

The Role of Herbal Supplements in Alleviating Menopause Symptoms

Sakthi Sanjana Deenadhayan¹, Venkatesh Babu¹, Elizabeth Rani Edwin¹, Preethi Harikrishnan¹, Ramya Govindarajulu¹, Thirumalaikumaran Rathinam², Vandhana Vijayakumar^{2,*}

¹Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, INDIA.

²Department of Pharmacognosy, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, INDIA.

ABSTRACT

Menopause is a natural physiological change in women characterized by decreased ovarian hormone production, which causes a variety of symptoms such as hot flashes, nocturnal sweats, mood swings, sleep difficulties, and diminished bone density. Although Hormone Replacement Therapy (HRT) is commonly used to treat these symptoms, worries about its long-term safety have led many women to seek alternative and complementary treatments. Herbal supplements, in particular, have attracted a lot of attention because of their presumed natural nature and potential therapeutic effects. This study will assess the effectiveness of commonly used herbal supplements in treating menopausal symptoms, focusing on their mechanisms of action, therapeutic advantages, safety issues, and potential drug interactions. A comprehensive literature evaluation was undertaken by examining published scientific articles, clinical research, and review papers on herbal therapies for menopausal symptom management. Relevant data on efficacy, pharmacological mechanisms, safety profiles, and clinical outcomes were rigorously reviewed and compiled. Several herbal supplements, including phytoestrogen-rich plants and medicinal herbs with anti-inflammatory, antioxidant, and neuroprotective qualities, have showed promise in alleviating menopausal symptoms such as vasomotor disturbances, mood shifts, and sleep irregularities. However, variances in herbal composition, dose, and clinical evidence lead to uneven results. Furthermore, worries about product standardization, safety, and potential herb-drug interactions remain substantial obstacles. Herbal supplements may give supportive alleviation for menopausal symptoms and constitute a promising complementary treatment option for women seeking alternatives to traditional treatments. Nonetheless, additional well-designed clinical trials, standardized formulations, and stronger regulatory frameworks are required to ensure efficacy, safety, and appropriate therapeutic use.

Keywords: Herbal supplements, Hormone replacement therapy, Hot flashes, Menopause.

Correspondence:

Mrs. Vandhana Vijayakumar

Lecturer, Department of Pharmacognosy, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai-602105, Tamil Nadu, INDIA.

Email: vandhanav.scop@saveetha.com

Received: 16-03-2026;

Revised: 27-05-2026;

Accepted: 03-07-2026.

INTRODUCTION

The diagnosis of menopause is made following a year of amenorrhea characterized by the irreversible loss of function of the ovaries. The typical age of menopause onset is 51 (Ilankoon *et al.*, 2021). Ovarian function changes during the perimenopause, which occurs several years before the last menstrual cycle. Symptoms like hot flashes, mood swings undoubtedly start in the perimenopause, the physiology and clinical signs of this menopausal transition is unknown (Santoro *et al.*, 2021). The replacement therapy may be used to treat or prevent chronic

illnesses or to alleviate their symptoms. Hormone replacement treatment dosages and delivery methods differ depending on the indication. The Hormone replacement therapy complications vary depending on the protocol. Unexpected bleeding may indicate endometrial hyperplasia, thus it's critical to understand the typical bleeding from the vagina pattern for any hormone replacement treatment plan. A complex intervention, postmenopausal hormone therapy has both beneficial and detrimental effects on certain health outcomes (Troia *et al.*, 2021). Observational studies have shown that postmenopausal women who consume hormones show a 30% to 50% decrease in all-cause mortality rate than those that don't. It is crucial to acknowledge that different women may place varying values on different health results related to hormone replacement therapy. Therefore, after carefully weighing the potential advantages, risks, and individual preferences, each woman and healthcare provider should decide whether to use hormone replacement therapy (J *et al.*, 2024; Nandhini *et al.*, 2024b; Zanello *et al.*, 2019).



DOI: 10.5530/pres.20260073

Copyright Information :

Copyright Author (s) 2026 Distributed under
Creative Commons CC-BY 4.0

Publishing Partner : Manuscript Technomedia. [www.mstechnomedia.com]

Pharmacological therapy is frequently substituted with herbal products. Many women choose to utilize herbal products to treat gynecological disorders and menopausal symptoms. (like premenstrual syndrome and dysmenorrhea), as these are the indications where pharmaceutical therapy may have serious adverse events (Jeong and Park, 2022). Examining clinical data, safety profiles, and the justification for their use, the plants and their derivatives are frequently used for the aforementioned indications. Few studies have been conducted on the use of certain plants to treat gynecological disorders and menopausal symptoms (Comhaire and Depypere, 2015). Clinical studies have consistently demonstrated that red clover (*Trifolium pretense*) and black cohosh (*Cimicifuga racemosa*) can help decrease menopausal symptoms; however, the evidence presently accessible does never completely allow the use of soybean (*Glycine max* and *Glycine soja*), hops (*Humulus lupulus*), valerian (*Valeriana officinalis*), and fenugreek (*Trigonella foenum-graecum*) for this indication (Francesco et al., 2012; Nandhini et al., 2024a; Ravindran et al., 2025; Venugopal et al., 2023). For a variety of gynecological conditions, women frequently seek treatment. These include menopausal symptoms, dysmenorrhea, and premenstrual syndrome. They frequently favor using herbal products to reduce symptoms rather than using pharmaceutical therapy. This is particularly true for hormone replacement therapy during menopause, as there is a risk of major side effects like breast cancer (Pop et al., 2023). Hot flashes, too many perspiration, disruptions in sleep and irritability, depression, the disorder of attention deficit, bone and joint pain, headache, arrhythmias, and paresthesia are just a few of the menopausal symptoms that can be measured using the Kupperman Menopausal Index, which is a scale of 1 to 4. The menopausal rating scale, often known as the Greene climacteric range are used for other comparable evaluations (Sourouni et al., 2021). Selective serotonin reuptake inhibitors, hormone replacement treatment, and selective serotonin-norepinephrine reuptake inhibitors are pharmacological treatments for these symptoms. The regularity and intensity of hot flashes are frequently used to gauge how well a therapy is working. For the most part, menopausal symptoms go away within a year. This highlights the necessity of a control group and conducts supplement trials intended to reduce these effects extremely complex (Kenda et al., 2021). In the Western world, plants and their derivatives are frequently used as over-the-counter medications or dietary supplements to alleviate menopausal symptoms. This review focused on various herbal supplements which can be used for treating menopause symptoms.

METHODOLOGY/SEARCH STRATEGY

A comprehensive literature search was conducted to identify studies evaluating the role of herbal supplements in the management of menopausal symptoms. Electronic databases including PubMed, Scopus, Web of Science, and Google Scholar were systematically

searched for relevant articles published between 2000 and 2024. The search strategy employed combinations of keywords such as “menopause,” “herbal supplements,” “phytoestrogens,” “hot flashes,” “natural therapies,” and “alternative medicine for menopause.” Boolean operators (AND, OR) were used to refine the search and retrieve relevant studies.

Both clinical trials, observational studies, and review articles examining the efficacy, mechanisms of action, safety profiles, and potential drug interactions of herbal supplements were included. Studies focusing on commonly used herbal therapies such as *Panax ginseng*, *Cimicifuga racemosa* (black cohosh), *Trifolium pratense* (red clover), *Linum usitatissimum* (flaxseed), and *Oenothera biennis* (evening primrose oil) were particularly considered. Articles not published in English, duplicate records, and studies lacking sufficient scientific evidence were excluded. Relevant data were carefully reviewed and synthesized to provide a comprehensive overview of herbal approaches for menopause symptom management.

DISCUSSION/REVIEW OF LITERATURE

Physiology Of Menopause

The menopause is a normal physiological process that older women go through. The quantity of primary ovarian follicles rapidly declines during this period, leaving insufficient numbers to respond to the effects of FSH. Peripheral tissues like fat and skin still manufacture estrogens from androgens like testosterone and androstenedione. However, throughout the five years following menopause, the overall level of estrogen steadily declines, and the most prevalent estrogen is now estrone rather than estradiol (Gatenby and Simpson, 2024). Circulating levels of LH and FSH rise significantly when ovarian inhibin and estrogen levels fall, which prevents pituitary release of these hormones. Numerous situations can impact menopausal physiological processes. These include things like body mass index, socioeconomic status, physical activity, health problems, smoking, diet, ethnicity, and overall gynecologic health (Devaraji et al., 2024; Elumalai et al., 2024; Mahalakshmi et al., 2025; Talaulikar, 2022). Among these are body mass index, socioeconomic status, physical activity, health problems, diet, smoking, ethnicity, severely affects the gynecologic health (Bauer and Santoro, 2018). Figure 1 shows physiology of menopause.

Prevalence and Impact of Menopause Symptoms

It is predicted that over 50 million people worldwide may experience menopause each year. By 2030, there will be 1.2 billion menopausal women globally, up from 467 million postmenopausal women in 1990. Women in different regions and nations have varying rates of menopausal symptoms; in Europe, 74% of women experience these symptoms, compared to 36-50% in the United States, 22-63% in Asia and 45-69% in Latin America (Wang et al., 2022). The average age of patients receiving Hormone Therapy (HT)

was 54 years old, and menopausal symptoms were common among these women. Hot flashes (40%) and night sweats (17%), sleeplessness (16%), vaginal dryness (13%), and weight gain (12%) were the most prevalent symptoms of menopause. It is believed that between 40 and 50 million women in the US suffer with vasomotor symptoms, such as night sweats and hot flashes (Kalhan *et al.*, 2020).

Epidemiology of menopause symptoms

Around 1.3 million women from the United States pass through menopause each annually. Menopause usually begins around the ages of 45 and 56. However, early spontaneous menopause, which happens at the years of 40 and 45, affects roughly 5% of women. Furthermore, primary ovarian insufficiency affects 1% of women which is defined by an irreversible ovarian failure that results in the total end of menstruation prior to the age of forty (Crandall *et al.*, 2023; Makara-Studzińska *et al.*, 2014).

Impact of menopause symptoms on quality of life

Quality of life is adversely affected by menopausal symptoms. Because they arise when women have important societal duties, such as those of the home and the career, the symptoms associated with a poor health-related standard of life may be upsetting. Menopause symptoms are also common in women, and the majority of them are unpleasant, self-limiting, and occasionally incapacitating. Menopausal women's quality of life is therefore very important, and their health-related quality of life is enhanced by managing their menopausal symptoms (Bairy *et al.*, 2009). Figure 2 shows Etiology and hormonal regulation of menopause in women. Menopausal women's health-related standard of life is influenced by a number of characteristics, including age, education, ethnicity, length of time since menopause, not living with a partner, smoking, food, exercise, beliefs about reproductive history, and attitude toward menopausal symptoms. Therefore, in the modern healthcare system, it is vital to comprehend how menopause affects middle-aged women's quality of life (Rathnayake *et al.*, 2019). Since postmenopausal women often gain weight during this time, which further lowers their Quality of Life (QOL), it has been shown that physical activity predicts QOL. Vasomotor symptoms, such as hot flashes, and urogenital symptoms, which are directly linked to estrogen deficiency, have less of an effect on quality of life. In addition, lifestyle elements like exercise are essential for improving life quality (Whiteley *et al.*, 2013).

