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Systematic Review and Meta-Analysis

Symptoms and Clinical Manifestations in Perimenopausal and Postmenopausal Women in Asia: A Systematic Review and Meta-Analysis

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ABSTRACT

Introduction: Menopause is a physiological transition marked by the permanent cessation of menstruation due to declining ovarian function and estrogen production. The menopausal transition, particularly the perimenopausal phase, is frequently accompanied by symptoms that adversely affect women's daily functioning and quality of life. This meta-analysis aimed to estimate the relative risk (odds ratio [OR]) of somatic, psychological, and urogenital symptoms among perimenopausal compared with postmenopausal women in Asia.

Material and Methods: A systematic review was conducted following PRISMA guidelines, including studies published within the last 10 years. A total of 14,331 participants were analyzed. Quantitative synthesis was performed using RevMan Cochrane version 5.4.1, with subgroup analysis focusing on hot flushes. Risk of bias assessment indicated moderate to high bias across most included studies.

Results: Perimenopausal women had a significantly higher risk of somatic symptoms than postmenopausal women (OR 1.24; 95% CI 1.20–1.29), particularly hot flushes, night sweats, sleep disturbances, and musculoskeletal pain. Psychological symptoms were also more prevalent during perimenopause (OR 1.05; 95% CI 1.01–1.10), notably anxiety and memory impairment. Urogenital symptoms showed the greatest increase (OR 1.31; 95% CI 1.23–1.40), with vaginal dryness being the most prominent complaint (OR 1.77; 95% CI 1.58–1.98).

Conclusion: Perimenopausal women are at greater risk of experiencing somatic, psychological, and urogenital symptoms than postmenopausal women, with vaginal dryness, sleep disturbances, and cognitive complaints being most pronounced. These findings underscore the impact of hormonal fluctuations during the menopausal transition and highlight the need for early identification and targeted management of menopausal symptoms.

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INTRODUCTION

Menopause is the permanent cessation of menstruation in women caused by the loss of ovarian function, including estrogen production [1]. Marking the end of a woman's reproductive years. By definition, menopause occurs when a woman has not experienced menstruation for 12 consecutive months. This period is generally characterized by the absence of menstruation for at least 12 consecutive months due to decreased ovarian function. With advancing age, the decline in estrogen and progesterone levels triggers various physical, psychological, and cognitive changes that often have a significant impact on women's quality of life [2]. Menopause usually occurs between the ages of 40 and 58, with most women experiencing it around the age of 50 [3].

Menopause is divided into three phases: premenopause, perimenopause, and postmenopause. Premenopause is the period preceding hormonal disturbances, when ovarian function is still normal and menstrual cycles remain regular. Perimenopause is the transition phase to menopause, lasting for 4–8 years before menopause until one year after the last menstruation. In this phase, significant hormonal fluctuations occur along with the emergence of vasomotor and psychological symptoms. Postmenopause begins after 12 months without menstruation, characterized by persistently low estrogen levels, with symptoms that may continue or persist in the long term [4].

During the menopausal transition, women often experience a variety of symptoms that negatively affect their daily activities, physical and mental health, and overall quality of life. Some symptoms in postmenopausal women may even persist for a long time. In addition, the risks of osteoporosis, cardiovascular disease, and other degenerative disorders increase significantly after menopause, indicating that estrogen deficiency accelerates the decline in physical function [1].

According to a study conducted by Qi Yu (2022), the prevalence of vasomotor symptoms (VMS), including hot flashes, excessive sweating, and night sweats, was reported to range from 43% to 84% among East Asian women (Chinese, Korean, Taiwanese). In China, the most frequently reported symptoms were muscle or joint pain (54.5%), followed by sexual problems (48.7%) and fatigue (46.1%) [1]. In Indonesia, particularly in Bali, the most common symptoms were joint and muscle pain (52.8%) and sleep disturbances (51.8%). These prevalence data highlight the importance of identifying menopausal symptoms, especially in the perimenopausal and postmenopausal phases. By understanding the issues surrounding menopause, women are expected to be able to take early preventive measures and prepare for this stage of life without having to experience unnecessary complaints.

MATERIAL AND METHODS

This systematic review and meta-analysis were conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. This study aims to estimate the relative risk (odds ratio/OR) of various symptoms occurring during the perimenopausal and postmenopausal phases through a meta-analysis approach.

The review process consisted of the following steps: (1) determining inclusion criteria, exclusion criteria, and research objectives; (2) conducting a literature search in electronic databases; (3) screening the retrieved articles; (4) assessing the quality of the included studies; (5) extracting data; (6) performing quantitative data analysis; and (7) preparing the systematic review. The review was carried out independently by five researchers (RA, KF, VK, DS, and RD).

A comprehensive search was conducted in ScienceDirect, Cochrane, PubMed, EBSCO, Taylor & Francis, Springer, and ProQuest, limited to publications from the last 10 years. The search strategy used Boolean operators to combine keywords, resulting in the following search string: (Vasomotor) OR (Sexual Symptoms) AND (Menopause) AND (Asia) NOT (Treatment).

The inclusion criteria were determined using the PICO framework: Population: women with menopausal symptoms in ASIA; Intervention: women experiencing postmenopausal symptoms; Comparison: women experiencing perimenopausal symptoms; Outcome: somatic symptoms (hot flushes, sweating, night sweats, heart discomfort, sleep problems, joint and muscular discomfort, and headache), psychological symptoms (depressive mood, irritability, anxiety, fatigue, and poor memory), and urogenital symptoms (sexual problems, bladder problems, and vaginal dryness).

Exclusion criteria included paid-access articles, studies with non-extractable data, non-English publications, and review articles. The literature search results are presented in the PRISMA flowchart (Fig.1). In total, 14 cross-sectional studies and 1 cohort study were included. The methodological quality of the included studies was assessed using ROBINS-I V2 (Table 2). Quantitative data analysis was performed using Cochrane RevMan version 5.4.1. The findings of the systematic review are presented descriptively.

RESULTS

Search Strategy and Study Selection

The database search using the predefined keywords initially yielded 2,853 records. After the deduplication process, 977 records remained. After eligibility assessment, 40 articles were identified, and subsequent screening resulted in 15 studies that met the inclusion criteria. These studies consisted of cross-sectional and cohort designs that evaluated symptoms in perimenopausal and postmenopausal women in Asia. The characteristics of the included studies are presented in Table 1.

