Multidisciplinary Reviews

REVIEW ARTICLE
Published Online: October 14, 2024
https://doi.org/10.31893/multirev.2025057

Menopause dynamics: From symptoms to quality of life, unraveling the complexities of the hormonal shift

Simerjeet Singh Bagga[a] ✉ | **Surekha Tayade**[a] | **Nilesh Lohiya**[a] | **Archana Tyagi**[a] |**Aditya Chauhan**[a]

[a]Department of Obst and Gynecology, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research, India.

Abstract The article delves deeply into the nature and process of menopause through which women undergo, which comprises profound transitions that occur during all menopausal stages. These findings emphasize the critical importance of comprehending and effectively addressing the diverse array of menopausal symptoms. The profound decline in progesterone and estrogen levels has been identified as the catalyst for triggering a spectrum of symptoms, which include but are not limited to hot flashes, mood swings, sleep disturbances, and genitourinary issues. These symptoms are noted to have a tangible impact on the daily functioning and overall well-being of women. This article underscores the pivotal role played by hormonal shifts in the manifestation of these symptoms and highlights the pressing need for the development of robust management strategies. Furthermore, hormone replacement therapy (HRT) is a well-researched treatment option, albeit with the caveat that its potential risks necessitate a personalized and nuanced approach. It also emphasizes the importance of lifestyle modifications, such as engaging in regular physical activity, adopting a balanced diet, and considering cognitive behavioral therapy, as pivotal elements in mitigating certain menopausal symptoms while concurrently enhancing overall health. The article also underscores the importance of addressing sexual health through therapeutic interventions, acknowledging their potential to significantly ameliorate vaginal symptoms and enhance sexual function, thereby fostering greater intimacy and relational satisfaction. Additionally, it highlights the profound psychosocial adjustments that women undergo during menopause, which are intrinsically intertwined with sociocultural factors. A holistic approach to menopause management is advised, which encompasses psychological support, medical treatments, and social interventions, underscoring their collective importance in effectively supporting women through this important life transition.

Keywords: women, psychological, hrt, harmonal, QoL

1. Introduction

Menopause is a natural phase in the life of a woman that signifies the end of her reproductive years. It is defined as the cessation of spontaneous menstrual periods for a continuous period of 12 months. Most women will experience menopausal symptoms, with a considerable number experiencing severe and prolonged symptoms. As life expectancy for women continues to increase, a majority of women will undergo the menopausal transition and undergo a considerable portion of their lives in this phase. The transition to menopause encompasses a wide range of physical, hormonal, and emotional changes, which can be affected by factors such as sociocultural background, ethnicity, and psychology. While traditionally considered a medical syndrome primarily characterized by vasomotor symptoms and hormonal imbalances, contemporary perspectives emphasize its broader impact on women's lives (Talaulikar, 2022).

Historically, menopause has been viewed predominantly through a medical lens, emphasizing its symptomatic presentation and hormonal alterations. Pioneering studies such as the “Study of Women's Health Across the Nation” (SWAN) shed light on the severity and prevalence of vasomotor symptoms, insomnia and sleep disturbances, and genitourinary syndrome related to menopause. These findings underscore the need for effective symptom management strategies, including hormone replacement therapy (HRT) and nonhormonal interventions (Avis et al., 2003).

The hormonal milieu during menopause, characterized by declining estrogen levels and fluctuations in follicle-stimulating hormone (FSH) and luteinizing hormone (LH), plays a central role in symptom manifestation. Landmark studies elucidating the intricate interplay between hormonal shifts and vasomotor symptoms, cognitive changes, and sexual dysfunction have advanced our understanding of menopause pathophysiology. Additionally, emerging evidence suggests a link between hormonal fluctuations and mood disturbances, including depression and anxiety, highlighting the need for comprehensive management approaches (Santoro et al., 2015).

While menopause is often associated with physical discomfort and hormonal dysregulation, its impact extends far beyond mere symptomatology. Recent research has underscored the multidimensional nature of menopause, encompassing

psychosocial, relational, and existential dimensions. Studies exploring women's experiences during the menopausal transition have highlighted the themes of identity reformation, existential introspection, and renegotiation of roles and relationships (Cheng et al., 2020). Furthermore, the intersectionality of menopause with sociocultural factors, including socioeconomic status, ethnicity, and cultural norms, shapes women's experiences and coping strategies (M et al., 2018).

