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SYSTEMATIC REVIEW

Female Sexual Dysfunction in Postmenopausal Women: A Systematic Review and Meta-Analysis

María Rodríguez-García[1] · Javier Fagundo-Rivera[1] · Juan Gómez-Salgado[2,3] · Antonio Luis Partida-Márquez[1,4]

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Abstract

Introduction Female sexual dysfunction (FSD) is highly prevalent among postmenopausal women, with multifactorial influences including biological, psychological, and sociocultural determinants. Despite extensive research on individual aspects of FSD, a comprehensive, cross-cultural synthesis of these factors remains limited. This review aims to address this gap by examining international evidence on the prevalence of FSD and the sociodemographic, clinical, psychological, and cultural factors shaping postmenopausal sexuality.

Methods A systematic review and meta-analysis were conducted following PRISMA guidelines. Literature was searched in PubMed, Scopus, Web of Science, CINAHL, and EMBASE for studies published between 2000 and 2026. Twenty-three eligible original studies were included, excluding those involving hormone therapy or participants with diagnosed mental health conditions such as major depression, anxiety, or psychosis. These exclusions were applied to avoid potential confounding effects. Methodological quality was assessed using Joanna Briggs Institute tools. Random-effects meta-analyses were performed using StatsDirect software to account for heterogeneity.

Results The analysis included 11,892 postmenopausal women across 23 studies. FSD affected 61.24% (95% CI: 46.15%–75.29%; Effect Size: 0,612407) of participants, while severe symptoms associated with the climacteric were reported in over 30% (95% CI: 22.59%–39.95%; Effect Size: 0,309362). Higher risk was associated with older age, unemployment, living in urban areas, low education, and high parity. Urogenital and somatic symptoms, together with depressive and anxious manifestations and negative body image, were significantly associated with reduced sexual function. Cultural and societal beliefs further shaped women's experiences and perceptions of sexuality.

Conclusions FSD in postmenopausal women is a widespread and multifaceted issue, requiring recognition of physical, psychological, and cultural contributors. A biopsychosocial perspective is essential to fully address its impact.

Policy Implications Healthcare systems should implement culturally sensitive, woman-centered strategies that integrate sexual education, empowerment, and psychosocial support. Policies must promote equitable access to sexual health services, multidisciplinary care, and interventions that normalize menopause while reducing stigma and disparities.

Keywords Postmenopause · Climacteric · Sexual dysfunction · Menopausal symptoms · Well-being · Cultural beliefs · Psychological factors

✉ Javier Fagundo-Rivera
javier.fagundo.rivera@gmail.com

✉ Juan Gómez-Salgado
salgado@uhu.es

María Rodríguez-García
marrogar789@gmail.com

Antonio Luis Partida-Márquez
antonio.partida@cruzroja.es

[1] Centro Universitario de Enfermería Cruz Roja, University of Seville, Seville, Spain

[2] Department of Sociology, Social Work and Public Health, Faculty of Labour Sciences, University of Huelva, Huelva, Spain

[3] Safety and Health Postgraduate Programme, Universidad de Especialidades Espíritu Santo, Guayaquil, Ecuador

[4] Department of Genetics, Reproduction and Maternal-Fetal Medicine, Hospital Universitario Virgen del Rocío, Seville, Spain

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Introduction

According to current scientific evidence, the climacteric is the biological stage of life during which reproductive capacity progressively declines and eventually ceases. In women, it begins with the gradual decrease in ovarian activity and continues beyond the cessation of ovarian function (Polo-Kantola & Toffol, 2023). This period is typically divided into three phases: premenopause, menopause, and postmenopause (Allen & Tully-Wilson, 2023). Premenopause is marked by hormonal fluctuations and a variety of symptoms, including menstrual irregularities, hot flashes, mood changes, and sleep disturbances. Menopause, defined as the permanent cessation of menstruation for at least 12 months without pathological causes, marks the end of a woman's reproductive period (Couto Núñez & Nápoles Méndez, 2014; Soriano-Ortega et al., 2017) and may occur naturally or be induced, either early (between 40 and 45 years old) or late (after age 55) (Couto Núñez et al., 2012; Spanish Association for the Study of Menopause, 2020). Postmenopause, in turn, extends from the first year following the final menstrual period into later life stages, during which tissue degeneration, particularly within the genitourinary tract, becomes increasingly evident (Ayala Peralta, 2020; Torres Jiménez et al., 2018).