Qualitative Analysis

Quality assessment of 15 studies with cross-sectional and cohort designs using the ROBINS-I V2 tool, the majority of studies included in this systematic review

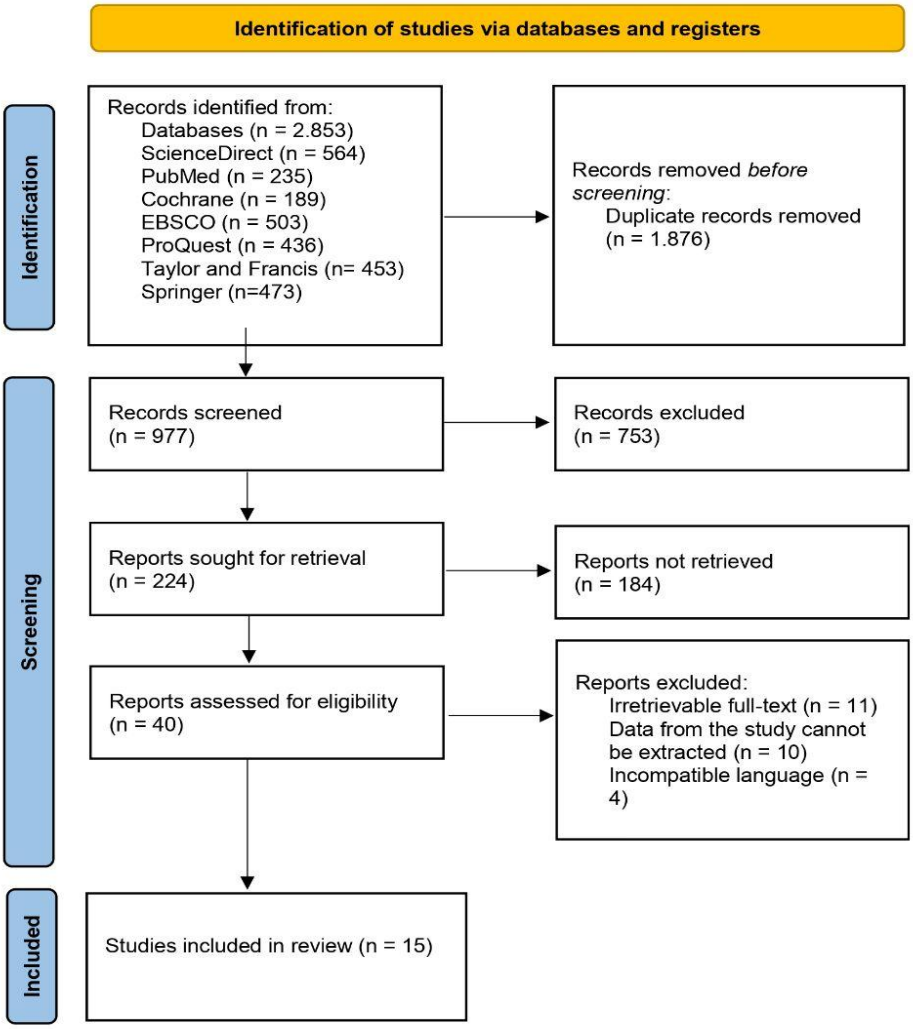


Fig.1. PRISMA Flowchart

were found to have a moderate to high risk of bias, as shown in Fig.4. The highest risk of bias was identified in the confounding domain in four studies, which can be attributed to the inability of cross-sectional designs to establish causal relationships.

Quantitative Analysis

A meta-analysis was conducted to evaluate somatic, psychological, and urogenital symptoms in perimenopausal and postmenopausal women in ASIA. The countries included in the study were China, Korea, Taiwan, Iran, Pakistan, Bangladesh, East India, Cambodia, Saudi Arabia, Indonesia, and Nepal. Somatic symptoms included hot flushes, sweating, night sweats, heart discomfort, sleep problems, joint and muscular discomfort, and headache. Psychological symptoms included depressive mood, irritability, anxiety, fatigue, and poor memory. Urogenital symptoms included sexual problems, bladder problems, and vaginal dryness.

Somatic Symptoms

A subgroup meta-analysis was conducted on seven somatic symptoms, including hot flushes, sweating, night sweats, heart discomfort, sleep disturbances, joint and muscular discomfort, and headaches, as shown in Fig. 4.

In the hot flush subgroup, 15 studies comprising 14,331 participants were analyzed. The fixed-effects model yielded an OR of 1.26 (95% CI: 1.17–1.35, $P < 0.00001$), indicating that hot flushes were 1.26 times more likely in perimenopausal women compared to postmenopausal women. The heterogeneity test indicated substantial heterogeneity ($I^2 = 85\%$, $P < 0,00001$). For the sweating subgroup, two studies including 2,820 participants were analyzed. The OR was

1.29 (95% CI: 1.10–1.52, P = 0.002), suggesting that sweating was significantly more frequent in perimenopausal women. The heterogeneity test showed high heterogeneity (I^2 = 79%, P = 0,003).

In the night sweats subgroup, seven studies with a total of 9,408 participants were analyzed. The OR was 1.33 (95% CI: 1.22–1.45, P < 0.00001), indicating that night sweats were significantly more common in perimenopausal women. The heterogeneity test revealed substantial heterogeneity (I^2 = 80%, P < 0,00001). For the heart discomfort subgroup, eight studies comprising 8,340 participants were analyzed. The OR was 1.06 (95% CI: 0.93–1.21, P = 0.38), suggesting no significant difference in heart discomfort between perimenopausal and postmenopausal women. The heterogeneity test showed low heterogeneity (I^2 = 27%, P = 0,22).

In the sleep disturbances subgroup, 10 studies including 10,895 participants were analyzed. The OR was 1.52 (95% CI: 1.38–1.66, P < 0.00001), indicating that sleep disturbances were significantly more likely in perimenopausal women. The heterogeneity test demonstrated high heterogeneity (I^2 = 86%, P < 0,00001). For the joint and muscular discomfort subgroup, 11 studies comprising 11,385 participants were analyzed. The OR was 1.22 (95% CI: 1.12–1.32, P < 0.00001), demonstrating that joint and muscular discomfort was significantly more frequent in perimenopausal women. The heterogeneity test showed high heterogeneity (I^2 = 81%, P < 0,00001).

In the headache subgroup, five studies including 7,527 participants were analyzed. The OR was 0.97 (95% CI: 0.89–1.07, P = 0.59), suggesting no significant difference in headache prevalence between postmenopausal and perimenopausal women. The heterogeneity test indicated high heterogeneity (I^2 = 78%, P = 0,0002).

An overall analysis of somatic symptoms yielded a heterogeneity test result of I^2 = 82%. As shown in Fig.3, the OR was 1.24 (95% CI: 1.20–1.29, P < 0.00001), demonstrating that overall somatic symptoms were significantly more frequent in perimenopausal women compared to postmenopausal women.

Psychological Symptoms

A total of five psychological symptoms, consisting of irritability, anxiety, fatigue, poor memory, and depressive mood, were subjected to subgroup meta-analysis, as shown in Fig. 4.

This study analyzed nine articles, encompassing 7,394 participants, to assess the incidence of irritability among perimenopausal and postmenopausal women. The heterogeneity test showed an I^2 value of 76%. The OR was 1.02 (95% CI of 0.92-1.12, P = 0.74). These results indicate that irritability was not significantly higher in perimenopausal women compared with postmenopausal women. For the anxiety subgroup, nine articles comprising 8,654 participants were analyzed. The heterogeneity test showed an I^2 value of 25%. The OR was 1.10 (95% CI of 1.01-1.20, P = 0.03). These findings indicate that anxiety was significantly 1.10 times higher in perimenopausal women compared with postmenopausal women.

For the fatigue subgroup, eleven articles comprising 11,385 participants were analyzed. The heterogeneity test showed an I^2 value of 73%. The OR was 1.00 (95% CI of 0.92 to 1.09, P = 0.97). These results indicate that fatigue was not significantly different between postmenopausal and perimenopausal women. For the poor memory subgroup, six articles comprising 8,108 participants were analyzed. The heterogeneity test showed an I^2 value of 77%. The OR was 1.11 (95% CI of 1.01-1.23, P = 0.03). These findings indicate that poor memory was significantly 1.11 times higher in perimenopausal women compared with postmenopausal women.