During the menopausal transition, changes in reproductive hormones can lead to disturbances in vasomotor symptoms (hot flashes and night sweating), temporary cognitive issues, genitourinary symptoms, mood disturbances, and other health issues that can lower the health-related quality of life for women experiencing these symptoms. This article delves deeply into these menopausal dynamics affecting the health-related quality of life of women.

2. Review

2.1. Understanding menopause

Menopause marks the permanent end of menstruation due to a decline in ovarian follicle activity. The term "menopause" comes from the Latin words "meno," meaning month, and "pausia," meaning stop. This transition signifies a shift from reproductive to nonreproductive. The climacteric period, which begins before menopause and continues for at least a year after, is when this transition occurs. Menopause is a significant factor in studies related to the population because it indicates the end of fertility under natural conditions. (National Collaborating Centre for Women's and Children's Health (UK), 2015).

The WHO defines menopause as "Menopause is a stage when the menstrual cycle stops for over 12 months and there is a drop in the levels of the two most important hormones in the body of women, namely, estrogen and progesterone [WHO 1996]". There are two kinds of impacts resulting from decreases in progesterone and estrogen levels: short-term and long-term. flashes, irritability, mood swings, and depression are some of the effects; cardiovascular issues, Alzheimer's disease, lower back pain, osteoporosis, brittle bones, and joint pain are long-term effects. All of these effects lower the quality of life for women and increase the need for medical care (Greene & Cooke, 1980).

Normally, menopause occurs anywhere between 45 and 55 years of age, with a global average age of approximately 51 years (Dj & Sm, 1989). Various studies indicate that women from the Indian subcontinent experience menopause on average between the ages of 40 and 47 (Jungari & Chauhan, 2017).

The average age at menopause varies significantly depending on the country, the area, the population's biological and behavioral traits, and the level of development attained. Most agree that, compared with nonindustrialized or undernourished populations, modern industrialized populations exhibit a later median age at menopause. Early menopause may increase the risk of heart disease, breast cancer, osteoporosis, hypertension, and diabetes incidence, as well as early mortality from disorders associated with lowered estrogen levels. Numerous factors, including genetic, reproductive, sociodemographic, and behavioral impacts, have been linked to variations in the natural age at menopause. According to recent studies, having no or few children, being older when menarch, never using oral contraceptives, and having no education or career are some common characteristics linked to menopause. According to a few recent menopausal studies, anthropometric parameters such as body mass index, height, and weight may influence indicators of menopausal age (Syamala & Sivakami, 2005).

The term "premature menopause" refers to the onset of menopause in women under the age of 40. Premature menopause can be induced by different genetic, chromosomal, metabolic, enzymatic, iatrogenic, and viral causes. Women with premature menopause show signs of hypoestrogenism and anovulation, amenorrhea (primary or secondary), sex steroid insufficiency, infertility, and increased levels of gonadotrophin hormones.

In India, women in rural areas are at a greater risk of experiencing early menopause than are those in urban areas (Jungari & Chauhan, 2017).

2.2. Understanding menopausal stages

Researchers have unanimously acknowledged the STRAW+10 criteria, which are founded on menstrual bleeding patterns. (Harlow et al., 2012). The STRAW guidelines were developed on the basis of extensive global studies of the menopausal transition and offer practical clinical implications. The menopausal transition includes (i) the late reproductive stage (−3), (ii) the early menopausal transition (−2), and (iii) the late menopausal transition (−1), followed by (iv) the final menstrual period (stage 0) and (v) the early postmenopause period (+1).

2.2.1. Late reproductive stage

In this first stage, a reduction in ovarian reserve begins well before any changes in the menstrual cycle, and the decrease in follicle count is compensated for by hormonal changes to maintain regular ovulatory cycling. The decline in anti-Müllerian hormone (AMH) levels with increasing age indicates the remaining primordial follicle pool and is a valuable biomarker for estimating the time to the final menstrual period (FMP). There is also a decrease in the level of inhibin B, which signals the release of negative feedback inhibition of follicle-stimulating hormone (FSH) production. These changes are inconsistent and subtle from cycle to cycle, with women experiencing normal to irregular menstrual cycles (Santoro & Johnson, 2019) (Figure 1).