Symptoms associated with the climacteric, particularly during postmenopause, are diverse. Hot flashes are the most frequently reported, influenced by both emotional and environmental factors (Gombert-Labedens et al., 2025; Stearns et al., 2002). Genitourinary syndrome, including vaginal atrophy, dyspareunia, and incontinence, affects approximately 45% of women over the age of 50 (Gandhi et al., 2016; Wasnik et al., 2023). Dyspareunia, defined as pain occurring before, during, or after sexual intercourse, is commonly associated with estrogen deficiency in women, which alters the genitourinary mucosa and impairs lubrication in response to sexual stimuli (Tayyeb & Gupta, 2025). Likewise, diminished levels of estrogen and testosterone during climacteric affect brain regions involved in sexual arousal (Armeni et al., 2023), disrupting the feedback mechanisms of the hypothalamic–pituitary–gonadal axis and contributing to anorgasmia (Espitia-De La Hoz, 2018; Scavello et al., 2019). Musculoskeletal complaints are also common, occurring in up to 70% of cases, and contribute to an increased risk of fractures (Fuentes et al., 2017; Ogwumike et al., 2016).

Psychologically, approximately 10% perimenopausal women experience depressive episodes characterized by irritability, insomnia, and decreased libido (Sánchez-Prieto et al., 2023; Sesma Pardo et al., 2013) partly attributable to reduced estrogen levels, which influence serotonin production (Rondón, 2008). Insomnia, often associated with nocturnal hot flashes, negatively affects both rest and cognitive functioning (Couto Núñez & Nápoles Méndez, 2012; Peralta López, 2017). In this context, self-esteem plays a pivotal role, as a positive self-image can enhance adaptation to this life stage (Kobau et al., 2011).

In recent decades, the approach to women's sexual health has evolved considerably, shifting from an exclusive focus on biological factors (World Health Organization, 1994) to a more comprehensive perspective that acknowledges the complexity of symptoms and the influence of psychological, social, and cultural aspects across the different reproductive stages (Peacock et al., 2025).

One of the most prevalent and impactful concerns is female sexual dysfunction (FSD), a condition influenced by anatomical, neurological, hormonal, emotional, and social factors, commonly emerging during the climacteric, and often resulting in sexual dissatisfaction (Espitia-De La Hoz, 2018; Scavello et al., 2019) and a substantial impact on women's quality of life (Nappi et al., 2016). Nazarpour et al. (2016) published a systematic review reporting a high prevalence of FSD among postmenopausal women, ranging from 68% to 86.5%, as well as its strong association with hormonal changes and both physical and psychological menopausal symptoms. Similarly, Heidari et al. (2019) emphasized the critical role of hormonal imbalances in the onset of vasomotor and urinary symptoms, and atrophic vaginitis, underlining their detrimental effects on sexual function. Psychological factors have also been widely documented. For instance, studies by Riguete de Souza Soares et al. (2012) and Resendiz-Oviedo and Sánchez Rodríguez (2022) indicate that symptoms of anxiety, depression, and insomnia, together with relationship conflicts, significantly compromise quality of life and sexual activity during the climacteric.

Cultural factors have also emerged as key modulators of the sexual experience in postmenopausal women. A 2016 meta-analysis revealed that awareness of sexual rights, gender norms, and traditional beliefs substantially shape the experience of FSD (McCool et al., 2016). Other authors (Martorell Poveda et al., 2020) highlighted that while menopause is frequently medicalized in Western societies, in non-Western contexts it is often perceived as a liberating phase, emphasizing the importance of culturally adapted interventions.

Thus, FSD is closely linked to a constellation of hormonal, emotional, and cognitive changes that occur during climacteric and may interfere with sexual satisfaction (Khani et al., 2021; Nappi et al., 2016). Specifically, reduced sexual desire can result from hormonal imbalances, medical conditions (i.e., history of pelvic or genital tract surgery), and psychosocial factors such as stress or low self-esteem. Dyadic or interpersonal factors, such as marital

dissatisfaction, partner sexual difficulties, and reduced partnered sexual activity, are also key correlates of FSD and reduced sexual desire (Heshmatnia et al., 2025). It is important to note that general sexual activity, including solo sexual activity, may still occur in the absence of a partner and can help alleviate menopause-related symptoms, such as mood changes, sleep disturbances, and vaginal discomfort (Lehmiller et al., 2024).