For the depressive mood subgroup, eleven articles comprising 11,385 participants were analyzed. The heterogeneity test showed an I^2 value of 59%. The OR was 1.05 (95% CI of 0.96 to 1.14, P = 0.27). These results indicate that depressive mood was not significantly different between postmenopausal and perimenopausal women.

The overall analysis of the psychological symptom group showed a heterogeneity test result of I^2 = 66%. As illustrated in Fig. 4, the OR was 1.05 (95% CI of 1.01 to 1.10 (P = 0.01). These findings indicate that psychological symptoms overall were significantly higher in perimenopausal women compared with postmenopausal women.

Urogenital Symptoms

A total of three urogenital symptoms, consisting of sexual problems, bladder problems, and vaginal dryness, were analyzed through subgroup meta-analysis, as shown in Fig. 5.

This study analyzed ten articles, encompassing 7,587 participants, to assess the incidence of sexual problems among perimenopausal and postmenopausal women. The heterogeneity test indicated an I^2 value of 84%. The OR was 1.35 (95% CI of 1.20 to 1.52, P < 0.00001). These findings demonstrate that sexual problems were significantly 1.35 times more prevalent in perimenopausal women compared to postmenopausal women.

This study analyzed twelve articles, encompassing 8,950 participants, to assess the incidence of bladder problems among perimenopausal and postmenopausal women. The heterogeneity test indicated an I^2 value of 68%. The OR was 0.98 (95% CI of 0.88 to 1.09, P = 0.76). These findings suggest that bladder problems were

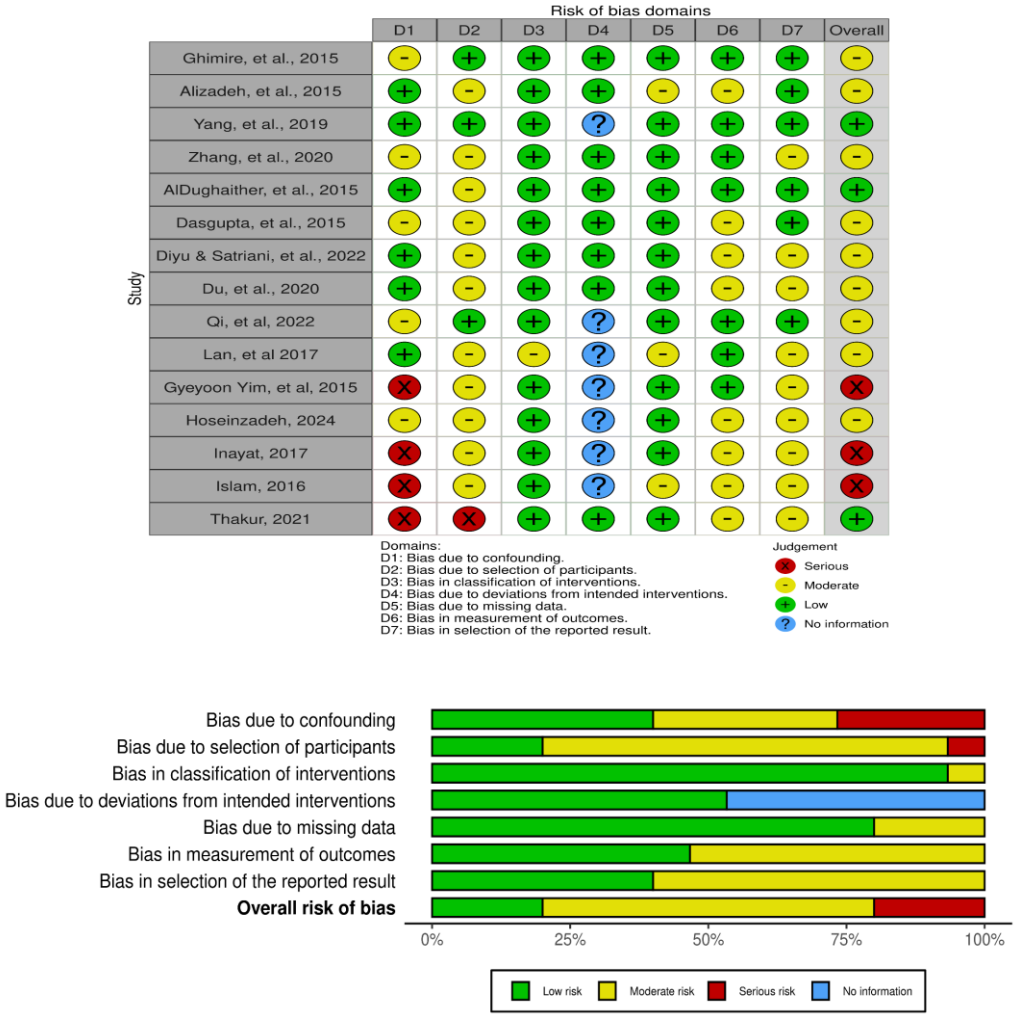


Fig.2. Risk of Bias Assessment (ROBINS-I V2)

not significantly higher in perimenopausal women compared to postmenopausal women.

This study analyzed eleven articles, encompassing 6,891 participants, to assess the incidence of vaginal dryness among perimenopausal and postmenopausal women. The heterogeneity test indicated an I^2 value of 51%. The OR was 1.77 (95% CI of 1.58 to 1.98, $P < 0.00001$). These findings demonstrate that vaginal dryness was significantly 1.77 times more prevalent in perimenopausal women compared to postmenopausal women.

The overall analysis of urogenital symptoms showed a heterogeneity test result with an I^2 value of 80%. As illustrated in Fig. 5, the OR was 1.31 (95% CI of 1.23 to 1.40, $P < 0.00001$). These findings indicate that urogenital symptoms as a whole were significantly 1.31 times more prevalent in perimenopausal women compared to postmenopausal women.

The overall results of this meta-analysis show that the symptoms with the highest odds ratios, in order of magnitude and predominantly observed in perimenopause, are vaginal dryness (95% CI = 1.77 [1.58, 1.98], $p < 0.00001$, $I^2 = 51\%$), sleep problems (95% CI = 1.52 [1.38, 1.66], $p < 0.00001$, $I^2 = 86\%$), and poor memory (95% CI = 1.11 [1.01, 1.23], $p = 0.03$, $I^2 = 77\%$).

DISCUSSION

Perimenopause and menopause are common conditions in women, with the average age being 49.76 years [1]. Menopause is defined as the absence of menstruation for 12 consecutive months. It is a natural process that typically occurs around the age of 51 but may occur earlier due to several factors, such as surgical removal of the ovaries (oophorectomy) and/or uterus

(hysterectomy), chemotherapy, or pelvic radiotherapy. During menopause, the production of estrogen and progesterone abruptly ceases, which may lead to various menopausal symptoms. These include hot flushes and night sweats, sleep disturbances, joint pain and fatigue, anxiety and mood changes, vaginal dryness, and bladder problems. Menopausal symptoms often appear before menstruation completely stops, a phase referred to as perimenopause [7].