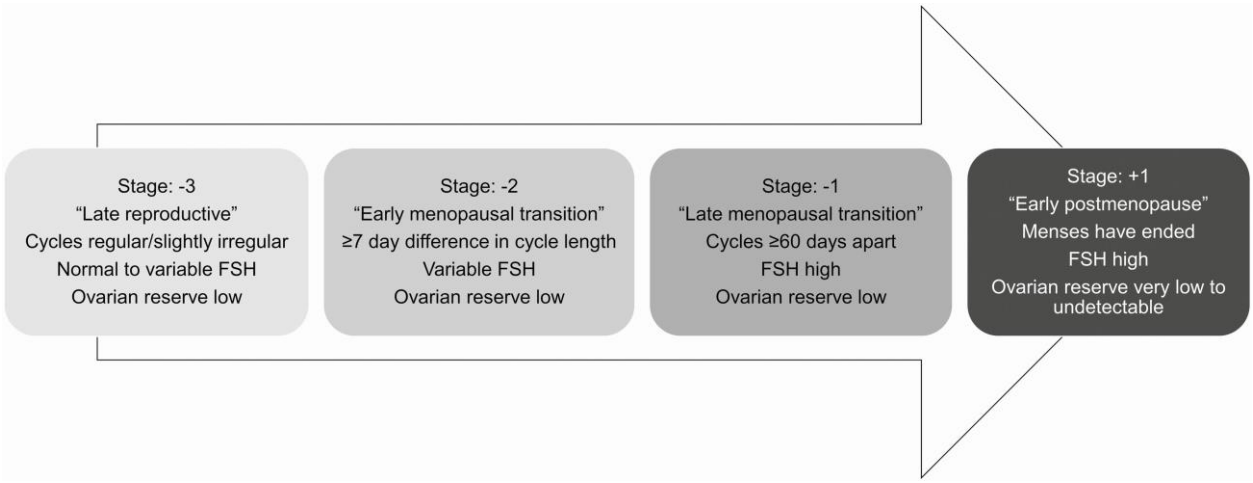

Figure 1 Stages of the menopausal transition.

2.2.2. Early menopausal Stage

After ovulation, there is a reduction in progesterone and inhibin A production, most likely due to the lower quality of follicles. This increases FSH and leads to early release of the dominant follicle for the next cycle, which results in shorter menstrual cycles. In some cases, high FSH levels can cause ovulation, which is out-of-phase, leading to high estradiol levels and irregular cycles. Despite irregularities, most cycles continue to show evidence of luteal activity, indicating ovulation. Some compensatory mechanisms during the early menopausal transition help maintain menstrual regularity and fertility, despite some irregularity (Paramsothy et al., 2017).

2.2.3. Late menopausal stage

During the late menopausal transition, women may experience amenorrhea or go without menses for 60 days or more. This particular stage lasts approximately 1--3 years and is characterized by consistently elevated FSH levels, consistently low estrogen levels, declining Pdg levels, and longer menstrual cycles with a decreased likelihood of ovulation. Anovulatory cycles during this stage can have varying hormonal patterns, and there is substantial variability among women. Notably, ovulatory cycles can still occur during this stage, which signifies that fertility may exist until the final menstrual period (Harlow et al., 2012).

2.2.4. Early postmenopause

In the early postmenopausal stage, women enter this phase when 12 months have elapsed since her last menstrual period. During this stage, the ovarian reserve is extremely low, meaning that it is virtually undetectable. Additionally, there is a continuous increase in follicle-stimulating hormone (FSH) levels, whereas a decrease in estrogen levels continues to occur until they eventually stabilize, typically approximately 2 years after the final menstrual period (FMP) (Harlow et al., 2012).

2.3. Understanding menopause and its effect on quality of life

Health-related quality of life (HRQL) generally pertains to the facets of life that are particularly susceptible to being affected by changes in health status. (Albrecht, 1994). It is typically considered to be multidimensional, encompassing physical and emotional well-being, social functioning, and role limitations. According to the Wilson and Cleary model (Wilson & Cleary, 1995), the influence of physiological and biological factors on HRQL can be facilitated by menopausal symptoms; individual characteristics such as psychological status and personality; and environmental factors such as stress, social support and economic situation.

Menopausal symptoms are commonly perceived to exert a detrimental influence on quality of life. However, within nonclinical cohorts of women, the impact of menopause on well-being and mood has produced conflicting findings. Many cross-sectional studies have investigated broader quality-of-life outcomes, yielding mixed results, although certain studies have indicated heightened body pain and role limitations attributed to physical health. Notably, cross-sectional studies have limitations in assessing health-related quality of life (HRQL) alterations during the menopausal transition. (Daly et al., 1993).