Given the complexity of FSD in postmenopausal women, studying this population is particularly relevant in light of increased life expectancy, as women may spend 30–35% of their lives in the climacteric phase. It is estimated that over 750 million women worldwide will soon be in this life stage (Couto Núñez & Nápoles Méndez, 2014; Department of Economic and Social Affairs, 2021), and in 2021, 26% of the global female population was over 50 years of age (World Health Organization, 2020). This longevity emphasizes the importance of investigating the biopsychosocial factors involved (dos Zanotelli et al., 2012). In response, several national health policies have prioritized promoting healthy sexuality during menopause through awareness campaigns that normalize and demystify this life stage using evidence-based information, while emphasizing female empowerment and the role of multidisciplinary teams (Gobierno de España, 2025) (Junta de Andalucía, 2024).

Nevertheless, limited knowledge of sexual health during post-menopause (both among women and healthcare providers) combined with the rapid growth of this demographic group and the high prevalence of FSD reported in recent literature (Colacurci et al., 2024; Taylor-Swanson et al., 2024; United Nations, Department of Economic and Social Affairs, 2019), highlights a critical gap in understanding how sociocultural factors shape postmenopausal sexual health experiences and outcomes. While existing studies have primarily focused on biomedical or psychological aspects within single cultural contexts, there is a lack of integrative, cross-cultural analyses that compare perspectives, behaviors, and healthcare responses across regions. FSD in postmenopausal women is influenced by multifactorial determinants, and understanding these influences is essential for improving sexual health and quality of life. Accordingly, this study aims to synthesize international scientific evidence through a contemporary cross-cultural lens, addressing prevalence, sociodemographic and somatic correlates, psychological dimensions, and the role of cultural beliefs and attitudes in shaping sexuality. This approach offers a novel contribution by providing a more comprehensive, culturally grounded understanding that can guide future research, inform culturally sensitive clinical guidelines, enhance healthcare provider training, and support public health strategies promoting equitable, evidence-based interventions for postmenopausal women.

Methods

Research Question

This review was guided by a research question structured according to the PEO framework: Population (P), Exposure (E), and Outcomes (O). Based on this model, the following question was formulated: *How do somatic*, *urogenital*, *psychological*, *sociodemographic*, *and sociocultural factors (E) influence sexual health*, *sexual satisfaction*, *and sexual activity (O) in postmenopausal women (P)?* This question shaped both the methodological design and the literature search strategy.

Information Sources and Search Strategy

The study was conducted in accordance with the PRISMA and MOOSE guidelines (Page et al., 2021; Stroup et al., 2000), and was registered on the Open Science Framework (OSF) platform (XXXXXX). No deviations from the registered protocol occurred.

In January 2026, a comprehensive literature search was conducted across PubMed, Scopus, Web of Science (WoS), EMBASE, and CINAHL databases. The last search was conducted on January 16th, 2026. The PROSPERO registry was consulted to confirm the absence of relevant reviews published within the previous two years. The final search strategy was:

(menopaus OR postmenopaus* OR climacter*) AND ("sexual dysfunction" OR "sexual problem*" OR "sexual function" OR "sexual health" OR libid*) AND ("menopaus* symptom*" OR "climacter* symptom*" OR "vasomotor symptom*" OR "psychology* symptom*" OR "personal satisfaction" OR "quality of life").* Table 1 presents the database-specific adaptations of the unified search strategy.

Eligibility Criteria

Inclusion criteria included original studies published between 2000 and 2026, to ensure the review reflects the most recent evidence and contemporary understanding of postmenopausal sexual health. Only women undergoing natural postmenopause (World Health Organization, 2024) were included. Therefore, studies including participants undergoing hormone replacement therapy, those with previously diagnosed mental health disorders (such as major depression, anxiety, or psychosis), or women with early or premature menopause were excluded, given their distinct biological and psychosocial profiles that might confound the observed associations. Systematic reviews and meta-analyses, as well as articles that did not meet the predefined criteria based on title, abstract,