Climacteric, or perimenopause, is the transitional period around menopause when ovarian function becomes unstable and gradually declines, leading to reduced fertility, menopause, and subsequent disorders associated with chronic estrogen deficiency [8]. The duration of this transition varies among women. In general, if menopause occurs around the age of 50, the climacteric phase lasts approximately two years. Conversely, if menopause occurs earlier (around the age of 40), the climacteric phase may last up to four years [9]. Based on the Stages of Reproductive Aging Workshop (STRAW +10) criteria, perimenopause begins when there is a persistent change in menstrual cycle length of seven days or more between consecutive cycles (stage -2) and continues until 12 months after the final menstrual period (stage +1a) [10].

Perimenopausal symptoms may be related to both estrogen excess and deficiency. Excess estrogen may cause breast tenderness (mastalgia), heavy menstrual bleeding, and headaches, while estrogen deficiency may result in vasomotor complaints (such as hot flushes), sleep disturbances, mood changes, fatigue, cognitive difficulties, decreased libido, genitourinary symptoms, as well as joint (arthralgia) and muscle (myalgia) pain. Additionally, perimenopause is marked by changes in chronic disease risk factors, including accelerated bone loss, increased cardiovascular risk with central fat accumulation, adverse changes in lipid profile, and impaired glucose metabolism. The incidence of mood disorders is also higher, particularly among women with a history of hormone-related mood symptoms [11].

In this study, several articles were reviewed regarding the prevalence of perimenopausal and postmenopausal symptoms in Asia. These symptoms were categorized according to their characteristics into somatic, psychological, and urogenital symptoms. This classification of perimenopausal and postmenopausal symptoms is consistent with the studies by Diyu et al. (2022) and AlDughaither et al. (2015), where symptoms were grouped into somatic, psychological, and urogenital categories.

Somatic Symptoms in Perimenopause and Postmenopause

In this study, somatic symptoms included hot flashes, sweating, night sweats, heart discomfort, sleep problems, joint and muscular discomfort, and headache. This classification is consistent with several previous studies, including that of Diyu et al. (2022), which reported that psychological and somatic symptoms were more common in perimenopausal women, while somatic and urogenital symptoms were more frequent in postmenopausal women. Similarly, in this study, somatic, psychological, and urogenital symptoms were significantly higher in the perimenopausal group compared with the postmenopausal group ($p < 0.05$). Vasomotor symptoms (VMS), which include hot flashes, excessive sweating, and night sweats, are common complaints among women during both perimenopause and postmenopause; however, in this study, they were more common in perimenopause than in postmenopause. The prevalence of menopausal VMS has been reported to range between 43% and 84% among East Asian women [12].

In the study by Du et al, 2020, the prevalence of most symptoms, such as hot flushes/sweating, fatigue, and emotional disorder among the participants in the perimenopausal period was found significantly higher than in the women in the pre-menopausal and post-menopausal periods: 43.18%, 44.52%, and 21.25% respectively ($p < 0.01$). In the study by Islam (2016), the highest mean VMS score was found in perimenopausal women (3.4 ± 1.8), which was higher than in postmenopausal women (2.7 ± 1.6). These findings align with this study, where nearly all somatic symptoms were significantly higher in the perimenopausal group, except for headache, which tended to be more common in postmenopausal women (95% CI = 0.97 [0.89, 1.07], $p = 0.59$, $I^2 = 78\%$), and heart discomfort, which was slightly but not significantly higher in the perimenopausal group (95% CI = 1.06 [0.93, 1.21], $p = 0.38$, $I^2 = 27\%$).

Across Asian countries, the prevalence of symptoms varied. According to Qi Yu et al. (2022), night sweats were the dominant symptom in China; feeling tired or worn out (92.8% peri; 83.2% post) was most common in Korea; and decreased physical strength (74.2% peri; 68.9% post) was prevalent in Taiwan[12]. The transition into menopause is marked by significant fluctuations in hormone levels as ovarian function declines. Serum estradiol and progesterone levels decrease, while follicle-stimulating hormone (FSH) levels rise. These hormonal changes affect menstrual patterns, often beginning with heavier menstrual bleeding in perimenopause, followed by increasingly infrequent cycles until amenorrhea occurs [13].

Although women may experience a wide range of symptoms, vasomotor and vaginal symptoms are most closely associated with hormonal changes during the menopausal transition [14]. In the study by Al Dughaither (2015), perimenopausal women reported a higher frequency of somatic and psychological symptoms compared to other groups. These findings are

consistent with this study, in which almost all somatic symptoms were significantly higher in perimenopause than in postmenopause, except for heart discomfort and headache.

Commonly reported symptoms include hot flushes and night sweats, which may vary from mild to severe. A hot flush is typically experienced as a sudden, intense heat in the upper body, especially the face, neck, and chest, and may be accompanied by sweating, flushing, chills, damp skin, and last for 1–5 minutes [15]. During the menopausal transition, up to 75% of women experience VMS daily, with one-third reporting more than 10 episodes per day. The severity of VMS tends to peak in late perimenopause and early postmenopause, though significant variations exist among individuals and ethnic groups in terms of prevalence, severity, and frequency. Physiologically, the menopausal transition is associated with a narrowing of the thermoregulatory zone, making the body more sensitive to small changes in core temperature. A deviation of approximately 0.4°C outside this zone may trigger a hot flush through mechanisms involving vasodilation, increased sweating, and reduced skin resistance [16].

Almost all women experience these symptoms, though their intensity varies. Sleep disturbances are also common, either directly related to hot flushes or independent of them. Hormonal changes are believed to disrupt circadian rhythm, leading to difficulties in initiating and maintaining sleep [17]. Additional factors such as pain, snoring, alcohol, and caffeine intake may exacerbate these disturbances. Hormonal changes during menopause have also been linked to increased joint pain and fatigue compared with the premenopausal period [18].

In this study, heart discomfort also referred to palpitations, described as rapid, irregular, and/or exaggerated heartbeats. Palpitations were reported by up to 42% of perimenopausal women and 54% of postmenopausal women. Some authors suggest that palpitations are part of vasomotor symptoms [19]. In addition, headache symptoms in this study included all types of head pain, including migraine. The onset of migraine is often associated with menarche, when cyclic hormonal fluctuations begin, and early menarche has been reported as a risk factor for migraine development. More than 50% of adolescent girls experience headaches during menarche. Existing data indicate that migraine prevalence tends to remain stable or increase during perimenopause but decreases after menopause. This finding aligns with this study, which found that headaches were more common in perimenopausal women, although the difference was not statistically significant [20].

Psychological Symptoms in Perimenopause and Postmenopause

In this study, five psychological symptoms were identified: irritability, anxiety, fatigue, poor memory, and depressive mood. Patients with agitation were categorized under irritability, while fatigue referred to women experiencing both physical and mental exhaustion, as well as decreased physical strength. According to Inayat et al. (2017), irritability was the most common psychological symptom among perimenopausal women. In contrast, the prevalence of psychological symptoms was lower in the postmenopausal group, with irritability (16%) being the most reported, followed by poor memory (12%), fatigue (10%), and loss of libido (3%) [5]. Similarly, Alizadeh et al. (2015) found that mental symptoms (including depression, anxiety, fatigue, and musculoskeletal pain) were more prevalent in perimenopausal women compared to postmenopausal women. These findings align with the results of this meta-analysis, which showed that psychological symptoms, such as irritability, anxiety, fatigue, poor memory, and depressive mood tended to be more frequent in perimenopausal women. However, in this study, statistical significance was only observed for anxiety and poor memory, while irritability, fatigue, and depressive mood did not reach significance [21].