Recent population-based, epidemiologic studies have provided valuable insights into the prevalence, severity, and incidence of menopausal symptoms in women. Although the field is new, experts have identified certain symptoms that are likely linked to menopause, such as vaginal dryness/dyspareunia vasomotor symptoms, difficulty sleeping/insomnia, and adverse mood/depression. However, establishing a clear relationship between other reported symptoms and menopause has been challenging because of various factors, such as publication bias, the subjective nature of complaints, and variation over

time. Some symptoms, such as sexual function and urinary incontinence (UI), have mixed data linked to menopause. With the efficacy of estrogen treatment. As a result, this article focuses on core symptoms and cognitive issues, which are of particular concern to women undergoing menopause (Figure 2).

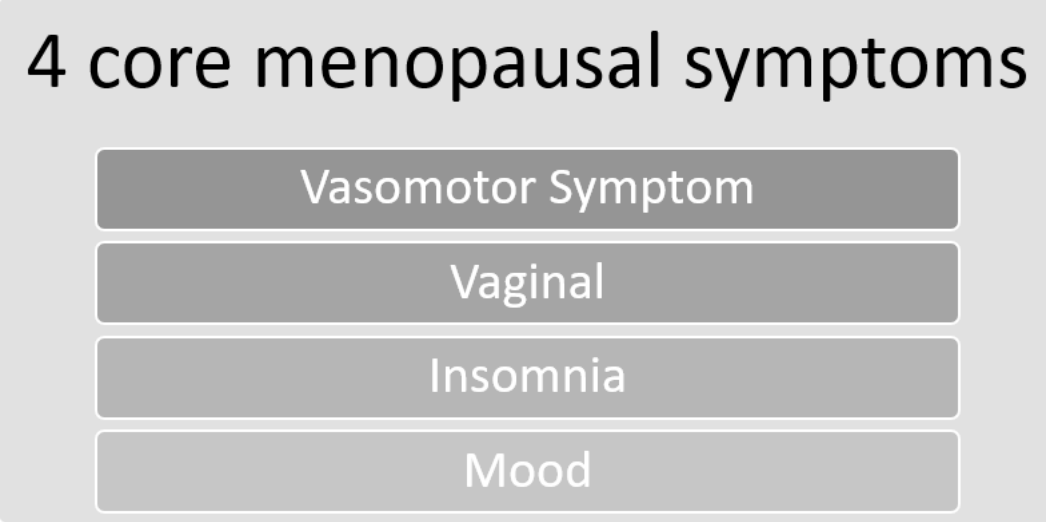

Figure 2 4 Core menopausal symptoms.

2.3.1. Vasomotor symptoms

Vasomotor symptoms, especially hot flashes, affect a significant majority of women. The prevalence, intensity, and duration of these symptoms vary widely among individuals. Eighty-five percent of menopausal women report hot flashes, with approximately 55% experiencing them before the onset of menstrual irregularities that mark entry into menopause ("ACOG Practice Bulletin No. 141," 2014). The severity and frequency of hot flashes typically increase as women progress through menopause, reaching a peak in the late transition phase and gradually diminishing over the subsequent years. Studies indicate that the average duration of these hot flashes is approximately 5.2 years (Col et al., 2009), although some women may experience milder symptoms for some extended period. Notably, approximately 25% of women continue to experience these vasomotor symptoms, including hot flashes, for 5 years or more after menopause.

The precise cause of hot flashes remains unclear. It has been suggested that fluctuations in estrogen production and subsequent changes in the thermoregulatory system may contribute to this phenomenon. While it was previously believed that hot flashes were solely linked to a decline in estrogen levels, it is now understood that, during hot flashes, there is no acute change in serum estradiol. Some researchers have proposed a connection between hot flashes and fluctuations in both follicle-stimulating hormone (FSH) and estradiol levels. It is hypothesized that a decrease in estrogen levels may lead to reduced serotonin levels, subsequently upregulating the 5-hydroxytryptamine (serotonin) (5-HT2A) receptor in the hypothalamus. This, in turn, may lead to the release of additional serotonin, potentially triggering the activation of the 5-HT2A receptor and resulting in hot flashes. Despite this etiology of hot flashes not being fully elucidated, both hormonal therapy and nonhormonal regimens have been shown to alleviate vasomotor symptoms (Freeman et al., 2007).