Physical and emotional symptoms of menopause

A woman has physical as well as emotional alterations when she enters menopause. Women usually experience menopause for the second third of their lives after their ovulatory cycle is over. According to their years of age, changes in their levels of sexual hormones, and other factors, women experience a variety of common problems and illnesses after menopause (Dalal and

Agarwal, 2015). Irregular menstrual cycles, metabolic processes, weight, cardiovascular and cardiac and musculoskeletal problems, along with urogenital and dermatological shrinkage and sexual dysfunction, are characteristics of the menopausal transition, which occurs a few years before to menopause (Ee *et al.*, 2016). When menopause begins, the hormonal balance changes dramatically. Estrogen levels fall, and FSH and LH levels rise, which lowers progesterone levels and results in lifelong amenorrhea. Acute menopausal syndrome encompasses psychosomatic symptoms and vasomotor phenomena (such as flashes of light and night sweats), which are perceived differently by individuals with varying psychological, social/cultural traits (Rowe and Baber, 2021).

Hot flashes are the most common menopausal symptom that women experience. Hot flashes are characterized by sudden flushing and sweating, chills, palpitations, anxiety, a feeling of tension in the head and chest, nausea, coughing, and lack of focus. They usually last a few seconds to a minute, and occasionally equal to an hour (Mirabi and Mojab, 2013). The following variables can cause hot flashes, which can differ from person to person: drinking alcohol, using caffeine-containing goods, eating spicy meals, being in an environment with high temperatures, wearing tight clothing, smoking, or being around cigarette smoke (Kargozar *et al.*, 2017). A person who experiences sleep disturbances feels exhausted. Sleep disorders like restless legs syndrome and obstructed sleep are becoming more common in menopausal women. Polysomnography (PSG) is a clinically useful method for assessing sleep disorders (Schaedel *et al.*, 2021). A decreased sleep habits or irregularities in the sleep cycle that can be identified by polysomnography are considered observable sleep disturbances, whereas self-reported complaints of quasi-sleep, difficulty falling asleep, frequent wakefulness, or waking up early are considered interpretive sleep disturbances (Santoro *et al.*, 2015). Itching, dyspareunia, urethritis, dysuria, incontinence, and frequent urination are additional symptoms of urogenital tract atrophy brought on by estrogen deprivation. Hormone replacement therapy, or HRT, is used as a treatment to promote follicle development and reduce symptoms. Among the most effective methods for treating additional menopausal problems and lowering vasomotor symptoms is hormone therapy (Hachul *et al.*, 2009). Figure 2 shows various menopausal symptoms in women.

Herbal supplements for menopause symptoms

All women must experience the menopause at some point in their lives. The period is notable for the sharp drop in estrogen production, which is the hormone that keeps women fertile. Women's quality of life has been negatively impacted by this hormonal decline for many years, with symptoms varying in severity (Davis *et al.*, 2023). Menopause symptoms are a significant concern for 90% of women, leading to concerns about hormone therapy and alternative medicines. The use of hormone

therapy to treat these symptoms is widespread, but some women are not allowed to use it due to worries about possible risks, such as breast and endometrial carcinoma, cardiac incidents, and vaginal bleeding. Instead of using hormone therapy, some women would rather use complement and alternate therapies such as herbal medicine, yoga, behavioral therapy, stress management, and nutritional supplements. Herbal therapy is the most widely used natural treatment for controlling hormone imbalance and menopausal symptoms. The use of these medications to prevent and alleviate menopausal symptoms is acknowledged by the World Health Organization (WHO). Phytoestrogen-containing herbal medications are frequently used to treat menopausal symptoms because they have estrogenic properties (Koysombat *et al.*, 2024). According to study conducted on Korean Medicine Doctors (KMDs) found that hot flashes, sleep disorders, systemic fatigue, and sweating are the most common symptoms of menopause. The most effective herbal medicines were Jiawei shaoyao-san (12.5%) and Jiawei decoction of guipi (11.8%). The KMDs suggested two to three every day of herbal medicine in addition to traditional Korean medicine for a duration of one to two months medicine therapies. The results may provide insights into doctor perceptions on using herbal medicines for menopausal symptoms (Jun *et al.*, 2019). Table 1 shows the role of various herbal supplements and its mechanism on menopausal symptoms.

Rosa damascena extract

Rosa damascena, a traditional Iranian herbal medicine, contains compounds like alkanes, alcohols, terpenes, antioxidants, vitamins, and minerals. Its phytoestrogenic effects are attributed to flavonoids and isoflavones like anthocyanin and cyanidin. Menopausal women's sexual function can be enhanced by isoflavones. Alpha and beta estrogen receptors are bound by phytoestrogens, which results in estrogenic effects. These substances can lessen genital symptoms and enhance sexual function by enhancing blood circulation in the vulva and vagina and mucus, elasticity (Gholinezhad *et al.*, 2024). According to Riazi *et al.*, study in Tehran, Iran, investigated the therapeutic properties of *Rosa damascena* on postmenopausal women. The Findings indicated that the intervention and placebo groups' levels of anxiety and sadness differed significantly. The study suggests *Rosa damascena* as an effective non-pharmacological intervention for postmenopausal depression and anxiety (Riazi *et al.*, 2021).

Ocimum basilicum leaf extract

Ocimum basilicum (OB) is a Lamiaceae herb that is well-known for its phytoestrogenic qualities. The significant amounts of linalool, eugenol, and rosmarinic acid—all of which have sedative properties—are found in basil (Askari *et al.*, 2016). According to certain animal studies, eugenol lengthens sleep duration and linalool lengthens barbiturate-induced sleep time. The

methanolic extract of basil contains rosmarinic acid, which also has sedative and sleep-promoting properties (Nugroho *et al.*, 2012). According to Karimi *et al.* study, Basil is one of the plants to have antidepressant properties (Jayaprakash *et al.*, 2025; Karimi *et al.*, 2024). Yenni *et al.* study, investigates the potential of basil leaves as a phytoestrogen alternative for premenopausal symptoms in female Wistar rats. The study concluded that giving premenopausal female Wistar rats an oral dose of basil leaf ethanol extract raised their estrogen levels and prevented the number of ovarian follicles from decreasing. This shows that basil leaves might be a good substitute for treating premenopausal symptoms (Devaraji and Thanikachalam, 2025; Nandhini *et al.*, 2024c; Soesanto *et al.*, 2023).

Panax ginseng

The two most widely consumed ginseng varieties in the world are *P. quinquefolius* (American ginseng; AG) and *Panax ginseng* Meyer (*P. ginseng*; PG). The most important bioactive substances in PG and AG are ginseng saponins, sometimes referred to as ginsenosides. Based on a number of experimental studies and clinical trials, and according to KFDA, KRG, and Korean FDA, is beneficial for seven main signs and symptoms, such as reducing fatigue, enhancing circulation, improving memory, strengthening the immune system, enhancing antioxidant activity, and easing menopausal symptoms (Song *et al.*, 2024). Zahra *et al.* study, investigates the postmenopausal women's quality of life, menopausal symptoms, and sexual performance are affected by ginseng. For four weeks, the intervention group was given 500 mg of *Panax ginseng*, and the control group was given a placebo twice a day. The findings indicated that ginseng was a good substitute for traditional treatments in menopausal women since it markedly enhanced sexual performance, quality of life and menopausal symptoms (Ghorbani *et al.*, 2019).

Black Cohosh

The plant *Cimicifuga racemosa* belongs to the Ranunculaceae family and is indigenous to eastern and central North America. Europeans have been using it to treat the symptoms of menopause for centuries. The phytochemical components of black cohosh include triterpene glycosides, phenols, flavonoids, fatty acids, resin, phytosterol, sugar, starch, cinnamic acid esters, aromatic acids and alkaloids. Important ingredients include methyl serotonin, methyl cystine, baptifoline, anagyrine, magnoflorine, and quinoline. Insomnia, vertigo, anxiety, mood swings, hot flashes, vaginal dryness, and night sweats

are the menopausal symptoms that it is commonly used to treat in postmenopausal women. Hot flashes are brought on by postmenopausal changes in serotonin and circulating estrogen levels, which also cause mitochondrial dysfunction, an elevated basal metabolic rate, and an ionic imbalance. Cognitive impairment is another effect of these decreased serotonin and estrogen levels. Because of its multifaceted mode of action, which

includes anti-inflammatory, anti-apoptotic, antioxidant, strong SSRI, agonist to μ R and estrogenic receptor, and antagonist to ER on the breast and uterus, *Cimicifuga racemosa* may be a viable treatment option for these symptoms (Mohapatra *et al.*, 2022). Guida *et al* study, investigated the efficiency of *Cimicifuga*

racemosa (iCR) isopropanolic extract in lowering menopausal symptoms. 163 women participated in single-center observational prospective case-control research. The findings revealed that there were notable variations in menopausal symptoms between patients and controls, with vasomotor symptoms, sleep issues,

Table 1: The role of various herbal supplements and its mechanism on menopausal symptoms.

Herbal supplements	Type of Study	Phyto constituent	Effects	Mechanism	References
<i>Rosa damascena</i> extract	Triple-blind randomized clinical trial	Phytoestrogens, anthocyanins, cyanidin antioxidants, geraniol, terpenes. Citronellol.	Minimizing the intensity of menopausal symptoms, such as those pertaining to mental health and the urogenital tract.	Sedative, hypoactive sexual desire disorder, antidepressant, anti-anxiety, phytoestrogenic and antioxidant properties, sexual dysfunction, and insomnia.	(Gholinezhad <i>et al.</i> , 2025)
<i>Ocimum basilicum</i> leaf extract	Placebo-controlled clinical trial	Linalool, eugenol, Rosmarinic acid	Diminish the overall intensity of women's menopausal symptoms	Antihypertensive, antithrombotic, antioxidant, vasorelaxant, anti-platelet, anti-osteoporotic, anxiolytic, and sedative effects.	(Karimi <i>et al.</i> , 2024)
<i>Panax ginseng</i>	Randomized placebo-controlled trials	Saponins (ginsenosides)	Improve hot flashes, menopausal symptoms, and Quality of Life (QOL).	Estrogenic effects	(Lee <i>et al.</i> , 2022)
<i>Cimicifuga racemosa</i> (Black Cohosh)	placebo-controlled clinical trial, animal study	Terpene glycosides	relieve climacteric hot flushes and depression.	selectively inhibit the release of LH by binding to the estrogen receptor; FSH is unaffected.	(Kargozar <i>et al.</i> , 2017)
<i>Matricaria chamomilla</i> (chamomile)	Triple-blind clinical trial	Flavonoids, coumarins, volatile oils, terpenes, organic acids, polysaccharides.	Alleviating menopausal symptoms.	Hypolipidemic, hypoglycemic, antihypertensive, depressive, neuroprotective, anticancer, anti-inflammatory, anti-infective, antithrombotic, and antioxidant properties.	(Ledari <i>et al.</i> , 2025)
Danggui Buxue Tang (<i>Astragalus membranaceus</i> and <i>Angelica sinensis</i>)	Third clinical trial	Ferulic acid, formononetin, calycosin, and astragaloside IV.	Reduction on mild hot flashes	Estrogenic effects	(Wong <i>et al.</i> , 2022)
Red clover (<i>Trifolium pratense</i> L.)	randomized, triple-blind, placebo-controlled clinical trial	Isoflavones	Reduction of menopausal symptoms and assist in maintaining bone density and safeguard the immunological and cardiovascular systems.	Protect against oxidative damage, inhibit angiogenesis, and have an estrogenic impact.	(Ehsanpour <i>et al.</i> , 2012)