Table 1 Database results

Database	Search strategy	Results
PubMed	(menopaus* OR postmenopaus* OR climacter*) AND ("sexual dysfunction" OR "sexual problem*" OR "sexual function" OR "sexual health" OR libid*) AND ("menopaus* symptom*" OR "climacter* symptom*" OR "vasomotor symptom*" OR "psychology* symptom*" OR "personal satisfaction" OR "quality of life") Filter: 2000–2026	1038
Scopus	(menopaus* OR postmenopaus* OR climacter*) AND ("sexual dysfunction" OR "sexual problem*" OR "sexual function" OR "sexual health" OR libid*) AND ("menopaus* symptom*" OR "climacter* symptom*" OR "vasomotor symptom*" OR "psychology* symptom*" OR "personal satisfaction" OR "quality of life") Filter: 2000–2026	2055
CINAHL	(menopaus* OR postmenopaus* OR climacter*) AND ("sexual dysfunction" OR "sexual problem*" OR "sexual function" OR "sexual health" OR libid*) AND ("menopaus* symptom*" OR "climacter* symptom*" OR "vasomotor symptom*" OR "psychology* symptom*" OR "personal satisfaction" OR "quality of life")	447
EMBASE	(menopaus* OR postmenopaus* OR climacter*) AND ("sexual dysfunction" OR "sexual problem*" OR "sexual function" OR "sexual health" OR libid*) AND ("menopaus* symptom*" OR "climacter* symptom*" OR "vasomotor symptom*" OR "psychology* symptom*" OR "personal satisfaction" OR "quality of life") Filter: 2000–2026	3968
Web of Science	(menopaus* OR postmenopaus* OR climacter*) AND ("sexual dysfunction" OR "sexual problem*" OR "sexual function" OR "sexual health" OR libid*) AND ("menopaus* symptom*" OR "climacter* symptom*" OR "vasomotor symptom*" OR "psychology* symptom*" OR "personal satisfaction" OR "quality of life") Filter: 2000–2026	1903

or full text, were also excluded. Additionally, studies with a methodological quality score below 5 (assessed using the Joanna Briggs Institute - JBI - critical appraisal tools) were omitted to ensure reliability.

Study Selection and Data Extraction

A total of 9,411 records were initially identified. After removing 7,246 duplicates, 2,165 records remained for screening. Of these, 1,843 were excluded based on title and abstract for not aligning with the study objectives. The remaining 322 full-text articles were assessed for eligibility, of which 299 were excluded: 165 for not addressing the main objective, 64 for unclear study design, methodology, or variables assessed, and 70 for not including the target population. No studies were excluded due to low methodological quality according to JBI criteria. Ultimately, 23 studies met the inclusion criteria and were included in the final review.

The selection process is detailed in the PRISMA flow diagram (Page et al., 2021) (Fig. 1). Zotero reference manager software was used to organize and manage citations.