2.3.2. Vaginal symptoms (vulvovaginal atrophy, dryness and dyspareunia)

Sexual difficulties are a common issue for postmenopausal women and are often overlooked. During menopause, decreased estrogen levels can lead to some physical changes that impact sexual function, particularly the development of vulvovaginal atrophy. This condition can cause vaginal irritation, itching, dryness, painful intercourse, reduced lubrication, and bleeding during sexual activity. Estrogen deficiency affects other aspects of sexual function, such as reduced vaginal blood flow and a decreased ability to become aroused and achieve orgasm (Simon, 2011).

Since urogenital tissues are highly sensitive to estrogen levels in the body, fluctuations in estrogen during menopause and low estrogen levels make these tissues delicate and lead to distressing symptoms, such as symptoms of vaginal dryness or pain during intercourse (dyspareunia), as they progress through menopause. Furthermore, the vagina may narrow and shorten, leading to high chances of uterine prolapse, contributing to high rates of dyspareunia. The urinary tract, including the urethra and bladder, has estrogen receptors, and as estrogen levels decrease, this leads to urinary incontinence. Unlike hot flashes, symptoms of vulvovaginal atrophy are not alleviated over time without proper treatment(Santoro & Komi, 2009).

2.3.3. Sleep disturbance and insomnia

As women age, their sleep quality tends to decline, and the onset of menopause leads to an increase in the experience of these symptoms. Menopausal women often report having trouble sleeping, and studies have shown that sleep tends to be disturbed around the time of menstruation (Zheng et al., 2015). Actigraphy studies have shown that women in their late reproductive years lose almost 25 minutes of sleep compared with those in the premenstrual stage and experience sleep difficulties twice as often as men do(Manber & Armitage, 1999). Hormonal changes during menopause and aging, along with other factors, contribute to a further decline in sleep quality. Over time, the prevalence of sleep difficulties has increased in women, with more than 50% of women reporting sleep disturbance after menopause ("Proceedings from the NIH State-of-the-Science Conference on Management of Menopause-Related Symptoms, March 21-23, 2005, Bethesda, Maryland, USA," 2005). It appears that women experience more pronounced effects on sleep as they age than men do. Importantly, hormonal changes alone may not fully explain the relationship between menopause and sleep difficulties. Hormone-based treatments may not always be effective in addressing sleep problems in middle life and old age. In addition to hormonal changes, mood disorders and chronic poor sleep habits play significant roles in contributing to sleep problems (Alexander et al., 2007).

2.3.4. Mood

Because of the significant fluctuations in the levels of estrogen during menopause, researchers have focused on understanding the relationship between mood changes and estrogen levels. Longitudinal prospective studies have shown that there is increased variability in estrogen levels during menopause in women who are suffering from depression(Ew et al., 2006). Moreover, the absolute level of estrogen is not directly related to the risk of depression. Some studies have utilized gonadotropin-releasing hormone (GnRH) agonists to instill menopausal changes in premenopausal women, making it easier to evaluate mood symptoms, measure hormones, and assess the response to add-back hormone therapy (Schmidt et al., 2009).

2.4. Improving the quality of life of menopausal women

The manifestations of menopause can significantly impact a woman's overall well-being. The physical discomfort, emotional volatility, and cognitive challenges associated with this phase can lead to diminished productivity, strained interpersonal relationships, and a decrease in overall life satisfaction. It is imperative to comprehend and proactively address these symptoms to improve quality of life during the menopausal period.

2.5. Hormonal replacement therapy

Hormone replacement therapy (HRT) is a well-researched and effective treatment for symptoms associated with menopause. This process involves administering estrogen and progesterone to compensate for the decline in hormone production by the ovaries. Studies indicate that HRT can substantially alleviate the intensity and frequency of night sweats, hot flashes, and vaginal atrophy. (Manson et al., 2013) However, HRT is linked to potential risks such as an increased likelihood of cardiovascular disease, breast cancer, and thromboembolism, underscoring the need for a personalized approach to its usage (Cho et al., 2023).

3.6. Lifestyle modifications

2.6.1. Diet and nutrition

A well-balanced diet that is rich in calcium, vitamin D, and phytoestrogens is crucial for the management of menopausal symptoms. Phytoestrogens present in soy products and flaxseeds have the ability to mimic the effects of estrogen and may contribute to alleviating hot flashes. Furthermore, maintaining a healthy weight through dietary choices can potentially decrease the severity of these symptoms (Messina, 2014).