Herbal supplements	Type of Study	Phyto constituent	Effects	Mechanism	References
Pomegranate (<i>Punica granatum</i> L.)	Randomized double-blind placebo-controlled trial	Polyphenols, tannin, and anthocyanin	Reduces the symptoms of menopause, such as hot flashes, sweating, paraesthesia, sleeplessness, anxiety, depression, vertigo, exhaustion, headache, arthralgia, formication, sexual problems, and Urinary Tract Infections (UTI).	Antioxidants, anti mitogenic and phytoestrogenic effects.	(Adel-Mehraban <i>et al.</i> , 2022)
Evening Primrose (<i>Oenothera biennis</i>)	Single-Blind Randomized Controlled Trial	Fatty acids (linoleic acid and γ -linolenic acid), phenolic acids, and flavonoids.	Reduced the incidence and intensity of night sweats and hot flashes.	Antioxidant activities, inhibition of platelet aggregation.	(Kazemi <i>et al.</i> , 2021)
EstroG-100 (<i>Angelica gigas</i> Nakai, <i>Phlomis umbrosa</i> Turczaninow, and <i>Cynanchum wilfordii</i> Hemsley)	Randomized, double-blind, placebo-controlled trial	Phyto sterols, flavonoids, coumarin, ferulic acid, phenylpropanoids.	Improve hot flashes in postmenopausal women.	Antioxidative, anti-cancer, and anti-atherosclerotic properties, hormonal balance.	(Farzaneh <i>et al.</i> , 2024)
<i>Lavandula angustifolia</i> Mill.	Triple-blind parallel-armed randomized trial	Caryophyllene oxide, linalool, linalyl acetate, tannins, coumarin, flavonoids, and phytosterols	It alleviates vasomotor, psychological, physical, depressive, and sexual problems.	Relaxation, antidepressants and antioxidants.	(Haramshahi <i>et al.</i> , 2024)
<i>Hypericum perforatum</i> (St John's wort)	Randomized controlled study	Flavonol derivatives, biflavones, proanthocyanidines, xanthones, phloroglucinols and naphthodianthrone.	Reducing hot flashes, menopausal symptoms, and depression in postmenopausal women.	Antidepressant and analgesia.	(Eatamadnia <i>et al.</i> , 2019)
Valerian Root (<i>Valerian officinalis</i>)	Double blind clinical trial	Flavonoids, sesquiterpenes, iridoids, lignans, alkaloids	Reduction of hot flashes, sleeplessness and mental disorders.	Estrogenic activity	(Mirabi and Mojab, 2013)
Flaxseed (<i>Linum usitatissimum</i>)	Open-label interventional clinical trial	Protein, lignans, α -linolenic acid, and omega-3 fatty acids	Decreased vasomotor symptoms, including hot flashes, bone pain, vaginal dryness, and nocturnal sweats.	Antioxidant, estrogenic activity.	(Dizaye <i>et al.</i> , 2023)
<i>Lepidium meyenii</i>	Randomized controlled clinical trial	Starch, polyphenolics, dietary fiber, alkaloids, protein, steroid, phenol.	Improves Hormonal balance, hot flashes, night sweat, mood, anxiety.	antioxidant activity, anticancer, hepatoprotective.	(Bower-Cargill <i>et al.</i> , 2022)

and irritability showing the most improvement. After one to three months of therapy, iCR may be useful in lowering menopausal symptoms (Guida *et al.*, 2021).

Matricaria chamomilla

Chamomile a therapeutic plant from the Compositae or Astraceae is utilized for its anti-inflammatory properties, antioxidant, and pain-relieving characteristics. It is also used for treating digestive issues and skin and eye diseases. Chamomile's chemical components include apigenin, caffeic acid, chlorogenic acid, luteolin, chamazolen, flavonoids, and coumarin. Apigenin and chrysin flavonoids have been found in chamomile extract which have phytoestrogenic properties and can bind both classical and non-classical estrogen receptors to produce estrogenic effects. It has been demonstrated that chamomile extract stimulates bone cell differentiation and prevents osteoporosis by acting on bone estrogen receptors (Bosak *et al.*, n.d.). Kupfersztain *et al* study, evaluated the efficiency of a medicinal plant extract called Climex, which contains *Angelica sinensis* and *Matricaria chamomilla*, in treating menopausal symptoms. Two groups of postmenopausal women were formed, and one of them was given

55 a placebo and the other five chewable Climex pills daily in between meals. For 12 weeks, both groups took Climex. A reaction was already observed in the first month, and the results demonstrated a considerable reduction in hot flashes and sleep difficulties. When hormone replacement medication is not appropriate for menopausal women, this hormone-free formulation may be a useful alternative (Kupfersztain *et al.*, 2003).

Danggui Buxue Tang

The two herbs *Astragalus membranaceus* and *Angelica sinensis* combine to make a simple herbal formulation known as *Danggui Buxue Tang* (DBT). In China, DBT is recommended for women with menopausal symptoms since it improves their health by nourishing their blood (body circulation) and increasing their Qi (vital energy) (Zierau *et al.*, 2014). According to Oliver *et al* study,

Angelica sinensis Radix with *Astragali Radix* are two ingredients in DBT, or *Danggui Buxue Tang*, is a Chinese herbal infusion

that has been used for more than 800 years to treat menopausal irregularities in women. DBT was found to have mild but considerable oestrogenic effects *in vivo*, promoting the expression of aryl hydrocarbon receptor family members and genes sensitive to oestrogen. Nonetheless, some of its effects were not dependent on the oestrogen receptor, indicating that DBT could be a different menopausal therapeutic option free of oestrogenic adverse effects (Zierau *et al.*, 2014).

Red clover

Red clover, rich in isoflavones, has estrogenic effects, making it a popular dietary supplement for treating menopausal symptoms, including Formononetin, biochanin A, aglycones, and other isoflavones (Gościński *et al.*, 2023). Ghazanfarpour *et al* study, evaluates red clover was shown to have a reduced frequency of hot flashes than the control group in postmenopausal and perimenopausal women's hormone state, endometrial thickness, and hot flashes. Nonetheless, the red clover group induces a greater decline in FSH and SHBG levels than the placebo group. According to the findings of this study red clover helped menopausal women with their hot flashes (Ghazanfarpour *et al.*, 2015).

Punica granatum

A plant with estrogen-like properties, pomegranates (*Punica granatum* L.) are used as a traditional treatment for hormonal disorders. It possesses anti-mitogenic and phytoestrogenic properties and is abundant in antioxidants such as polyphenols, tannin, and anthocyanin. Pomegranates can reduce FSH and considerably lessen the intensity of hot flashes and menopausal symptoms (Adel-Mehraban *et al.*, 2022). Kim *et al* study, involving 58 menopause women found that taking pomegranate extracts significantly reduced hot flush and sweating duration, menopausal rating scales, and the Kuppermann index. The extracts were

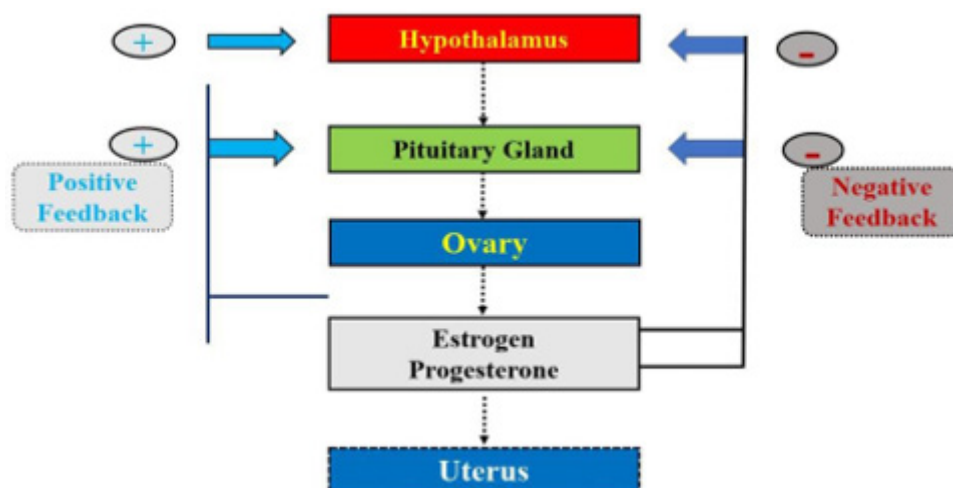


Figure 1: Physiology of menopause.

taken orally for 8 weeks, and two groups were formed from the participants. The results suggest that pomegranate extracts may be beneficial for menopause women, as they can help reduce menopause symptoms and improve overall health (Kim *et al.*, 2010).

Evening Primrose

Oenothera biennis L., Primroses in the evening, belongs to the Onagraceae family of plants. The oil derived from this plant's seeds contains a variety of unsaturated fatty acids, including linoleic and gamma linoleic acids. It has been demonstrated that this oil is frequently used to treat menopausal symptoms, dermatitis, psoriasis, rheumatic diseases, and premenstrual syndrome (Safdari *et al.*, 2021). Motaghi *et al.* study found that evening primrose, a phytoestrogen, can effectively reduce physical symptoms in postmenopausal women. The study found that evening primrose reduced flushing, sleep disorders, and Musculo-skeletal disorders compared to placebo. This suggests evening primrose as a complementary therapy or alternative to hormone replacement methods (Motaghi Dastenaie *et al.*, 2017).

EstroG-100

Estro-G is a blend of extracts from the herbs *Angelica gigas*, *Phlomis umbrosa*, and *Cynanchum wilfordii*. Menopausal women can use it to treat vasomotor symptoms, paraesthesia, sleeplessness, anxiety, vertigo, exhaustion, rheumatic pain, formication, and vaginal dryness (Chang *et al.*, 2012). Kirubamani *et al.* study, evaluated EstroG-100 effectiveness and safety in treating menopausal symptoms in Symptoms significantly improved among Indian ladies, from baseline to 12 weeks. The treatment was safe and effective, with 96.5% of patients satisfied. The treatment successfully reduced menopausal symptoms and was well tolerated., highlighting the need for alternative therapies without extended clinical application of hormone replacement treatment (Kirubamani *et al.*, 2023).

Lavandula angustifolia

Lavender, a plant with active compounds like linalool, lavandulol, coumarin, and terpinen-4-ol, has a sedative effect similar to narcotics. It improves sleep disorders through blocking acetylcholine secretion and receptors for gamma-aminobutyric acid in the central nervous system. Lavender also alleviates hot flashes in menopausal women by decreasing stress hormone and stimulating beta-endorphin secretion (Aarshageetha *et al.*, 2023). In their study, Reis Lucena *et al.* assessed the inhaling essential oil of *Lavandula angustifolia* affected the sleep and menopausal symptoms of insomnia in postmenopausal women. The results showed improvements in wake after sleep onset, sleep quality, and postmenopausal symptoms (Dos *et al.*, 2021).