During the perimenopausal period, women are more vulnerable to experiencing higher levels of anxiety and depression due to a combination of physiological, social, and psychological factors. From a physiological perspective, these changes originate from the natural biological process within the female body. At this stage, the decline in ovarian follicle reserves leads to unstable levels of estrogen and progesterone. Such hormonal fluctuations affect the central nervous system, particularly the regulation of neurotransmitters such as serotonin and GABA, which play crucial roles in mood regulation and anxiety response [22]. In addition, estrogen instability also impacts cognitive functioning, often manifesting as complaints of poor memory and difficulties with concentration, which are commonly reported during perimenopause [23].

In contrast, anxiety related to psychological factors during perimenopause and menopause is often described as a form of "maladaptation." At this stage, women may experience the loss of important life roles such as retirement from the workforce, children becoming independent and leaving home, divorce, or the death of loved ones. These circumstances can trigger what is commonly referred to as "empty nest syndrome" and "loss syndrome," which serve as significant sources of psychological stress. Moreover, women with mood disturbances are often found to have lower levels of estrogen [24].

Overall, psychological symptoms are not directly linked to natural menopause, except for a slight increase in irritability during the perimenopausal phase. It is important to distinguish midlife stressors, such as marital issues, physical appearance changes, children entering adolescence, or caring for aging parents from climacteric symptoms. Research findings suggest that midlife stressors, rather than menopause itself, play a greater role in the occurrence of irritability. Nonetheless, there is evidence that menopause can trigger anxiety and mood changes, where minor stressors that were previously manageable become overwhelming. Hormonal fluctuations are believed to be a key factor contributing to these psychological disturbances [25].

Urogenital Symptoms in Perimenopause and Postmenopause

In this study, three urogenital symptoms: sexual problems, bladder problems, and vaginal dryness were analyzed in a subgroup meta-analysis, with incontinence included under bladder problems. In the study by AlDughaither *et al*. (2015), urogenital symptoms, including sexual problems, bladder problems, and vaginal dryness, were reported more frequently during the perimenopausal stage compared to the postmenopausal stage. In particular, bladder problems were significantly higher in perimenopausal women (19.3%) than in postmenopausal women (5.9%), while the prevalence of sexual problems (7.6% vs. 10.1%) and vaginal dryness (13.4% vs. 10.1%) was also slightly higher in the perimenopausal group, although not statistically significant. Overall, these findings suggest that urogenital complaints tend to be more pronounced during perimenopause than in postmenopause, likely due to the hormonal fluctuations characteristic of the menopausal transition.

This findings are consistent with the results of this meta-analysis, which showed that vaginal dryness was 1.77 times more likely to occur in perimenopausal women (OR = 1.77, $p < 0.00001$), and sexual problems were 1.35 times more likely in the perimenopausal women (OR = 1.35, $p < 0.00001$). The most frequently reported symptom was vaginal dryness, particularly during intercourse, caused by reduced moisture due to thinning of the vaginal wall. Many women also reported bladder-related issues, such as increased urinary frequency, difficulty controlling urination, or discomfort from a sensation of bladder fullness [21].

During perimenopause, fluctuating estrogen levels, not yet persistently low as in postmenopause, lead to intermittent hypoestrogenic episodes that can destabilize urogenital tissues. Estrogen is critical for maintaining the thickness, collagen integrity, vascularity, and elasticity of the vaginal epithelium, vulvar tissues, urethra, and bladder trigone. During periods of reduced estrogen in perimenopause, tissue thinning, decreased lubrication, loss of superficial epithelial cells, microvascular changes, and altered pelvic support can cause symptoms such as vaginal dryness, dyspareunia, urinary frequency, urgency, and incontinence. These fluctuations may also diminish lactobacilli populations, raising vaginal pH and increasing susceptibility to infections including UTIs. In contrast, postmenopause is characterized by chronically low estrogen levels resulting in more uniform and progressive tissue atrophy and adaptation over time; although symptoms persist, the fluctuating nature of estrogen during perimenopause may precipitate sudden onset or exacerbations of urogenital symptoms that seem more pronounced during that transitional period [26]. Thus, the hormonal volatility of perimenopause often drives more abrupt and noticeable urogenital symptom episodes compared to the more stable, albeit atrophic, condition seen in postmenopause.

Estrogen plays a crucial role in maintaining the structure and normal function of the urogenital system. Estrogen receptors are present in the vagina, vulva, urethra, and bladder trigone, helping preserve blood flow, epithelial thickness, rugosity, elasticity, and moisture in response to estrogen stimulation [27,28]. During reproductive years, the vaginal epithelium is rich in glycogen, which is fermented by normal flora (Lactobacillus) into lactic acid, creating an acidic environment (pH 3.5–5.0) that supports Lactobacillus growth while protecting the vagina and urinary tract from infection. After menopause, Lactobacillus levels decline, vaginal pH increases, and genitourinary syndrome of menopause (GSM) develops [29].

Sexual activity also promotes epithelial regeneration and enhances lubrication. However, the decline in estrogen levels after menopause leads to reduced secretions and atrophy of the genitourinary tissues, causing the characteristic symptoms of GSM [25]. Other factors contributing to GSM include lactation, hypothalamic amenorrhea, and the use of antiestrogenic medications for uterine fibroids, endometriosis, or breast cancer [30].

CONCLUSION

This study shows that perimenopausal women face a higher risk of experiencing somatic, psychological, and urogenital symptoms compared to postmenopausal women. Overall, both groups tend to report higher occurrences of vaginal dryness, sleep problems, and poor memory. Vaginal dryness and reduced lubrication are caused by decreased estrogen levels, which affect the structure and function of the urogenital system. The study also indicates that fluctuations in estrogen and progesterone during the menopausal transition trigger significant hormonal changes that impact the menstrual cycle, physical function, and mental health.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

Availability of Data and Materials

All data sources described in this study are directed to the corresponding author.