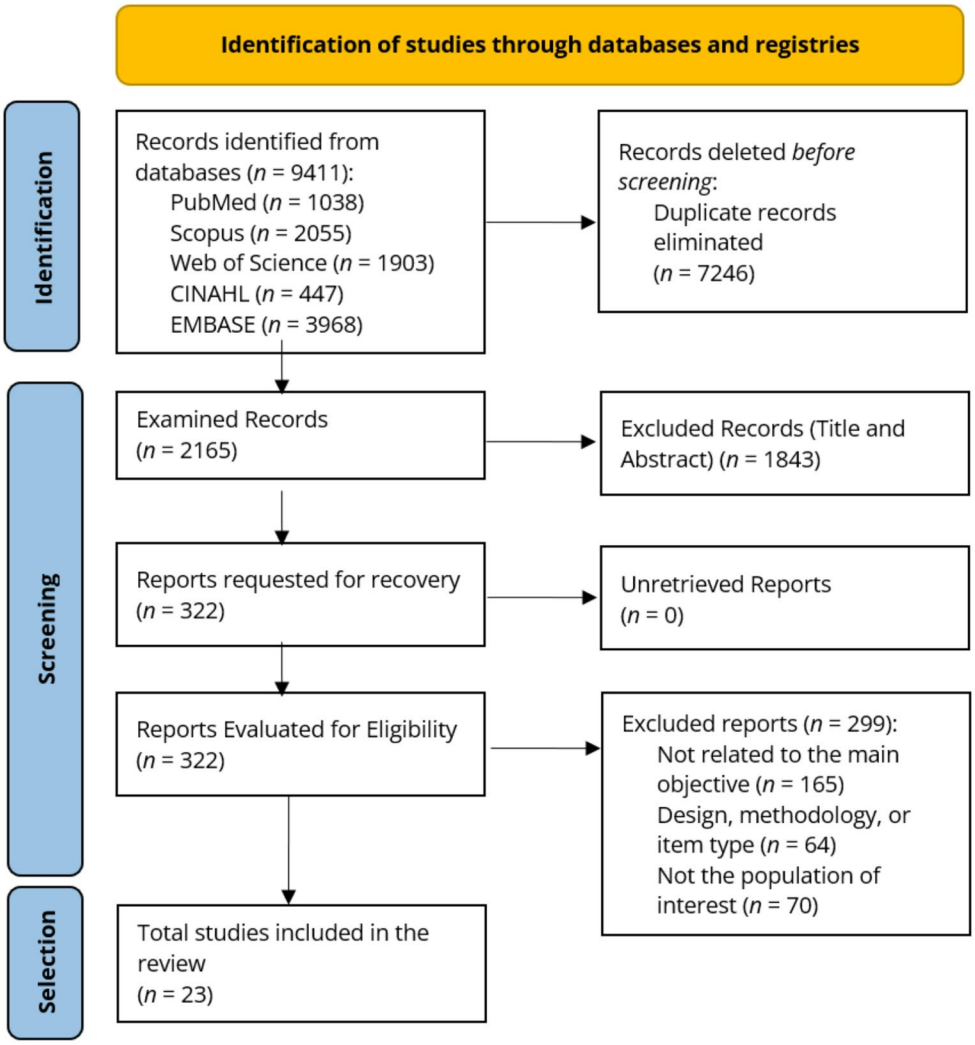
All titles, abstracts, and full texts were independently screened by two reviewers. Data extraction was also conducted independently by two reviewers using a standardized extraction form, which included information on study design, sample size, population characteristics, instruments used, and main outcomes. Any discrepancies between reviewers were resolved through discussion or, when necessary, by consulting a third reviewer. During reference selection, four disagreements were identified and resolved through peer discussion moderated by an additional reviewer. No disagreements occurred during data extraction or risk-of-bias assessment.

During data extraction, we also documented whether and how individual studies addressed potential confounding variables. This included noting if studies used multivariate regression models to adjust for confounders, matched comparison groups, or explicitly discussed confounding as a limitation. The specific confounders that were adjusted for in the analyses (e.g., age, BMI, relationship status, socioeconomic status, use of medications) were recorded. However, a formal quantitative synthesis of adjusted effect estimates was not feasible due to the heterogeneity in how confounders were defined, measured, and analyzed across the included studies.

Assessment of Risk of Bias and Methodological Quality

The methodological quality of the included studies was assessed using the Joanna Briggs Institute (JBI) critical appraisal checklists (Jordan et al., 2019), adapted according to study design (Supplementary File 1). For cross-sectional studies, a maximum score of 8 points was applied, evaluating aspects such as participant description, measurement validity, and control of confounding factors; studies scoring below 4 were considered at high risk of bias and excluded. Case-control studies were assessed using a 10-point scale, focusing on comparability between groups, case-control matching, and standardization of exposure and outcome

Fig. 1 PRISMA Flowchart



assessments, with studies scoring 5 or below excluded. Qualitative studies were evaluated using a 10-point checklist addressing methodological congruence, researcher influence, sample representativeness, and ethical approval; studies with scores of 5 or lower were excluded due to potential bias. Studies with lower methodological quality were examined separately to determine their impact on the overall results. This approach allowed to systematically evaluate the robustness of the findings and ensure that potential bias related to study quality was transparently accounted for.

Data Synthesis: Meta-Analyses of Prevalence and Correlation

Two separate meta-analyses were conducted (Supplementary File 2). The first focused on prevalence estimates and included data derived from the Menopause Rating Scale (MRS) (Heinemann et al., 2004) and Female Sexual Function Index (FSFI) (Rosen et al., 2000), considering both total scores and individual subdomains.