Hypericum perforatum

The herbal plant known as St. John's wort, or *Hypericum perforatum*, possesses antidepressant and analgesic properties. It contains flavonol derivatives, biflavones, proanthocyanidines, xanthones, phloroglucinols, and naphthodianthrone, which can treat mild to moderate depression and hot flashes in postmenopausal women (Eatemadnia *et al.*, 2019). Abdali *et al* study in Iran compared potential efficiency with St. John's wort extract in treating women's Compared to a placebo, hot flashes. The average age of the 100 women who participated in the study was 50.4 years old. The frequency, duration, and intensity of hot flashes varied significantly between the two groups, according to the results. The frequency and intensity of flashes decreased after taking St. John's wort; the impact was most noticeable during

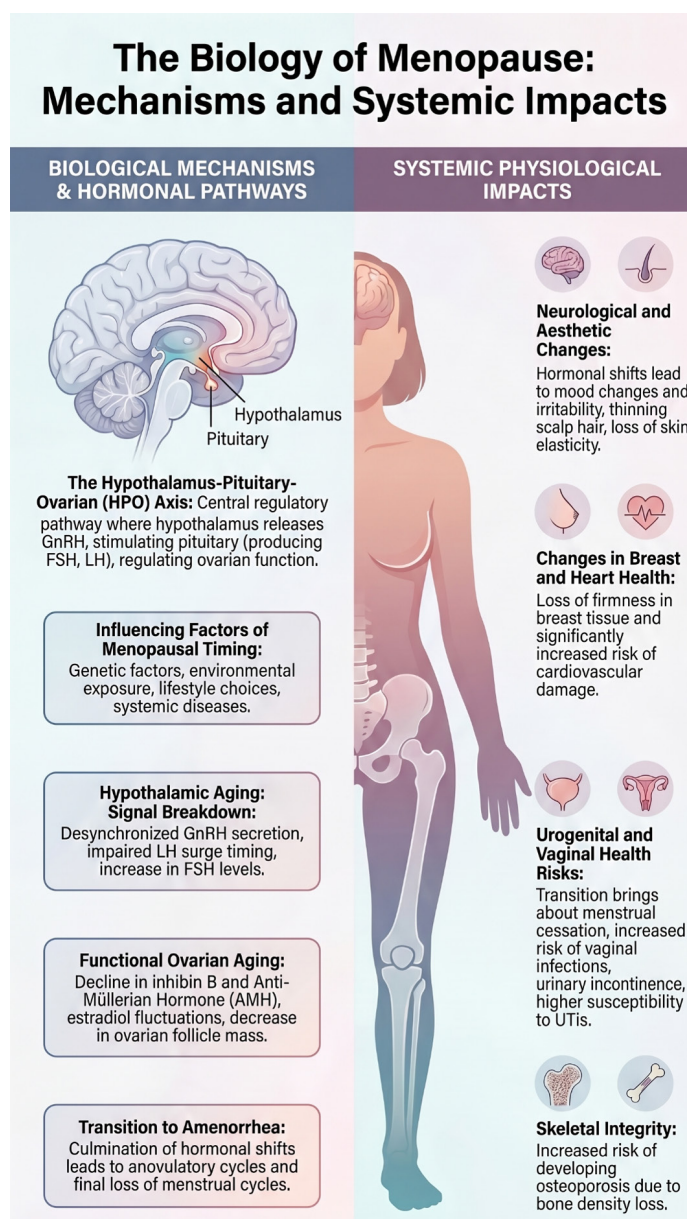


Figure 2: Etiology and hormonal regulation of menopause in women. And various menopausal symptoms in women.

Table 2: The drug interaction of herbal supplements.

Sl. No.	Herbal supplements	Potential interaction	Drugs involved	Mechanism of interaction	Clinical implications	References
1.	Black Cohosh	Increased risk of liver damage	Atorvastatin (Lipitor), Acetaminophen (Tylenol), Alcohol, disulfiram (Antabuse), Leflunomide (Arava), Carbamazepine	Potential hepatotoxicity	Monitor liver function, avoid or limit use of drugs, monitor the therapeutic efficacy.	(Patel and Derkits, 2007)
2.	Flax seed	Enhanced blood pressure lowering effect	Antihypertensive medication	Additive effect leading to lower blood pressure	Monitor blood pressure to avoid hypotension, dosage adjustments may be necessary	(Toulabi <i>et al.</i> , 2022)
3.	St. John's Wort	Reduced drug efficacy	Antidepressants, oral contraceptives, anticoagulants, Immunosuppressants	Induce cytochrome P450 enzymes, increasing drug metabolism	Decreased therapeutic effect of medications	(Pakseresht <i>et al.</i> , 2012)
4.	Evening primrose oil	Increased bleeding risk, seizure risk	Anticoagulants (e.g. Warfarin), Antiplatelet (e.g. Aspirin, clopidogrel)	It may have blood thinning properties, potentially enhancing the effects of these medications	Increased risk of bleeding, Caution advised when combined with these drugs	(Agbabiaka <i>et al.</i> , 2018)
5.	Valerian root	Increased sedation	Sedatives (e.g. benzodiazepines like alprazolam), barbiturates, sleep aids, alcohol	Valerian may enhance sedative effects of these substances leading to excessive drowsiness or sedation	Increased risk of drowsiness or sedation; avoid combining other sedatives or alcohol	(Mirabi and Mojab, 2013)

weeks four and eight. The study suggests that St John's wort can successfully cure vasomotor symptoms in perimenopausal or postmenopausal women (Abdali *et al.*, 2010).

Valerian Root

The Valerianaceae family includes Valerian (*Valeriana officinalis*), which is grown in Iran. Herbal remedies containing valerian rhizomes and roots are used to treat menopausal symptoms, anxiety, depression, stress, dizziness, and neural pain and unilateral headaches. Valerian contains phytoestrogen compounds, according to earlier research. Valerian's effects on menopausal problems are now being investigated in a number of clinical research (Jenabi *et al.*, 2023). Jenabi *et al.* study in Hamadan, Iran, investigated the impact of Valerian on postmenopausal women's hot flashes. Two sets of participants were created: one for valerian and one for a placebo. According

to the study, Valerian considerably decreased the frequency and intensity of hot flashes, indicating that it could be a useful therapy for menopausal women (Jenabi *et al.*, 2017).

Flaxseed

Flaxseed is a well-known and plentiful source of phytoestrogens (*Linum usitatissimum*), a plant of genus *Linum* and family *Linaceae*. In past, menopausal symptoms have been treated using *Linum usitatissimum* oil. Numerous preclinical and clinical studies have also indicated that this plant may help with postmenopausal symptoms (Goyal *et al.*, 2014). It is a rich source of lignan, particularly Secoisolariciresinol (SECO), which has been studied in nutrition and disease due to its physiologically active components. Plants and plant-derived products contain diphenolic compounds, also known as phytoestrogens, with estrogenic or antiestrogenic properties. Lignans, a type of

phytoestrogen with weak estrogenic properties, may help alleviate symptoms of perimenopausal syndrome (Shayan *et al.*, 2020). In Kawa *et al* study, the effects of *Linum usitatissimum* (Flaxseeds) on menopausal symptoms, include bone pain, hot flashes, vaginal dryness, and sweats at nights, were assessed. In this study, menopausal women were given 1000 mg of powdered flaxseed orally twice a day for six weeks. *Linum usitatissimum* seed powder was found to considerably improve menopausal women's hot flashes, bone discomfort, vaginal dryness, and night sweats (Kawa *et al.*, 2023).

Lepidium meyenii

Since ancient times, the Andean herb maca has been used to treat female hormone balance, anaemia, and infertility. Bioactive ingredients found in maca include fatty acids, sterols, alkaloids, glucosinolates, minerals, and vitamins whereas glucosinolates can operate as antioxidants and free radical scavengers also maca alkaloids have anti-sterility properties. According to clinical investigations, it could help postmenopausal women with their menopausal symptoms (Lee *et al.*, 2011). Brooks *et al* study involving postmenopausal women found that 3.5 g/d of *Lepidium meyenii* (Maca) decreased anxiety, psychological symptoms, depression, and sexual dysfunction in postmenopausal women. The study suggests that Maca may be an effective treatment for postmenopausal symptoms (Brooks *et al.*, 2008). Figure 3 shows various herbal supplements used in regulating menopausal symptoms.

Integrating Herbal Supplements with Lifestyle Changes

Many lifestyle variables can lower the likelihood of acquiring all the diseases (tumors, osteoporosis, type 2 diabetes, cardiovascular disease, and insulin resistance) and symptoms that are typical of the perimenopausal and menopausal phases (Bermingham *et al.*, 2022). There is mounting evidence that menopausal symptoms and overall health are significantly impacted by lifestyle choices like diet, exercise, smoking, and alcohol use. Women gain 10 kg on average between 40 and 60 years of age, regardless of menopause. Women are advised to control health risks and avoid excessive weight gain by, among other things, establishing a diet that complies with national dietary requirements and engaging in regular exercise (Rees *et al.*, 2022).

Balanced Nutrition

At each phase of life, a person's health is determined by the quality of their nutrition. There is now enough evidence to support its involvement in the emergence of chronic, non-infectious disorders (Anne Simpson *et al.*, 2024). Consequently, a dietitian's intervention is a crucial component of preventive when it comes to nutrition. A healthy diet can reduce menopausal and perimenopausal symptoms and help prevent a number of chronic illnesses, including as diabetes, heart disease, and numerous types of cancer (Ojo and Adegboye, 2023). Many diets, including the Mediterranean-style diet and the very low in calories diet (VLCD-1200 kcal/day), are beneficial for managing weight and chronic non-infectious disorders. Micronutrient deficiencies

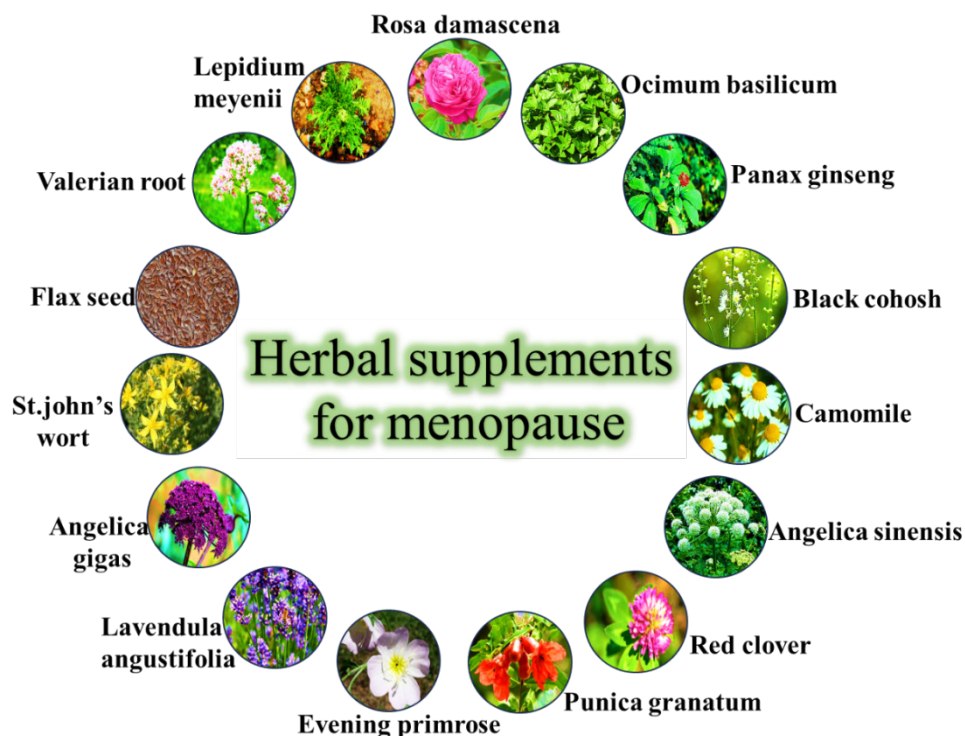


Figure 3: Various herbal supplements used in regulating menopausal symptoms.

from diets with fewer than 1200 kcal per day may have a detrimental impact on both weight management and nutritional status. Consequently, VLCDs and Low-Calorie Diets (LCDs) are only applied in clinical settings. Individuals can manage balanced hypocaloric diets, which may increase their chances of long-term success (Yumuk *et al.*, 2015).

