegetables

Choose a range of colors. Dark green, yellow, orange and red.

III. LIMIT STIMULANTS AND TRIGGER FOODS ^{3,15,17,31,32}

- Alcohol
- Spicy foods
- Caffeine
- Ultra-processed, high-fat, high-sugar foods



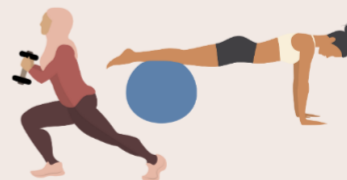
IV. MAINTAIN CONSISTENT MEAL TIMES ^{11,36,37}

- Low blood sugar can trigger hot flashes
- Eating regular meals throughout the day can keep blood sugar levels stable and reduce the risk of insulin resistance, which will help minimize uncomfortable symptoms



V. GET REGULAR MOVEMENT ^{3,38-41}

- Resistance training
- Aerobic exercise (i.e. running, walking, cycling, swimming, dance)
- Yoga
- Tai chi



VI. KEEP A JOURNAL

- Find your triggers by writing down each time you experience a hot flash and the events surrounding it to observe your pattern of flashes and learn which foods don't agree with you.
- Some questions to ask yourself:
 - Was the flash timed near a stressful event?
 - Did I have caffeine that day?
 - Did I consume alcohol the night before?
 - What foods did I eat that day?



VII. SUPPORT YOUR NERVOUS SYSTEM TO DECREASE STRESS AND MENOPAUSE SYMPTOMS ^{3,41-43}

- Adopt a mindfulness practice
 - Calms the “fight or flight” response
 - Observe the present moment, emotions, and body sensations with curiosity and without judgment
 - Start a gratitude journal
- Meditation
- Breathwork



VIII. EXPLORE PHARMACOLOGICAL INTERVENTION ³

- Hormone replacement therapy (HRT) can relieve menopause symptoms and reduce disease risk. Consider discussing this treatment option with your provider.

FUTURE CONSIDERATIONS⁸

Research on the relationship between specific diets or nutrients with symptom management and disease risk in women transitioning through perimenopause and menopause is limited but growing. The dominant literature has explored supplementation with single nutrients as a nutritional approach for improving age-related parameters in menopausal women, but the evidence is inconclusive. In recent years, nutritional epidemiology has begun to explore the broader perspective of whole diets and dietary interventions that modulate menopause-related health complications. Future research should continue to investigate how whole diets, not just individual nutrient approaches, can improve menopausal-related symptoms and reduce disease risk in this population. Additionally, the role of testosterone in women's health should be explored.

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