2.6.2. Exercise

Regular physical activity is advantageous for weight management, mood enhancement, and sleep quality improvement. Weight-bearing exercises, such as walking and strength training, are particularly crucial for maintaining bone density and reducing the risk of osteoporosis, especially during the menopausal period (Nelson et al., 2007). Few studies have shown that engaging in yoga practices among women in the early stages of menopause is effective in alleviating symptoms, improving mood, and reducing the risk of cardiovascular diseases (Praveena et al., 2018).

2.6.3. Cognitive behavioral therapy

CBT has been proven to be an effective approach for managing mood disturbances, anxiety, and depression, which can accompany menopause. By enabling individuals to recognize and change negative thought patterns, CBT empowers them to develop effective coping strategies, leading to improvements in mental well-being and overall quality of life (Mann et al., 2012). A few studies have demonstrated that sleep restriction therapy (SRT) and cognitive behavioral therapy for insomnia (CBTI) can

decrease dysfunctional beliefs about sleep, depressive symptoms, and presleep somatic hyperarousal in postmenopausal women. Additionally, CBTI has been found to produce superior results compared with SRT (Kalmbach et al., 2019).

2.6.4. Sexual health

Given the significant role of estrogen loss in menopausal sexual dysfunction, estrogen therapy is a reasonable treatment option. To improve vaginal health and sexual function, systemic and local estrogen therapies can be used; for women who do not require systemic therapy, estrogen creams, rings, or tablets may be more suitable. These treatment options are highly effective for reducing vaginal atrophy, improving sexual symptoms, and alleviating painful intercourse. There are also promising emerging treatments, including ultralow-dose vaginal estradiol tablets, new selective estrogen receptor modulators (SERMs), and intravaginal dehydroepiandrosterone (DHEA), for postmenopausal women experiencing vaginal atrophy and sexual difficulties (Simon, 2011).

3. Conclusions

The transition to menopause encompasses a wide range of changes that affect women's lives. As women now spend a significant portion of their lives in this phase, it is important to understand and address the symptoms associated with menopause. A decrease in estrogen and progesterone levels triggers various symptoms, such as hot flashes, sleep problems, mood swings, and genitourinary issues, which impact daily functioning and overall well-being. Hormonal shifts play a critical role in symptom manifestation, and studies have highlighted the need for effective management strategies. Hormone replacement therapy (HRT) is a well-researched treatment option, but its potential risks require a personalized approach. Lifestyle modifications, including a balanced diet, regular physical activity, and cognitive behavioral therapy, can alleviate some menopausal symptoms and enhance overall health. Addressing sexual health through therapies can significantly improve vaginal symptoms and sexual function, enhancing intimacy and relational satisfaction. Menopause also involves profound psychosocial adjustments that are influenced by sociocultural factors. A holistic approach to menopause management, encompassing medical treatments, psychological support, and social interventions, is essential. By integrating various strategies, healthcare providers can better support women in navigating this significant life transition.

Ethical Considerations

Not applicable.

Conflict of Interest

The authors declare no conflicts of interest.

Funding

This research did not receive any financial support.

References

ACOG Practice Bulletin No. 141: Management of menopausal symptoms. (2014). *Obstetrics and Gynecology*, *123*(1), 202–216. https://doi.org/10.1097/01.AOG.0000441353.20693.78

Albrecht, G. L. (1994). *Advances in Medical Sociology: Quality of Life in Health Care 1994* (R. Fitzpatrick, Ed.).

Alexander, J. L., Neylan, T., Kotz, K., Dennerstein, L., Richardson, G., & Rosenbaum, R. (2007). Assessment and treatment for insomnia and fatigue in the symptomatic menopausal woman with psychiatric comorbidity. *Expert Review of Neurotherapeutics*, *7*(11 Suppl), S139–S155. https://doi.org/10.1586/14737175.7.11s.S139

Avis, N. E., Ory, M., Matthews, K. A., Schocken, M., Bromberger, J., & Colvin, A. (2003). Health-related quality of life in a multiethnic sample of middle-aged women: Study of Women's Health Across the Nation (SWAN). *Medical Care*, *41*(11), 1262–1276. https://doi.org/10.1097/01.MLR.0000093479.39115.AF

Cho, L., Kaunitz, A. M., Faubion, S. S., Hayes, S. N., Lau, E. S., Pristera, N., Scott, N., Shifren, J. L., Shufelt, C. L., Stuenkel, C. A., & Lindley, K. J. (2023). Rethinking menopausal hormone therapy: For whom, what, when, and how long? *Circulation*, *147*(7), 597–610. https://doi.org/10.1161/CIRCULATIONAHA.122.061559