Exercise Regularly

The kind, level of intensity, frequency, and length of exercise that various studies have examined varies greatly. It is reasonable to believe that various forms of exercise, such as yoga, running, and weightlifting, may have distinct effects (Sapre and Thakur, 2014). Therefore, whereas several investigations have shown that exercise can alleviate symptoms, other studies have not reached the same conclusion (Stojanovska *et al.*, 2014). Compared to other menopausal symptoms, there may be less evidence linking exercise to vasomotor and sexual difficulties. Exercise is undoubtedly still a vital component of a healthy lifestyle, even if we are unable to determine if it is equally effective for all menopausal symptoms. There are no real drawbacks unless you count the possibility of harm; it promotes general long-term well-being and is essential for bones, cardiovascular, metabolic, psychological in nature and immunological health (Sternfeld *et al.*, 2017).

Safety and Drug Interactions of Herbal Supplements

When considering herbal supplements for menopausal symptoms, it is necessary to evaluate its safety and potential drug interactions. Even though a lot of herbal medicines, like evening primrose oil, red clover, and black cohosh, are frequently used to treat symptoms like mood swings and hot flashes, they might not be appropriate for everyone. Certain herbs may interfere with prescription drugs, reducing their effectiveness or producing negative side effects. For example, black cohosh may interfere with liver function and interact with medications metabolized by the liver, such as certain antidepressants or anti-anxiety drugs (Bunchorntavakul and Reddy, 2013). Similarly, red clover, which contains phytoestrogens, may interact with Hormone Replacement Therapy (HRT) or other estrogen-based medications, potentially leading to adverse hormonal effects. It is essential for individuals to seek advice from medical professionals' providers before using herbal supplements, particularly if they are already taking medications for chronic conditions, to ensure safety and avoid harmful interactions. Additionally, the quality and potency of herbal supplements can vary, and some products may be contaminated with heavy metals or other toxic substances, posing additional health risks (Beck *et al.*, 2005). As such, proper regulation and guidance are needed when incorporating herbal supplements into the management of menopausal symptoms. Certain herbal supplements have been associated with adverse effects. One of the most popular herbs for menopausal symptoms is black cohosh., has been linked to liver toxicity in some cases, prompting caution

in individuals with pre-existing liver conditions (Muqet *et al.*, 2014). Evening primrose oil, often used for hot flashes, may cause gastrointestinal discomfort, headaches, or allergic reactions in sensitive individuals (Mahboubi, 2019). Table 2 provides the drug interaction of herbal supplements. Furthermore, some herbal supplements can have blood-thinning effects, increasing the risk of bleeding, especially when taken with anticoagulant medications like warfarin (Ge *et al.*, 2014). Many herbal supplements contain bioactive compounds that can interfere with the metabolism and function of prescription drugs. Phytoestrogen-containing herbs, such as red clover and soy isoflavones, may exert estrogen-like effects in the body, potentially interfering with Hormone Replacement Therapy (HRT) or tamoxifen, a medication used for hormone-sensitive breast cancer (Fritz *et al.*, 2013). Additionally, St. John's wort is a strong inducer of cytochrome P450 enzymes, which can enhance the metabolism of a variety of medications including antidepressants, birth control pills, and anticoagulants, potentially reducing their effectiveness and it is occasionally used to stabilise mood during menopause (Coppock and Dziwenka, 2021). To minimize risks, individuals considering herbal supplements for menopausal symptoms should consult healthcare professionals before use, particularly if they are taking prescription drugs or have underlying medical issues. The products from reliable manufacturers who follows Good Manufacturing Practices (GMP) and have third-party testing for quality assurance are recommended (Fu *et al.*, 2009). Healthcare providers should also monitor patients for potential side effects or interactions, adjusting treatment plans accordingly. Ultimately, while herbal supplements can provide symptom relief for some individuals, their use should be approached with caution, and scientific evidence supporting their safety and efficacy should be continuously evaluated (Hassen *et al.*, 2022).

Regulation and Quality Control of Herbal Supplements

Herbal supplements are widely used as alternative or complementary therapies for managing menopausal symptoms, such as mood swings, sleep problems, and hot flashes. While many of these products are derived from plant-based sources such as black cohosh, red clover, and soy isoflavones, variations in their composition and bioactive compounds can significantly impact their safety and efficacy. Therefore, stringent regulation and quality control are essential to ensure that these supplements provide consistent therapeutic benefits while minimizing risks (Parveen *et al.*, 2015). Unlike pharmaceutical drugs, herbal supplements for menopause are often classified as dietary supplements in many regions, including the Food and Drug Administration (FDA) of the United States is in charge of regulating them. through the Dietary Supplement Health and Education Act (DSHEA). This classification exempts them from the rigorous pre-market approval process required for prescription medications. However, manufacturers must adhere to Good Manufacturing Practices

(GMP), ensuring product consistency, accurate labeling, and contamination-free formulations. In contrast, the European Medicines Agency (EMA) and other regulatory bodies in countries like Australia and Canada impose stricter controls on herbal medicines, requiring evidence of safety, quality, and in some cases, clinical efficacy (Bandaranayake, 2006).

Quality control plays a crucial role in ensuring that herbal supplements for menopause contain the correct plant species, standardized levels of active compounds, and are devoid of dangerous pollutants like pesticides, heavy metals, and microbiological poisons. The various analytical methods like Gas Chromatography-Mass Spectrometry (GC-MS), High-Performance Liquid Chromatography (HPLC), and DNA barcoding are commonly used to authenticate botanical ingredients and detect adulteration. Stability testing is also necessary to confirm the product's potency and shelf life over time (Klein-Junior *et al.*, 2021).

Another critical aspect of regulation involves monitoring potential drug-herb interactions, as menopausal women may also be taking Hormone Replacement Therapy (HRT) or other medications. Certain herbal supplements, such as soy isoflavones, which contain phytoestrogens, may interact with estrogen-based treatments or influence hormone-sensitive conditions. Post-market surveillance and adverse event reporting systems help regulatory agencies track and address any safety concerns that arise after these products are available to consumers (Liang *et al.*, 2004). Despite regulatory efforts, challenges remain in ensuring the uniform quality and efficacy of herbal menopause supplements due to variations in regulatory frameworks across countries, lack of standardization in herbal formulations, and misleading marketing claims. Strengthening global harmonization of herbal medicine regulations, increasing clinical research on herbal therapies, and promoting consumer education on product safety are essential to improving the reliability and credibility of these supplements. By implementing robust regulatory oversight and quality control measures, the safety and effectiveness of herbal supplements for menopause can be better assured, ultimately benefiting women's health and well-being (Sahoo *et al.*, 2010).

Future Directions

Despite the growing interest in herbal supplements for managing menopausal symptoms, several important research gaps remain. Although many plant-based therapies have demonstrated promising results in alleviating vasomotor symptoms, mood disturbances, and sleep disorders, the available evidence is often limited by small sample sizes, short study durations, and variations in herbal formulations. Future research should prioritize large-scale, well-designed randomized controlled clinical trials to establish the efficacy, safety, and optimal dosage of commonly used herbal supplements. Standardization of herbal

extracts and identification of active phytoconstituents are also essential to ensure consistent therapeutic outcomes.

Furthermore, the mechanisms underlying the phytoestrogenic and neuroprotective actions of herbal compounds require deeper investigation using advanced molecular and pharmacological approaches. Long-term safety evaluations and comprehensive assessments of herb-drug interactions are particularly important, especially for women receiving conventional pharmacological therapies. In addition, improvements in regulatory frameworks and quality control standards are necessary to guarantee the purity, potency, and safety of herbal products. Integrating evidence-based herbal medicine into menopausal care may provide safer complementary treatment options and enhance the overall quality of life for menopausal women.

CONCLUSION

Herbal supplements have emerged as a promising alternative for alleviating menopause symptoms, offering natural relief for issues such as mood swings, sleep difficulties, hot flashes, and night sweats. Many plant-based compounds, including phytoestrogens from soy and red clover, as well as bioactive constituents from black cohosh and evening primrose oil, have demonstrated potential benefits in menopausal symptom management. However, variations in plant composition, extraction methods, and individual physiological responses contribute to inconsistencies in their therapeutic effects. Despite their growing popularity, the regulation and quality control of herbal supplements remain a challenge. Differences in regulatory frameworks across countries, a lack of standardization in active ingredient concentrations, and the presence of contaminants or adulterants raise concerns regarding safety and efficacy. Strengthening regulatory oversight, enforcing Good Manufacturing Practices (GMP), and conducting rigorous scientific evaluations through clinical trials are essential to ensuring that herbal menopause supplements are both safe and effective. Establishing precise dosage recommendations, long-term safety profiles, and possible herb-drug interactions will require more investigation particularly for women using hormone replacement therapy or other medications. Healthcare professionals should provide evidence-based guidance to menopausal women considering herbal supplements, ensuring informed decision-making and safe integration into their wellness plans. With continued advancements in research, regulation, and consumer education, herbal supplements can serve as valuable tools in holistic menopause management, improving the quality of life for many women.

ACKNOWLEDGEMENT

The authors acknowledge the support of Saveetha College of Pharmacy for providing academic resources necessary for this review.

ABBREVIATIONS

FSH: Follicle-Stimulating Hormone; **LH:** Luteinizing Hormone; **HRT:** Hormone Replacement Therapy; **QOL:** Quality of Life; **FDA:** Food and Drug Administration; **EMA:** European Medicines Agency.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

SUMMARY

Menopause is a natural biological transition in women characterized by a decline in ovarian hormone production, often accompanied by symptoms such as hot flashes, night sweats, mood disturbances, sleep disorders, and reduced bone density. These symptoms can significantly affect the quality of life of many women. Although hormone replacement therapy remains an effective treatment, concerns regarding its long-term safety have encouraged the exploration of alternative therapeutic approaches. Herbal supplements have gained increasing attention due to their potential to provide symptom relief with fewer adverse effects.

This review highlights the role of several commonly used herbal supplements, including *Panax ginseng*, *Cimicifuga racemosa*, *Trifolium pratense*, *Linum usitatissimum*, and *Oenothera biennis*, in alleviating menopausal symptoms. Many of these herbs exhibit phytoestrogenic, antioxidant, and anti-inflammatory properties that may contribute to their therapeutic effects. The review also discusses safety considerations, potential herb-drug interactions, and the importance of quality control and regulatory oversight for herbal products. Although current evidence suggests promising benefits, further well-designed clinical studies and standardized herbal formulations are necessary to ensure their efficacy and safety in menopause management.