REFERENCES

1. Lan, Y., Huang, Y., Song, Y., Ma, L., Chen, P., Ying, Q., et al. Prevalence, severity, and associated factors of menopausal symptoms in middle-aged Chinese women: a community-based cross-sectional study in southeast China. Menopause, 2017; 24(10), 1200-1207. doi: 10.1097/GME.0000000000000906
2. Peacock K, Carlson K, Ketvertis KM. Menopause. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025. Available from: https://www.ncbi.nlm.nih.gov/books/NBK507826/
3. Yim, G., Ahn, Y., Chang, Y., Ryu, S., Lim, J. Y., Kang, D., et al. Prevalence and severity of menopause symptoms and associated factors across menopause status in Korean women. Menopause, 2015; 22(10), 1108-1116. doi:10.1097/GME.0000000000000438
4. Pyne, Y., Burgin, J., & Hickey, M. Towards a more accurate global picture of perimenopause. Bulletin of the World Health Organization, 2024; 102(12), 922. doi: 10.2471/BLT.24.292659
5. Inayat, K., Danish, N., & Hassan, L. Symptoms of Menopause in peri and postmenopausal women and their attitude towards them. Journal of Ayub Medical College Abbottabad, 2017; 29(3), 477-482. doi : https://pubmed.ncbi.nlm.nih.gov/29076687/
6. Sauer, M. V. Reproduction at an advanced maternal age and maternal health. Fertility and sterility, 2015; 103(5), 1136-1143. doi: 10.1016/j.fertnstert.2015.03.004
7. Thapa, R. and Yang, Y., Menopausal symptoms and related factors among Cambodian women. Women & health, 2020; 60(4), pp.396-411. doi: https://doi.org/10.1080/03630242.2019.1643815
8. Delamater, L., & Santoro, N. Management of the perimenopause. Clinical obstetrics and gynecology, 2018; 61(3), 419-432. doi: 10.1097/GRF.0000000000000389
9. Davis, S. R., Pinkerton, J., Santoro, N., & Simoncini, T. Menopause Biology, consequences, supportive care, and therapeutic options. Cell, 2023; 186(19), 4038-4058. doi: 10.1016/j.cell.2023.08.016
10. Harlow, S. D., Gass, M., Hall, J. E., Lobo, R., Maki, P., Rebar, R. W., STRAW+ 10 Collaborative Group. Executive summary of the Stages of Reproductive Aging Workshop+ 10: addressing the unfinished agenda of staging reproductive aging. Climacteric, 2012; 15(2), 105-114. doi: 10.1210/jc.2011-3362
11. Magraith, K. Perimenopausal hormone therapy–assessment and prescribing. Medicine Today, 2022; 61. doi: https://medicinetoday.com.au/2022/august/regular-series/perimenopausal-hormone-therapy-assessment-and-prescribing
12. Yu, Q., Chae, H. D., Hsiao, S. M., Xie, J., Blogg, M., Sumarsono, B., & Kim, S. Prevalence, severity, and associated factors in women in East Asia with moderate-to-severe vasomotor symptoms associated with menopause. Menopause, 2022; 29(5), 553-563. doi: 10.1097/GME.0000000000001949
13. Vigneswaran, K., & Hamoda, H. The pathophysiology and management of menopausal symptoms. Obstetrics, Gynaecology & Reproductive Medicine, 2023; 33(5), 135-140. doi: 10.1016/j.ogrm.2023.02.003
14. Duralde, E. R., Sobel, T. H., & Manson, J. E. Management of perimenopausal and menopausal symptoms. Bmj, 2023; 382. doi: 10.1136/bmj-2022-072612
15. Bansal, R., & Aggarwal, N. Menopausal hot flashes: a concise review. Journal of mid-life health, 2019; 10(1), 6-13. doi: 10.4103/jmh.JMH_7_19
16. Gibson, C. J., Ajmera, M., O'Sullivan, F., Shiozawa, A., Lozano-Ortega, G., Badillo, et al. Epidemiology and clinical outcomes of vasomotor symptoms among perimenopausal women and women aged 65 years or older in the US: a systematic review. Women & Health, 2024; 64(9), 687-703. doi: 10.1080/03630242.2024.2392136
17. Pertynska-Marczewska, M., & Pertynski, T. Non-hormonal pharmacological interventions for managing vasomotor symptoms-how can we help: 2024 landscape. European Journal of Obstetrics & Gynecology and Reproductive Biology, 2024; 302, 141-148. doi: 10.1016/j.ejogrb.2024.09.013

18. Wright, V. J., Schwartzman, J. D., Itinoche, R., & Wittstein, J. The musculoskeletal syndrome of menopause. Climacteric, 2024; 27(5), 466-472. doi: 10.1080/13697137.2024.2380363

19. Carpenter, J. S., Sheng, Y., Pike, C., Elomba, C. D., Alwine, J. S., Chen, C. X., & Tisdale, J. E. Correlates of palpitations during menopause: A scoping review. Women's Health, 2022; 18, 17455057221112267. doi: 10.1177/17455057221112267

20. Ripa, P., Ornello, R., Degan, D., Tiseo, C., Stewart, J., Pistoia, F., et al. Migraine in menopausal women: a systematic review. International journal of women's health, 2015; 773-782. doi: 10.2147/IJWH.S70073

21. Alizadeh, M., Sayyah-Melli, M., Ebrahimi, H., Shishavan, M. K., & Rahmani, F. Social determinants and reproductive factors of the menopausal symptoms among women in Tabriz-Iran. Social Determinants of Health, 2015; 1(1), 2-8. doi: https://doi.org/10.22037/sdh.v1i1.7198

22. Zhang, Y., Hu, T. T., Cheng, Y. R., Zhang, Z. F., & Su, J. Global, regional, and national burden of anxiety disorders during the perimenopause (1990–2021) and projections to 2035. BMC Women's Health, 2025; 25(1), 11. doi: 10.1186/s12905-025-03547-z

23. Brinton, R. D., Yao, J., Yin, F., Mack, W. J., & Cadenas, E. Perimenopause as a neurological transition state. Nature reviews endocrinology, 2015; 11(7), 393-405. doi: 10.1038/nrendo.2015.82

24. Gębka, N. M., Głogowska-Szeląg, J., Gębka, D., & Adamczyk, J. Etiology, symptoms and treatment of peri-menopausal depression. Journal of Pre-Clinical and Clinical Research, 2023; 17(2), 91-94. doi: 10.26444/jpccr/162920

25. Talaulikar, V. Menopause transition: Physiology and symptoms. Best practice & research Clinical obstetrics & gynaecology, 2022; 81, 3-7. doi: 10.1016/j.bpobgyn.2022.03.003

26. Farrell AM. Genitourinary Syndrome of Menopause (GSM): Pathophysiology and anatomical changes including estrogen-receptor mediated tissue changes. 2017. doi: https://pubmed.ncbi.nlm.nih.gov/28697291/

27. Zhang, L., Ruan, X., Cui, Y., Gu, M., & Mueck, A. O. Menopausal symptoms among Chinese peri- and postmenopausal women: a large prospective single-center cohort study. Gynecological Endocrinology, 2021; 37(2), 185-189. doi: 10.1080/09513590.2020.1832070

28. Zhang, C., Chen, Y., Yin, L., Deng, G., Xia, X., Tang, X., et al. Investigating the impact of estrogen levels on voiding characteristics, bladder structure, and related proteins in a mouse model of menopause-induced lower urinary tract symptoms. Biomolecules, 2024; 14(9), 1044. doi: 10.3390/biom14091044

29. Wilkinson, E. M., Łaniewski, P., Herbst-Kralovetz, M. M., & Brotman, R. M. Personal and clinical vaginal lubricants: impact on local vaginal microenvironment and implications for epithelial cell host response and barrier function. The Journal of infectious diseases, 2019; 220(12), 2009-2018. doi: 10.1093/infdis/jiz412

30. Angelou, K., Grigoriadis, T., Diakosavvas, M., Zacharakis, D., & Athanasiou, S. The genitourinary syndrome of menopause: an overview of the recent data. Cureus, 2020; 12(4). doi: 10.7759/cureus.7586