Col, N. F., Guthrie, J. R., Politi, M., & Dennerstein, L. (2009). Duration of vasomotor symptoms in middle-aged women: A longitudinal study. *Menopause (New York, N.Y.)*, *16*(3), 453–457. https://doi.org/10.1097/gme.0b013e31818d414e

Daly, E., Gray, A., Barlow, D., McPherson, K., Roche, M., & Vessey, M. (1993). Measuring the impact of menopausal symptoms on quality of life. *BMJ (Clinical Research Ed.)*, *307*(6908), 836–840. https://doi.org/10.1136/bmj.307.6908.836

Dj, B., & Sm, M. (1989). A prospective study of factors affecting age at menopause. *Journal of Clinical Epidemiology*, *42*(11). https://doi.org/10.1016/0895-4356(89)90044-9

Ew, F., Md, S., H, L., & Db, N. (2006). Associations of hormones and menopausal status with depressed mood in women with no history of depression. *Archives of General Psychiatry*, *63*(4). https://doi.org/10.1001/archpsyc.63.4.375

Freeman, E. W., Sammel, M. D., Lin, H., Gracia, C. R., Pien, G. W., Nelson, D. B., & Sheng, L. (2007). Symptoms associated with menopausal transition and reproductive hormones in midlife women. *Obstetrics and Gynecology*, *110*(2 Pt 1), 230–240. https://doi.org/10.1097/01.AOG.0000270153.59102.40

Greene, J. G., & Cooke, D. J. (1980). Life stress and symptoms at the climacterium. *The British Journal of Psychiatry: The Journal of Mental Science*, *136*, 486–491. https://doi.org/10.1192/bjp.136.5.486

Harlow, S. D., Gass, M., Hall, J. E., Lobo, R., Maki, P., Rebar, R. W., Sherman, S., Sluss, P. M., de Villiers, T. J., & STRAW 10 Collaborative Group. (2012). Executive summary of the Stages of Reproductive Aging Workshop + 10: Addressing the unfinished agenda of staging reproductive aging. *Menopause (New York, N.Y.)*, *19*(4), 387–395. https://doi.org/10.1097/gme.0b013e31824d8f40

Jungari, S., & Chauhan, B. (2017). Prevalence and determinants of premature menopause among Indian women: Issues and challenges ahead. *Health & Social Work*, *42*, 1–8. https://doi.org/10.1093/hsw/hlx010

Kalmbach, D. A., Cheng, P., Arnedt, J. T., Anderson, J. R., Roth, T., Fellman-Couture, C., Williams, R. A., & Drake, C. L. (2019). Treating insomnia improves depression, maladaptive thinking, and hyperarousal in postmenopausal women: Comparing cognitive-behavioral therapy for insomnia (CBTI), sleep restriction therapy, and sleep hygiene education. *Sleep Medicine*, *55*, 124–134. https://doi.org/10.1016/j.sleep.2018.11.019

M, T., S, A., G, O., A, E., & N, K. (2018). Strategies to improve menopausal quality of life: A systematic review. *Journal of Education and Health Promotion*, *7*. https://doi.org/10.4103/jehp.jehp_137_17

Manber, R., & Armitage, R. (1999). Sex, steroids, and sleep: A review. *Sleep*, *22*(5), 540–555.

Mann, E., Smith, M. J., Hellier, J., Balabanovic, J. A., Hamed, H., Grunfeld, E. A., & Hunter, M. S. (2012). Cognitive behavioural treatment for women who have menopausal symptoms after breast cancer treatment (MENOS 1): A randomised controlled trial. *The Lancet. Oncology*, *13*(3), 309–318. https://doi.org/10.1016/S1470-2045(11)70364-3

Manson, J. E., Chlebowski, R. T., Stefanick, M. L., Aragaki, A. K., Rossouw, J. E., Prentice, R. L., Anderson, G., Howard, B. V., Thomson, C. A., LaCroix, A. Z., Wactawski-Wende, J., Jackson, R. D., Limacher, M., Margolis, K. L., Wassertheil-Smoller, S., Beresford, S. A., Cauley, J. A., Eaton, C. B., Gass, M., & Wallace, R. B. (2013). Menopausal hormone therapy and health outcomes during the intervention and extended poststopping phases of the Women's Health Initiative randomized trials. *JAMA*, *310*(13), 1353–1368. https://doi.org/10.1001/jama.2013.278040