REFERENCES

- Aarshageetha, P., Rani Janci, P. R., and Devi Tharani, N. (2023). Role of alternate therapies to improve the quality of life in menopausal women: A systematic review. In *Journal of Mid-Life Health* (Vol. 14, Number 3). https://doi.org/10.4103/jmh.jmh_222_22
- Abdali, K., Khajehei, M., and Tabatabaee, H. R. (2010). Effect of St John's wort on severity, frequency, and duration of hot flashes in premenopausal, perimenopausal and postmenopausal women: a randomized, double-blind, placebo-controlled study. *Menopause*, 17(2). https://journals.lww.com/menopausejournal/fulltext/2010/17020/effect_of_st_john_s_wort_on_severity_frequency_20.aspx
- Adel-Mehraban, M. S., Tansaz, M., Mohammadi, M., and Yavari, M. (2022). Effects of pomegranate supplement on menopausal symptoms and quality of life in menopausal women: A double-blind randomized placebo-controlled trial. *Complementary Therapies in Clinical Practice*, 46. <https://doi.org/10.1016/j.ctcp.2022.101544>
- Agbabiaka, T. B., Spencer, N. H., Khanom, S., and Goodman, C. (2018). Prevalence of drug-herb and drug-supplement interactions in older adults: A cross-sectional survey. In *British Journal of General Practice* (Vol. 68, Number 675). <https://doi.org/10.3399/bjgp18X699101>
- Anne Simpson, E. E., Doherty, J., and Timlin, D. (2024). Menopause as a window of opportunity: the benefits of designing more effective theory-driven behaviour change interventions to promote healthier lifestyle choices at midlife. *Proceedings of the Nutrition Society*, 83(2). <https://doi.org/10.1017/S0029665123004810>
- Askari, V. R., Rahimi, V. B., Ghorbani, A., and Rakhshandeh, H. (2016). Hypnotic effect of *Ocimum Basilicum* on pentobarbital-induced sleep in mice. *Iranian Red Crescent Medical Journal*, 18(7). <https://doi.org/10.5812/ircmj.24261>
- Bairy, L., Adiga, S., Bhat, P., and Bhat, R. (2009). Prevalence of menopausal symptoms and quality of life after menopause in women from South India. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 49(1). <https://doi.org/10.1111/j.1479-828X.2009.00955.x>
- Bandaranayake, W. M. (2006). Quality Control, Screening, Toxicity, and Regulation of Herbal Drugs. In *Modern Phytomedicine: Turning Medicinal Plants into Drugs*. <https://doi.org/10.1002/9783527609987.ch2>
- Bauer, J. L., and Santoro, N. F. (2018). The Menopause Transition: Physiology, Definition, Symptoms, Diagnosis, and Evaluation. *DeckerMed Obstetrics and Gynecology*. <https://doi.org/10.2310/obg.19103>
- Beck, V., Rohr, U., and Jungbauer, A. (2005). Phytoestrogens derived from red clover: An alternative to estrogen replacement therapy? *Journal of Steroid Biochemistry and Molecular Biology*, 94(5). <https://doi.org/10.1016/j.jsmb.2004.12.038>
- Bermingham, K. M., Linenberg, I., Hall, W. L., Kadé, K., Franks, P. W., Davies, R., Wolf, J., Hadjigeorgiou, G., Asnicar, F., Segata, N., Manson, J. A. E., Newson, L. R., Delahanty, L. M., Ordoas, J. M., Chan, A. T., Spector, T. D., Valdes, A. M., and Berry, S. E. (2022). Menopause is associated with postprandial metabolism, metabolic health and lifestyle: The ZOE PREDICT study. *EBioMedicine*, 85. <https://doi.org/10.1016/j.ebiom.2022.104303>
- Bosak, Z., Iravani, M., Moghimipour, E., Hoseini Haghighizadeh, M., Jelodarian, P., and Khazdair, M. R. (n.d.). Evaluation of the influence of chamomile vaginal gel on dyspareunia and sexual satisfaction in postmenopausal women: A randomized, double-blind, controlled clinical trial. In *Original Research Article AJP* (Vol. 10, Number 5).
- Bower-Cargill, C., Yarandi, N., and Petróczy, A. (2022). A systematic review of the versatile effects of the Peruvian Maca Root (*Lepidium meyenii*) on sexual dysfunction, menopausal symptoms and related conditions. *Phytomedicine Plus*, 2(4), 100326. <https://doi.org/https://doi.org/10.1016/j.phyplu.2022.100326>
- Brooks, N. A., Wilcox, G., Walker, K. Z., Ashton, J. F., Cox, M. B., and Stojanovska, L. (2008). Beneficial effects of *Lepidium meyenii* (Maca) on psychological symptoms and measures of sexual dysfunction in postmenopausal women are not related to estrogen or androgen content. *Menopause*, 15(6). https://journals.lww.com/menopausejournal/fulltext/2008/15060/beneficial_effects_of_lepidium_meyenii_maca_on.24.aspx
- Bunchornravakul, C., and Reddy, K. R. (2013). Review article: Herbal and dietary supplement hepatotoxicity. In *Alimentary Pharmacology and Therapeutics* (Vol. 37, Number 1). <https://doi.org/10.1111/apt.12109>
- Chang, A., Kwak, B. Y., Yi, K., and Kim, J. S. (2012). The effect of herbal extract (EstroG-100) on pre-, peri- and post-menopausal women: A randomized double-blind, placebo-controlled study. *Phytotherapy Research*, 26(4). <https://doi.org/10.1002/ptr.3597>
- Comhaire, F., and Depypere, H. (2015). Herbal preparations and food supplements in the menopause. *Tijdschrift Voor Geneeskunde*, 71(1).
- Coppock, R. W., and Dziwenka, M. (2021). St John's wort (*Hypericum perforatum* L.). In *Nutraceuticals: Efficacy, Safety and Toxicity*. <https://doi.org/10.1016/B978-0-12-821038-3.00040-9>
- Crandall, C. J., Mehta, J. M., and Manson, J. E. (2023). Management of Menopausal Symptoms: A Review. In *JAMA* (Vol. 329, Number 5). <https://doi.org/10.1001/jama.2022.24140>
- Dalal, P. K., and Agarwal, M. (2015). Postmenopausal syndrome. In *Indian Journal of Psychiatry* (Vol. 57). <https://doi.org/10.4103/0019-5545.161483>
- Davis, S. R., Pinkerton, J. A., Santoro, N., and Simoncini, T. (2023). Menopause-Biology, consequences, supportive care, and therapeutic options. In *Cell* (Vol. 186, Number 19). <https://doi.org/10.1016/j.cell.2023.08.016>
- Devaraji, M., and Thanikachalam, P. V. (2025). Phytoconstituents as emerging therapeutics for breast cancer: Mechanistic insights and clinical implications. *Cancer Pathogenesis and Therapy*. <https://doi.org/10.1016/J.CPT.2025.02.006>
- Devaraji, M., Thanikachalam, P. V., AS, R., S., R., and J. B. (2024). Microwave-assisted synthesis of copper oxide nanoparticles using an *Andrographis paniculata* leaf extract: Characterization and multifunctional biological activities. *Nano-Structures and Nano-Objects*, 40, 101376. <https://doi.org/10.1016/J.NANOSO.2024.101376>
- Dizaye, K., Adeeb, D., and Marouf, B. (2023). Effects of flaxseed (*Linum usitatissimum*) on climacteric symptoms and clinical parameters in post-menopausal women: Flaxseed effects on menopause associated symptoms and biochemical parameters. *Iraqi Journal of Pharmaceutical Sciences (P-ISSN 1683 - 3597 E-ISSN 2521 - 3512)*, 32, 257-265. <https://doi.org/10.31351/vol32iss1pp257-265>
- dos Reis Lucena, L., dos Santos-Junior, J. G., Tufik, S., and Hachul, H. (2021). Lavender essential oil on postmenopausal women with insomnia: Double-blind randomized trial. *Complementary Therapies in Medicine*, 59. <https://doi.org/10.1016/j.ctim.2021.102726>
- Eatemadnia, A., Ansari, S., Abedi, P., and Najari, S. (2019). The effect of *Hypericum perforatum* on postmenopausal symptoms and depression: A randomized controlled trial. *Complementary Therapies in Medicine*, 45, 109-113. <https://doi.org/https://doi.org/10.1016/j.ctim.2019.05.028>
- Ee, C., Xue, C., Chondros, P., Myers, S. P., French, S. D., Teede, H., and Pirodda, M. (2016). Acupuncture for Menopausal Hot Flashes: A Randomized Trial. *Annals of Internal Medicine*, 164(3).
- Ehsanpour, S., Salehi, K., Zolfaghari, B., and Bakhtiari, S. (2012). The effects of red clover on quality of life in post-menopausal women. *Iranian Journal of Nursing and Midwifery Research*, 17(1).