Table 1. The Characteristics of the Included Studies

No.	Author, Year	Study Design	Center	Country	Total	Somatic Symptoms							Psychological Symptoms					Urogenital Symptoms		
						Hot flushes	Sweating	Night Sweat	Heart Discomfort	Sleep Problems	Joint and muscular discomfort	Headache	Depressive	Irritability	Anxiety	Fatigue	Poor memory	Sexual Problems	Bladder Problems	Vaginal Dryness
1.	Qi et al., 2022	Cross-sectional	Multi center	China	936	√	√	√		√	√	√	√		√	√	√	√	√	√
				Korea	466	√	√	√		√	√	√	√		√	√	√	√	√	√
				Taiwan	400	√	√	√		√	√	√	√		√	√	√	√	√	√
2.	Lan et al., 2017	Cross-sectional	Single center	China	672	√			√	√	√	√	√			√		√		
3.	Gyeyoon Yim et al., 2015	Cross-sectional	Single center	Korean	1018	√	√	√		√	√		√	√	√	√	√	√	√	√
4.	Hoseinzadeh et al., 2024	Cross-sectional	Single center	Iran	490	√		√			√	√	√	√	√	√	√	√	√	√
5.	Inayat et al., 2017	Cross-sectional	Single center	Pakistan	500	√			√			√		√			√	√	√	√
6.	Islam et al., 2016	Cross-sectional	Single center	Bangladesh	646	√														
7.	Thakur et al., 2021	Cross-sectional	Single center	East India	400	√		√											√	√
8.	Yang et al., 2019	Cross-sectional	Single center	Cambodia	157	√			√	√	√		√	√	√	√		√	√	√
9.	Zhang et al., 2020	Cohort	Single center	China	4063	√		√	√	√	√	√	√	√	√	√	√		√	
10.	AlDughaither et al., 2015	Cross-sectional	Single center	Saudi Arabia	88	√			√	√	√		√	√	√	√		√	√	√
11.	Alizadeh et al., 2015	Cross-sectional	Multi center	Iran	235	√		√		√	√		√	√	√	√	√		√	√
12.	Dasgupta et al., 2015	Cross-sectional	Single center	India	1400	√		√											√	√
13.	Diyu & Satriani et al., 2022	Cross-sectional	Single center	Indonesia	226	√			√	√	√		√	√	√	√		√	√	√
14.	Du et al., 2020	Cross-sectional	Single center	China	2059	√			√	√	√		√			√		√	√	
15.	Ghimire et al., 2015	Cross-sectional	Single center	Nepal	575	√			√	√	√		√	√	√	√		√	√	√

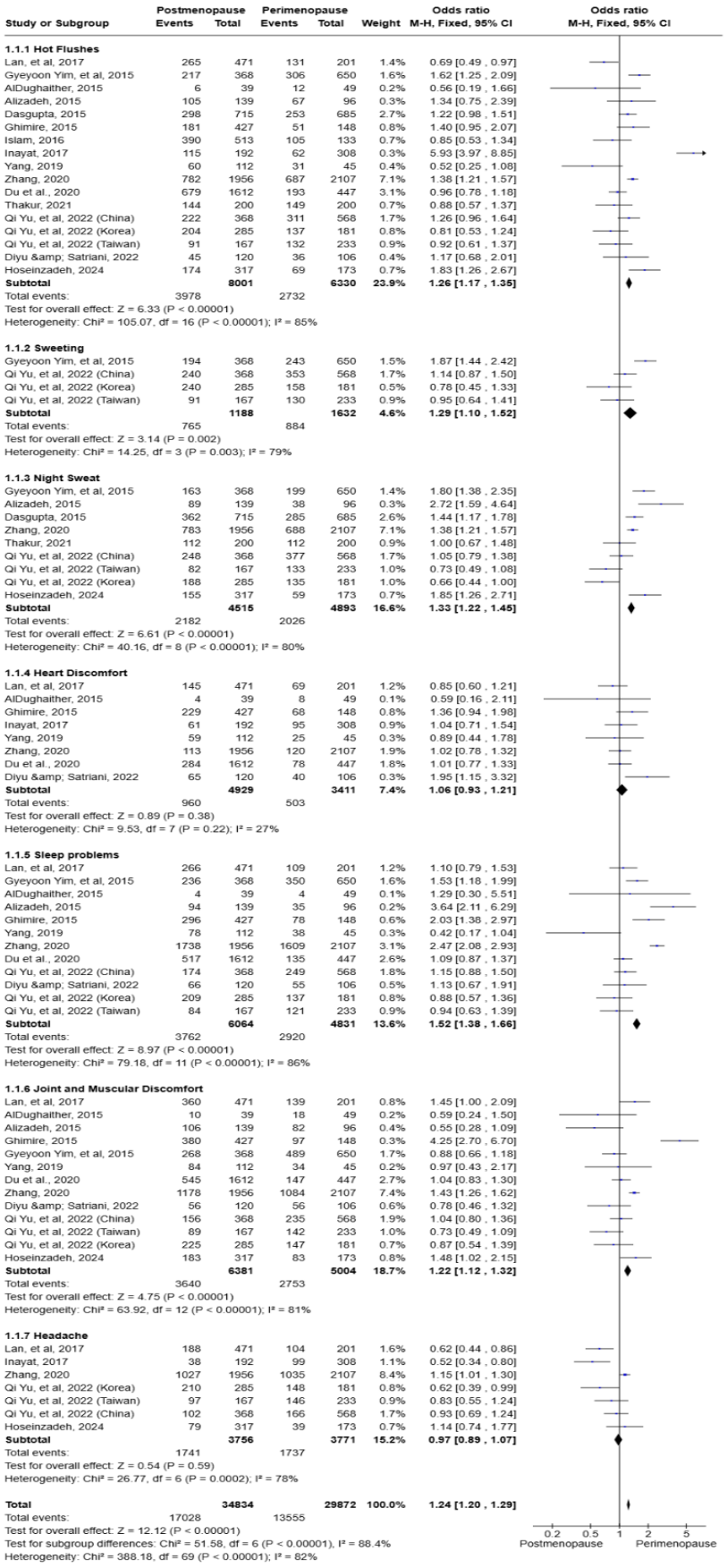


Fig.3. Meta-Analysis of Somatic Symptoms in Perimenopausal and Postmenopausal Women in ASIA