Messina, M. (2014). Soy foods, isoflavones, and the health of postmenopausal women. *The American Journal of Clinical Nutrition*, *100*(Suppl 1), 423S–430S. https://doi.org/10.3945/ajcn.113.071464

National Collaborating Centre for Women's and Children's Health (UK). (2015). *Menopause: Full Guideline*. National Institute for Health and Care Excellence (UK). http://www.ncbi.nlm.nih.gov/books/NBK327156/

Nelson, M. E., Rejeski, W. J., Blair, S. N., Duncan, P. W., Judge, J. O., King, A. C., Macera, C. A., & Castaneda-Sceppa, C. (2007). Physical activity and public health in older adults: Recommendation from the American College of Sports Medicine and the American Heart Association. *Medicine and Science in Sports and Exercise*, *39*(8), 1435–1445. https://doi.org/10.1249/mss.0b013e3180616aa2

Paramsothy, P., Harlow, S. D., Nan, B., Greendale, G. A., Santoro, N., Crawford, S. L., Gold, E. B., Tepper, P. G., & Randolph, J. F. (2017). Duration of the menopausal transition is longer in women with young age at onset: The multiethnic Study of Women's Health Across the Nation. *Menopause (New York, N.Y.)*, *24*(2), 142–149. https://doi.org/10.1097/GME.0000000000000736

Praveena, S. M., Asha, G., Sunita, M., Anju, J., & Ratna, B. (2018). Yoga offers cardiovascular protection in early postmenopausal women. *International Journal of Yoga*, *11*(1), 37–43. https://doi.org/10.4103/ijoy.IJOY_69_16

Proceedings from the NIH State-of-the-Science Conference on Management of Menopause-Related Symptoms, March 21-23, 2005, Bethesda, Maryland, USA. (2005). *The American Journal of Medicine*, *118*(Suppl 12B), 1–171. https://doi.org/10.1016/j.amjmed.2005.09.030

Santoro, N., & Johnson, J. (2019). Diagnosing the onset of menopause. *JAMA*, *322*(8), 775–776. https://doi.org/10.1001/jama.2019.6250

Santoro, N., & Komi, J. (2009). Prevalence and impact of vaginal symptoms among postmenopausal women. *The Journal of Sexual Medicine*, *6*(8), 2133–2142. https://doi.org/10.1111/j.1743-6109.2009.01335.x

Santoro, N., Epperson, C. N., & Mathews, S. B. (2015). Menopausal symptoms and their management. *Endocrinology and Metabolism Clinics of North America*, *44*(3), 497–515. https://doi.org/10.1016/j.ecl.2015.05.001

Schmidt, P. J., Steinberg, E. M., Negro, P. P., Haq, N., Gibson, C., & Rubinow, D. R. (2009). Pharmacologically induced hypogonadism and sexual function in healthy young women and men. *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology*, *34*(3), 565–576. https://doi.org/10.1038/npp.2008.24

Simon, J. A. (2011). Identifying and treating sexual dysfunction in postmenopausal women: The role of estrogen. *Journal of Women's Health (2002)*, *20*(10), 1453–1465. https://doi.org/10.1089/jwh.2010.2151

Syamala, T. S., & Sivakami, M. (2005). Menopause: An emerging issue in India. *Economic and Political Weekly*, *40*(47), 4923–4930. https://www.jstor.org/stable/4417427

Talaulikar, V. (2022). Menopause transition: Physiology and symptoms. *Best Practice & Research Clinical Obstetrics & Gynaecology*, *81*, 3–7. https://doi.org/10.1016/j.bpobgyn.2022.03.003

Wilson, I. B., & Cleary, P. D. (1995). Linking clinical variables with health-related quality of life: A conceptual model of patient outcomes. *JAMA*, *273*(1), 59–65.

Zheng, H., Harlow, S. D., Kravitz, H. M., Bromberger, J., Buysse, D. J., Matthews, K. A., Gold, E. B., Owens, J. F., & Hall, M. (2015). Actigraphy-defined measures of sleep and movement across the menstrual cycle in midlife menstruating women: Study of Women's Health Across the Nation Sleep Study. *Menopause (New York, N.Y.)*, *22*(1), 66–74. https://doi.org/10.1097/GME.0000000000000249