- Elumalai, K., Srinivasan, S., and Shanmugam, A. (2024). Review of the efficacy of nanoparticle-based drug delivery systems for cancer treatment. In *Biomedical Technology* (Vol. 5). <https://doi.org/10.1016/j.bmt.2023.09.001>
- Farzaneh, F., Fallah, G., Khalili-chelik, A., Fallah, A., and Hosseini, M. (2024). Estro G-100 herbal extract and hot flashes in postmenopausal women: A randomized double-blind controlled trial. *Explore*, 20(3). <https://doi.org/10.1016/j.explore.2023.09.004>
- Francesco, C., Annamaria, G., and Angelamaria, B. (2012). Herbal drugs and food supplements in menopause. *European Journal of Integrative Medicine*, 4. <https://doi.org/10.1016/j.eujim.2012.07.594>
- Fritz, H., Seely, D., Flower, G., Skidmore, B., Fernandes, R., Vadeboncoeur, S., Kennedy, D., Cooley, K., Wong, R., Sagar, S., Sabri, E., and Fergusson, D. (2013). Soy, red clover, and isoflavones and breast cancer: A systematic review. *PLoS ONE*, 8(11). <https://doi.org/10.1371/journal.pone.0081968>
- Fu, P. P., Chiang, H. M., Xia, Q., Chen, T., Chen, B. H., Yin, J. J., Wen, K. C., Lin, G., and Yu, H. (2009). Quality assurance and safety of herbal dietary supplements. *Journal of Environmental Science and Health - Part C Environmental Carcinogenesis and Ecotoxicology Reviews*, 27(2). <https://doi.org/10.1080/10590500902885676>
- Gatenby, C., and Simpson, P. (2024). Menopause: Physiology, definitions, and symptoms. In *Best Practice and Research: Clinical Endocrinology and Metabolism* (Vol. 38, Number 1). <https://doi.org/10.1016/j.beem.2023.101855>
- Ge, B., Zhang, Z., and Zuo, Z. (2014). Updates on the clinical evidenced herb-warfarin interactions. In *Evidence-based Complementary and Alternative Medicine* (Vol. 2014). <https://doi.org/10.1155/2014/957362>
- Ghazanfarpour, M., Sadeghi, R., Latifnejad Roudsari, R., Mirzainajmabadi, K., Abdollahian, S., and Khadivzadeh, T. (2015). Effects of red clover on hot flash and circulating hormone concentrations in menopausal women: a systematic review and meta-analysis. *Avicenna Journal of Phytomedicine*, 5, 498-511.
- Gholinezhad, Z., Karimi, F., Rakhshandeh, H., and Mazloum, S. (2024). Impact of *Rosa damascena* extract capsule on the sexual function of menopausal women: A randomized clinical trial. *EXPLORE*, 21, 103082. <https://doi.org/10.1016/j.explore.2024.103082>
- Gholinezhad, Z., Karimi, F. Z., Rakhshandeh, H., and Mazloum, S. R. (2025). Impact of *Rosa damascena* extract on improving menopausal symptoms: A randomized clinical trial. *Advances in Integrative Medicine*. <https://doi.org/https://doi.org/10.1016/j.aimed.2025.01.007>
- Ghorbani, Z., Mirghafourvand, M., Charandabi, S. M. A., and Javadzadeh, Y. (2019). The effect of ginseng on sexual dysfunction in menopausal women: A double-blind, randomized, controlled trial. *Complementary Therapies in Medicine*, 45. <https://doi.org/10.1016/j.ctim.2019.05.015>
- Gościński, A., Zsulc, P., Zielewicz, W., Walkowiak, J., and Cielecka-Piontek, J. (2023). Multidirectional Effects of Red Clover (*Trifolium pratense* L.) in Support of Menopause Therapy. *Molecules*, 28(13). <https://doi.org/10.3390/molecules28135178>
- Goyal, A., Sharma, V., Upadhyay, N., Gill, S., and Sihag, M. (2014). Flax and flaxseed oil: an ancient medicine and modern functional food. *Journal of Food Science and Technology*, 51, 1633-1653. <https://doi.org/10.1007/s13197-013-1247-9>
- Guida, M., Raffone, A., Travaglino, A., Neola, D., Reppuccia, S., Borgo, M., Vitale, C., Limone, A., D'Alessandro, P., Massaro, G., and Mollo, A. (2021). *Cimicifuga racemosa* isopropyl extract for menopausal symptoms: an observational prospective case-control study. *Gynecological Endocrinology*, 37(12). <https://doi.org/10.1080/09513590.2021.1974381>
- Hachul, H., Bittencourt, L. R. A., Soares, J. M., Tufik, S., and Baracat, E. C. (2009). Sleep in post-menopausal women: Differences between early and late post-menopause. *European Journal of Obstetrics and Gynecology and Reproductive Biology*, 145(1). <https://doi.org/10.1016/j.ejogrb.2009.03.019>
- Haramshahi, M., Babaie, S., Shahnazi, M., Kafil, B., Farshbaf-Khalili, A., and Naghdi, M. (2024). The efficacy of oral *Lavandula angustifolia* Mill. essential oil on menopausal symptoms, serum lipid profile, and cortisol concentration in postmenopausal women: A triple-blind, randomized, controlled trial. *Complementary Therapies in Medicine*, 82, 103050. <https://doi.org/https://doi.org/10.1016/j.ctim.2024.103050>
- Hassen, G., Belete, G., Carrera, K. G., Iriowen, R. O., Araya, H., Alemu, T., Solomon, N., Bam, D. S., Nicola, S. M., Araya, M. E., Debele, T., Zouetr, M., and Jain, N. (2022). Clinical Implications of Herbal Supplements in Conventional Medical Practice: A US Perspective. *Cureus*. <https://doi.org/10.7759/cureus.26893>
- Ilankoon, I. M. P. S., Samarasinghe, K., and Elgán, C. (2021). Menopause is a natural stage of aging: a qualitative study. *BMC Women's Health*, 21(1). <https://doi.org/10.1186/s12905-020-01164-6>
- J, N., E, K., and S, R. (2024). "Green synthesis of zinc oxide nanoparticles: Eco-friendly advancements for biomedical marvels." In *Resources Chemicals and Materials* (Vol. 3, Number 4). <https://doi.org/10.1016/j.recrm.2024.05.001>
- Jayaprakash, N., Arumugam, S., Paramasivam, B., Narasimhan Kuppasamy, S. T., Jayaraman, S., Venkatesan, P., Rajendran, S., and Elumalai, K. (2025). Formulation and Characterization of a Polyherbal Sunscreen Containing *Camellia sinensis*, *Vitis vinifera*, and *Silybum marianum* Extracts. *Pharmacognosy Research*, 17(3). <https://doi.org/10.5530/pres.20252128>
- Jenabi, E., Khazaei, S., Aghababaei, S., and Moradkhani, S. (2023). Effect of Fennel-Valerian Extract on Hot Flashes and Sleep Disorders in Postmenopausal Women: A Randomized Trial. *J Menopausal Med*, 29(1), 21-28. <https://doi.org/10.6118/jmm.22026>
- Jenabi, E., Shobeiri, F., Hazavehei, S., and Roshanaei, G. (2017). The Effect of Valerian on Severity and Frequency of Hot Flashes: A Triple- Blind Randomized Clinical Trial. *Women and Health*, 58. <https://doi.org/10.1080/03630242.2017.1296058>
- Jeong, H. G., and Park, H. (2022). Metabolic Disorders in Menopause. In *Metabolites* (Vol. 12, Number 10). <https://doi.org/10.3390/metabo12100954>
- Jun, J. H., Lee, H. W., Choi, J., Choi, T.-Y., Lee, J. A., Go, H.-Y., and Lee, M. S. (2019). Perceptions of using herbal medicines for managing menopausal symptoms: a web-based survey of Korean medicine doctors. *Integrative Medicine Research*, 8(4). <https://doi.org/10.1016/j.imr.2019.08.004>
- Kalhan, M., Singhanian, K., Choudhary, P., Verma, S., Kaushal, P., and Singh, T. (2020). Prevalence of menopausal symptoms and its effect on quality of life among rural middle aged women (40-60 Years) of Haryana, India. *International Journal of Applied and Basic Medical Research*, 10(3). https://doi.org/10.4103/ijabmr.ijabmr_428_19
- Kargozar, R., Azizi, H., and Salari, R. (2017). A review of effective herbal medicines in controlling menopausal symptoms. *Electronic Physician*, 9(11). <https://doi.org/10.19192/5826>
- karimi, F., Hosseini, H., Mazlom, S., and Rakhshandeh, H. (2024). The effect of oral capsules containing *Ocimum basilicum* leaf extract on menopausal symptoms in women: a triple-blind randomized clinical trial. *European Journal of Medical Research*, 29. <https://doi.org/10.1186/s40001-024-01965-7>
- Kawa Dizaye, Adeeb Alchalabi, D., and Marouf, B. H. (2023). Effects of flaxseed (*Linum usitatissimum*) on climacteric symptoms and clinical parameters in post-menopausal women. *Iraqi Journal of Pharmaceutical Sciences (P-ISSN 1683 - 3597 E-ISSN 2521 - 3512)*, 32(1), 257-265. <https://doi.org/10.31351/vol32iss1pp257-265>
- Kazemi, F., Masoumi, S. Z., Shayan, A., and Oshvandi, K. (2021). The Effect of Evening Primrose Oil Capsule on Hot Flashes and Night Sweats in Postmenopausal Women: A Single-Blind Randomized Controlled Trial. *J Menopausal Med*, 27(1), 8-14. <https://doi.org/10.6118/jmm.20033>
- Kenda, M., Glavač, N. K., Nagy, M., and Dolenc, M. S. (2021). Herbal products used in menopause and for gynecological disorders. In *Molecules* (Vol. 26, Number 24). <https://doi.org/10.3390/molecules26247421>
- Kim, H. J., Kwon, D. H., and Kum, E. J. (2010). Effects of *Punica granatum* (pomegranate) extracts on the menopause women. *대한의생명과학회지*, 16(1), 53-64.
- Kirubamani, H., Ahire, P., and Stalin, C. (2023). Evaluation of Efficacy and Safety of EstroG-100™ in Alleviating Menopausal Symptoms in Postmenopausal Women in India: A Prospective, Single-center, Single-arm, Interventional Study. *Journal of Mid-Life Health*, 14(4). https://doi.org/10.4103/jmh.jmh_220_23
- Klein-Junior, L. C., De Souza, M. R., Viaene, J., Bresolin, T. M. B., De Gaspar, A. L., Henriques, A. T., and Heyden, Y. Vander. (2021). Quality Control of Herbal Medicines: From Traditional Techniques to State-of-the-art Approaches. In *Planta Medica* (Vol. 87, Numbers 12-13). <https://doi.org/10.1055/a-1529-8339>
- Koysonbat, K., McGown, P., Nyunt, S., Abbasa, A., and Dhillon, W. S. (2024). New advances in menopause symptom management. In *Best Practice and Research: Clinical Endocrinology and Metabolism* (Vol. 38, Number 1). <https://doi.org/10.1016/j.beem.2023.101774>
- Kupfersztain, C., Rotem, C., Fagot, R., and Kaplan, B. (2003). The immediate effect of natural plant extract, *Angelica sinensis* and *Matricaria chamomilla* (Climex) for the treatment of hot flushes during menopause. A preliminary report. *Clinical and Experimental Obstetrics and Gynecology*, 30, 203-206.
- Ledari, F., Agajani Delavar, M., Moghadamnia, A., Khafri, S., Behmanesh, F., and Yazdani, S. (2025). Efficacy and safety of *Matricaria chamomilla* intervention in managing menopausal symptoms: a triple-blind clinical trial. *Menopause*. <https://doi.org/10.1097/GME.0000000000002496>
- Lee, H. W., Ang, L., and Lee, M. S. (2022). Using ginseng for menopausal women's health care: A systematic review of randomized placebo-controlled trials. In *Complementary Therapies in Clinical Practice* (Vol. 48). <https://doi.org/10.1016/j.ctcp.2022.101615>
- Lee, M. S., Shin, B.-C., Yang, E. J., Lim, H.-J., and Ernst, E. (2011). Maca (*Lepidium meyenii*) for treatment of menopausal symptoms: A systematic review. *Maturitas*, 70(3), 227-233. <https://doi.org/https://doi.org/10.1016/j.maturitas.2011.07.017>
- Liang, Y. Z., Xie, P., and Chan, K. (2004). Quality control of herbal medicines. In *Journal of Chromatography B: Analytical Technologies in the Biomedical and Life Sciences* (Vol. 812, Numbers 1-2 SPEC. ISS.). <https://doi.org/10.1016/j.jchromb.2004.08.041>
- Mahalakshmi, D., J, N., Karthikeyan, E., Karthik, K. K., Sujaritha, J., Vandhana, V., and Lokeswar, R. (2025). Carbon nanomaterials for emerging contaminant remediation: Addressing pharmaceutical pollution in the water cycle with precision. In *Water Cycle* (Vol. 6). <https://doi.org/10.1016/j.watcyc.2025.05.002>
- Mahboubi, M. (2019). Evening Primrose (*Oenothera biennis*) Oil in Management of Female Ailments. *Journal of Menopausal Medicine*, 25(2). <https://doi.org/10.6118/jmm.18190>
- Makara-Studzinska, M. T., Kryś-Noszczyk, K. M., and Jakiel, G. (2014). Epidemiology of the symptoms of menopause - An intercontinental review. In *Przegląd Menopauzalny* (Vol. 13, Number 3). <https://doi.org/10.5114/pm.2014.43827>
- Mirabi, P., and Mojab, F. (2013). The Effects of Valerian Root on Hot Flashes in Menopausal Women. *Iranian Journal of Pharmaceutical Research: IJPR*, 12, 217-222.
- Mohapatra, S., Iqbal, A., Ansari, M. J., Jan, B., Zahiruddin, S., Mirza, Mohd. A., Ahmad, S., and Iqbal, Z. (2022). Benefits of Black Cohosh (*Cimicifuga racemosa*) for Women Health: An Up-Close and In-Depth Review. *Pharmaceuticals*, 15. <https://api.semanticscholar.org/CorpusID:247113000>