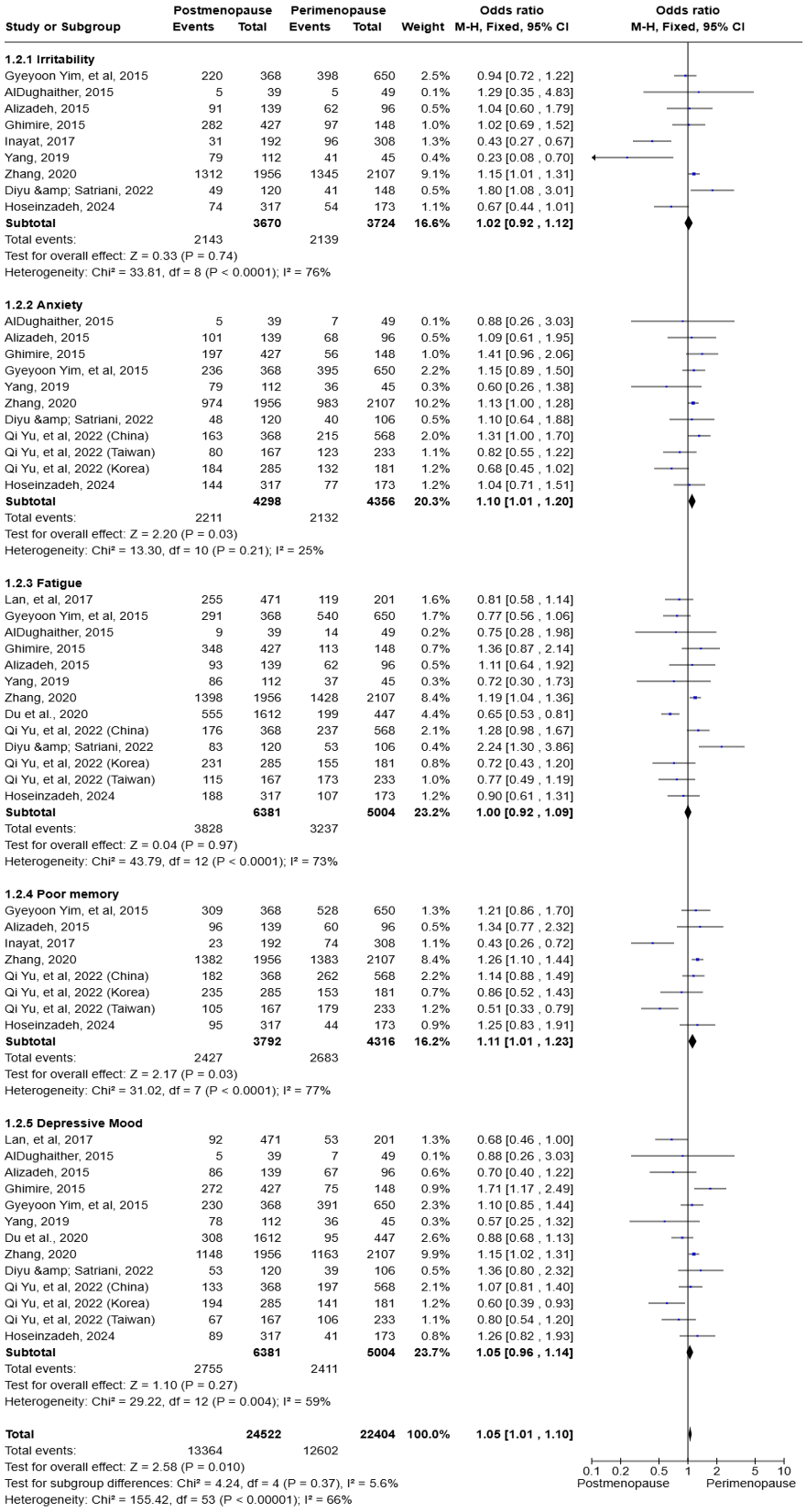


Fig. 4. Meta-Analysis of Psychological Symptoms in Perimenopausal and Postmenopausal Women in ASIA

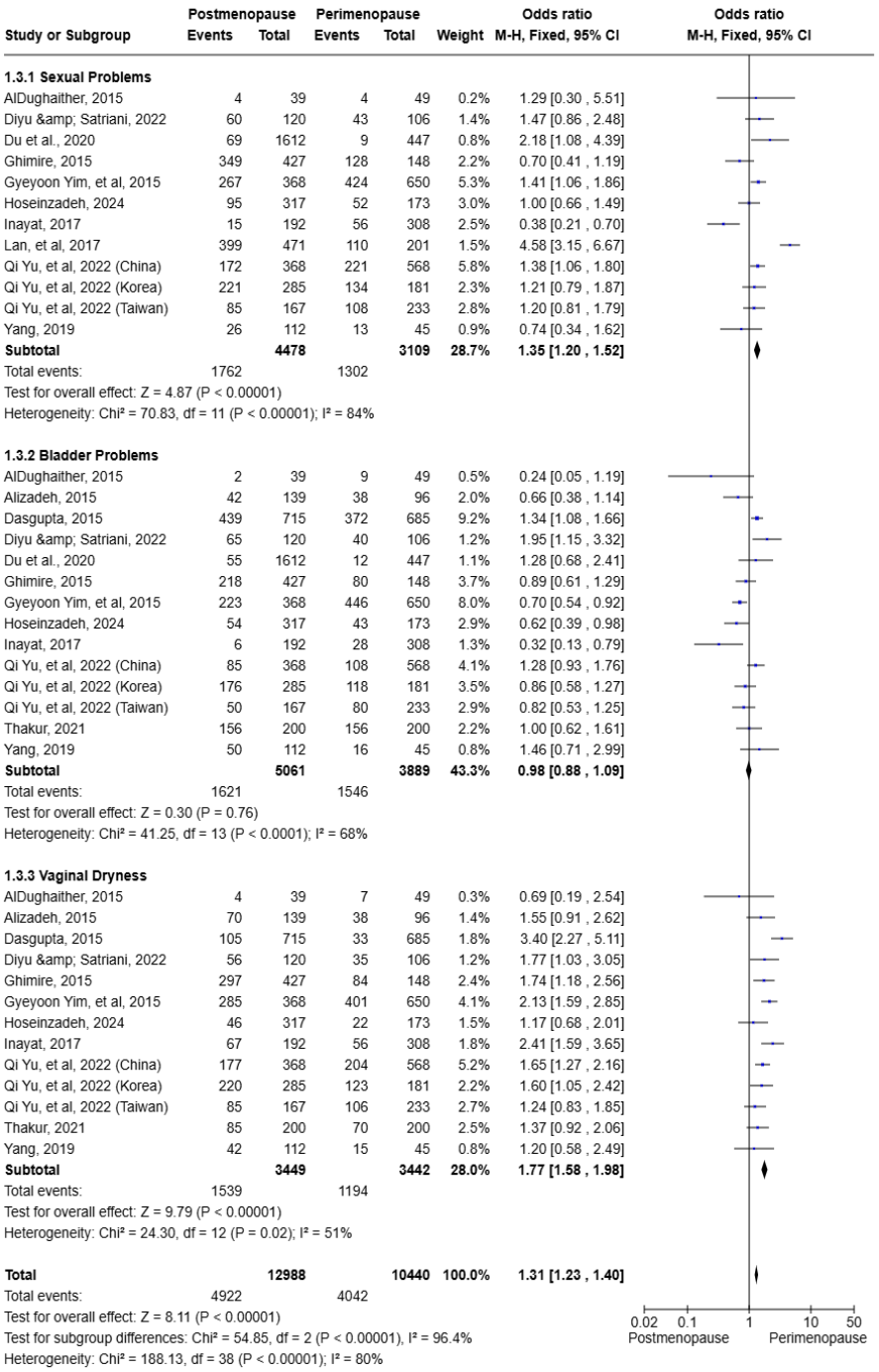


Fig. 5. Meta-Analysis of Urogenital Symptoms in Perimenopausal and Postmenopausal Women in ASIA