- Motaghi Dastenaee, B., Safdari, F., Raisi Dehkordi, Z., and Karimian, Z. (2017). The effect of evening primrose plant on physical symptoms of menopause. *Journal of Babol University of Medical Sciences*, 19(2).
- Muqeeet Adnan, M., Khan, M., Hashmi, S., Hamza, M., AbdulMujeeb, S., and Amer, S. (2014). Black Cohosh and Liver Toxicity: Is There a Relationship? *Case Reports in Gastrointestinal Medicine*, 2014. <https://doi.org/10.1155/2014/860614>
- Nandhini, J., Karthikeyan, E., and Rajeshkumar, S. (2024a). Eco-friendly bio-nanocomposites: pioneering sustainable biomedical advancements in engineering. In *Discover Nano* (Vol. 19, Number 1). <https://doi.org/10.1186/s11671-024-04007-7>
- Nandhini, J., Karthikeyan, E., and Rajeshkumar, S. (2024b). Nanomaterials for wound healing: Current status and futuristic frontier. In *Biomedical Technology* (Vol. 6). <https://doi.org/10.1016/j.bmt.2023.10.001>
- Nandhini, J., Karthikeyan, E., and Rajeshkumar, S. (2024c). Nanomaterials for wound healing: Current status and futuristic frontier. In *Biomedical Technology* (Vol. 6). <https://doi.org/10.1016/j.bmt.2023.10.001>
- Nugroho, A., Kim, M.-H., Choi, J., Baek, N.-I., and Park, H.-J. (2012). *In vivo* sedative and gastroprotective activities of Salvia plebeia extract and its composition of polyphenols. *Archives of Pharmacol Research*, 35(8), 1403-1411. <https://doi.org/10.1007/s12272-012-0810-7>
- Ojo, O., and Adegboye, A. R. A. (2023). The Effects of Nutrition on Chronic Conditions. In *Nutrients* (Vol. 15, Number 5). <https://doi.org/10.3390/nu15051066>
- Pakseresh, S., Boustani, H., Azemi, M. E., Nilsaz, J., Babapour, R., and Haghdust, M. R. (2012). Evaluation of pharmaceutical products of St. John's wort efficacy added on tricyclic antidepressants in treating major depressive disorder: A double blind randomized control trial. *Jundishapur Journal of Natural Pharmaceutical Products*, 7(3). <https://doi.org/10.5812/jjnp.4318>
- Parveen, A., Parveen, B., Parveen, R., and Ahmad, S. (2015). Challenges and guidelines for clinical trial of herbal drugs. *Journal of Pharmacy and Bioallied Sciences*, 7(4). <https://doi.org/10.4103/0975-7406.168035>
- Patel, N. M., and Derkits, R. M. (2007). Possible increase in liver enzymes secondary to atorvastatin and black cohosh administration. *Journal of Pharmacy Practice*, 20(4). <https://doi.org/10.1177/0897190007303051>
- Pop, A. L., Nasui, B. A., Bors, R. G., Penes, O. N., Prada, A. G., Clotea, E., Crisan, S., Cobelschi, C., Mehedintu, C., Carstoiu, M. M., and Varlas, V. N. (2023). The Current Strategy in Hormonal and Non-Hormonal Therapies in Menopause-A Comprehensive Review. In *Life* (Vol. 13, Number 3). <https://doi.org/10.3390/life13030649>
- Rathnayake, N., Lenora, J., Alwis, G., and Lekamwasam, S. (2019). Prevalence and Severity of Menopausal Symptoms and the Quality of Life in Middle-aged Women: A Study from Sri Lanka. *Nursing Research and Practice*, 2019. <https://doi.org/10.1155/2019/2081507>
- Ravindran, S., Ranganathan, S., R. K., J. N., A. S., Kannan, S. K., Prasad K. D., Marri, J., and K. R. (2025). The role of molecular biomarkers in the diagnosis, prognosis, and treatment stratification of oral squamous cell carcinoma: A comprehensive review. In *Journal of Liquid Biopsy* (Vol. 7). <https://doi.org/10.1016/j.jlb.2025.100285>
- Rees, M., Abernethy, K., Bachmann, G., Bretz, S., Ceausu, I., Durmusoglu, F., Erkkola, R., Fisticic, I., Gambacciani, M., Geukes, M., Goulis, D. G., Griffiths, A., Hamoda, H., Hardy, C., Hartley, C., Hirschberg, A. L., Kydd, A., Marshall, S., Meczekalski, B., ... Lambrounoudaki, I. (2022). The essential menopause curriculum for healthcare professionals: A European Menopause and Andropause Society (EMAS) position statement. *Maturitas*, 158. <https://doi.org/10.1016/j.maturitas.2021.12.001>
- Riazi, Q., Simbar, M., Akbari, S. A. A., Mojab, F., and Shakeri, N. (2021). Effect of *Rosa damascena* on the severity of depression and anxiety in postmenopausal women: A randomized, double-blind, placebo-controlled clinical trial. *Evidence Based Care Journal*, 11(1). <https://doi.org/10.22038/ebcj.2021.57608.2506>
- Rowe, I. J., and Baber, R. J. (2021). The effects of phytoestrogens on postmenopausal health. In *Climacteric* (Vol. 24, Number 1). <https://doi.org/10.1080/13697137.2020.1863356>
- Safdari, F., Motaghi Dastenaee, B., Khairi, S., and Karimiakakolaki, Z. (2021). Effect of Evening Primrose Oil on Postmenopausal Psychological Symptoms: A Triple-Blind Randomized Clinical Trial. *Journal of Menopausal Medicine*, 27(2). <https://doi.org/10.6118/jmm.21010>
- Sahoo, N., Manchikanti, P., and Dey, S. (2010). Herbal drugs: Standards and regulation. In *Fitoterapia* (Vol. 81, Number 6). <https://doi.org/10.1016/j.fitote.2010.02.001>
- Santoro, N., Epperson, C. N., and Mathews, S. B. (2015). Menopausal Symptoms and Their Management. In *Endocrinology and Metabolism Clinics of North America* (Vol. 44, Number 3). <https://doi.org/10.1016/j.ecl.2015.05.001>
- Santoro, N., Roeca, C., Peters, B. A., and Neal-Perry, G. (2021). The Menopause Transition: Signs, Symptoms, and Management Options. In *Journal of Clinical Endocrinology and Metabolism* (Vol. 106, Number 1). <https://doi.org/10.1210/clinem/dgaa764>
- Sapre, S., and Thakur, R. (2014). Lifestyle and dietary factors determine age at natural menopause. *Journal of Mid-Life Health*, 5(1). <https://doi.org/10.4103/0976-7800.127779>
- Schaedel, Z., Holloway, D., Bruce, D., and Rymer, J. (2021). Management of sleep disorders in the menopausal transition. In *Post Reproductive Health* (Vol. 27, Number 4). <https://doi.org/10.1177/20533691211039151>
- Shayan, M., Kamalian, S., Sahebkar, A., and Tayarani-Najaran, Z. (2020). Flaxseed for Health and Disease: Review of Clinical Trials. *Combinatorial Chemistry and High Throughput Screening*, 23(8). <https://doi.org/10.2174/1386207323666200521121708>
- Soesanto, Y., Pangkahila, W., Sriwidayanti, ni, Wiraguna, A. A. G. P., Widiyanti, I., and Sumadi, I. W. (2023). Effect of Extract of Basil Leaf (*Ocimum Basilicum* L) on Ovarian Follicle and Estrogen Level in Premenopausal Wistar Rats. *International Journal of Research Publication and Reviews*, 4, 895-898. <https://doi.org/10.55248/gengpi.4.72.3.48254>
- Song, J., Lee, N., Yang, H.-J., Lee, M. S., Kopalli, S. R., Kim, Y., and Lee, Y. (2024). The beneficial potential of ginseng for menopause. *Journal of Ginseng Research*, 48(5), 449-453. <https://doi.org/10.1016/j.jgr.2024.05.008>
- Sourouni, M., Zangger, M., Honermann, L., Foth, D., and Stute, P. (2021). Assessment of the climacteric syndrome: a narrative review. In *Archives of Gynecology and Obstetrics* (Vol. 304, Number 4). <https://doi.org/10.1007/s00404-021-06139-y>
- Sternfeld, B., Colvin, A., Stewart, A., Dugan, S., Nackers, L., El Khoudary, S. R., Huang, M. H., and Karvonen-Gutierrez, C. (2017). The Effect of a Healthy Lifestyle on Future Physical Functioning in Midlife Women. *Medicine and Science in Sports and Exercise*, 49(2). <https://doi.org/10.1249/MSS.0000000000001109>
- Stojanovska, L., Apostolopoulos, V., Polman, R., and Borkoles, E. (2014). To exercise, or, not to exercise, during menopause and beyond. In *Maturitas* (Vol. 77, Number 4). <https://doi.org/10.1016/j.maturitas.2014.01.006>
- Talaulikar, V. (2022). Menopause transition: Physiology and symptoms. In *Best Practice and Research: Clinical Obstetrics and Gynaecology* (Vol. 81). <https://doi.org/10.1016/j.bpobgyn.2022.03.003>
- Toulabi, T., Yarahmadi, M., Goudarzi, F., Ebrahimzadeh, F., Momenzadeh, A., and Yarahmadi, S. (2022). Effects of flaxseed on blood pressure, body mass index, and total cholesterol in hypertensive patients: A randomized clinical trial. *Explore*, 18(4). <https://doi.org/10.1016/j.explore.2021.05.003>
- Troia, L., Martone, S., Morgante, G., and Luisi, S. (2021). Management of perimenopause disorders: hormonal treatment. In *Gynecological Endocrinology* (Vol. 37, Number 3). <https://doi.org/10.1080/09513590.2020.1852544>
- Venugopal, V., Meenachisundram, S. G., Ramadoss, K., and Jayaprakash, N. (2023). Design and Optimization of Favipiravir Nanoparticles Using 3-Level Factorial Design by Box-Behnken Method. *Journal of Young Pharmacists*, 15(4). <https://doi.org/10.5530/jyp.2023.15.95>
- Wang, X., Zhao, G., Di, J., Wang, L., and Zhang, X. (2022). Prevalence and risk factors for depressive and anxiety symptoms in middle-aged Chinese women: a community-based cross-sectional study. *BMC Women's Health*, 22(1). <https://doi.org/10.1186/s12905-022-01908-6>
- Whiteley, J., Dibonaventura, M. D., Wagner, J. S., Alvir, J., and Shah, S. (2013). The impact of menopausal symptoms on quality of life, productivity, and economic outcomes. *Journal of Women's Health*, 22(11). <https://doi.org/10.1089/jwh.2012.3719>
- Wong, E. L. Y., Cheung, A. W. L., Haines, C. J., Wang, C. C., Wong, C.-K., Tsim, K. W. K., Cheng, W. K. F., and Leung, P.-C. (2022). The Efficacy of Herbal Supplement Danggui Buxue Tang for Relieving Menopausal Symptoms. *J Menopausal Med*, 28(1), 33-39. <https://doi.org/10.6118/jmm.21024>
- Yumuk, V., Tsigos, C., Fried, M., Schindler, K., Busetto, L., Micic, D., and Toplak, H. (2015). European Guidelines for Obesity Management in Adults. *Obesity Facts*, 8(6). <https://doi.org/10.1159/000442721>
- Zanello, M., Borghese, G., Manzara, F., Esposti, E. D., Moro, E., Raimondo, D., Abdullahi, L. O., Arena, A., and Terzano, P. (2019). Hormonal replacement therapy in menopausal women with history of endometriosis: A review of literature. In *Medicina (Lithuania)* (Vol. 55, Number 8). <https://doi.org/10.3390/medicina55080477>
- Zierau, O., Zheng, K. Y. Z., Papke, A., Dong, T. T. X., Tsim, K. W. K., and Vollmer, G. (2014). Functions of Danggui Buxue Tang, a Chinese Herbal Decoction Containing *Astragali Radix* and *Angelicae sinensis Radix*, in Uterus and Liver are Both Estrogen Receptor-Dependent and -Independent. *Evidence-Based Complementary and Alternative Medicine*, 2014(1), 438531. <https://doi.org/https://doi.org/10.1155/2014/438531>
- Zierau, O., Zheng, Y., Papke, A., Dong, T., and Vollmer, G. (2014). Functions of Danggui Buxue Tang, a Chinese Herbal Decoction Containing *Astragali Radix* and *Angelicae sinensis Radix*, in Uterus and Liver are Both Estrogen Receptor-Dependent and -Independent. *Evidence-Based Complementary and Alternative Medicine: ECAM*, 2014, 438531. <https://doi.org/10.1155/2014/438531>

Cite this article: Deenadhayalan SS, Babu V, Edwin ER, Harikrishnan P, Govindarajulu R, et al. The Role of Herbal Supplements in Alleviating Menopause Symptoms. *Pharmacog Res*. 2026;18(4):1159-73.