The FSFI and MRS are validated instruments commonly used to assess FSD and menopausal symptoms, respectively, in clinical and research settings worldwide. The MRS is a self-administered instrument designed to assess the presence and severity of menopausal symptoms in women over time and across different groups. It evaluates 11 symptoms grouped into three domains: somatovegetative (hot flashes, heart discomfort, sleep problems, muscle and joint pain), psychological (depressive mood, irritability, anxiety, physical and mental exhaustion), and urogenital (sexual problems, bladder issues, vaginal dryness). Each symptom is rated on a 5-point scale from 0 (no symptoms) to 4 (very severe). The total score ranges from 0 to 44. Cut-off values categorize burden as asymptomatic (0–4), mild (5–8), moderate (9–16), and severe (17+). The FSFI is a brief, multidimensional self-report questionnaire that evaluates six domains of sexual function: desire, arousal, lubrication, orgasm, satisfaction, and pain. It consists of 19 items, with a total score ranging from 2.0 to 36.0. Most of the items range from 0 (no sexual

activity), or 1 (Hardly ever/never) to 5 (Almost always/always), although four specific items use a 1 to 5 scale. Higher scores indicate healthy sexual function, while scores below 26.55 suggest potential dysfunction.

StatsDirect software (StatsDirect Ltd., Cambridge, UK) was used, and the DerSimonian–Laird method was applied to construct random-effects models. Prevalence estimates were calculated for FSD using the FSFI total score, applying the established cut-off of <26.55 to indicate sexual dysfunction. Despite being validated in multiple contexts, this threshold was consistently maintained. Additionally, prevalence was assessed for menopausal symptoms using the MRS total score, as well as separately for its three subdomains: somatic, urogenital, and psychological. Results are reported with 95% confidence intervals, and heterogeneity was evaluated using Cochran's Q test and the I^2 statistic. Random-effects models were selected when I^2 exceeded 50% (Cumpston et al., 2019).

Forest plots were generated to visualize outcomes, and statistical significance was set at $p < 0.05$. Publication bias was assessed using Egger's regression test and funnel plots. A threshold of $p < 0.10$ was applied to indicate potential bias, following methodological recommendations for situations in which Egger's test may be underpowered when the number of available studies is small to moderate. Using a more liberal cutoff reduces the risk of failing to detect small-study effects or funnel plot asymmetry. Funnel plots and their corresponding regression lines are provided in Supplementary File 2. A sensitivity analysis was also performed, and no substantial changes were observed after the exclusion of individual studies (Francis, 2013).

The second meta-analysis examined correlations using Pearson's r coefficients reported in seven studies assessing associations between total scores on the MRS and FSFI scales. For analysis, the correlation coefficients were first transformed using Fisher's r-to-z transformation to stabilize the variance, and the pooled estimates were subsequently back-transformed to r using the inverse Fisher transformation. StatsDirect software was used for all calculations, and heterogeneity was assessed via the Restricted Maximum Likelihood (REML) estimator (Viechtbauer, 2010), Cochran's Q test, and the I^2 statistic. When moderate heterogeneity ($I^2 > 50\%$) and non-zero tau^2 values were present, random-effects models were applied, and prediction intervals were calculated to estimate the range of effects expected in a new study. Potential outliers and influential studies were identified using studentized residuals, Cook's distance, and leave-one-out analyses. Funnel plot asymmetry was evaluated using rank correlation and regression-based tests (Supplementary File 2).

Results

Study Selection

A total of 23 articles (Abdollahi et al., 2025; Andac & Aslan, 2017; Cabral et al., 2012, 2013; Dombek et al., 2016; Fausto et al., 2023; Ghazanfarpour et al., 2015; Gozuyesil et al., 2018; Ling & Wang, 2023; Mezones-Holguin et al., 2011; Mundhra et al., 2024; Muralikrishna et al., 2025; Nazarpour et al., 2018; Pérez-Herrezuelo et al., 2020; Pérez-López et al., 2012; Pimenta et al., 2012; Rafiei et al., 2025; Saleh et al., 2024; Shahrahmani et al., 2025; Trento et al., 2021; Urrunaga-Pastor et al., 2022; Yanikkerem et al., 2012, 2018) were selected for the final review after a search across multiple databases. The combined sample comprised 11,892 women aged 45–75 years, with approximately 70% in the postmenopausal stage. The included studies, published between 2011 and 2026, represent diverse geographic regions, including Spain (Pérez-Herrezuelo et al., 2020; Pérez-López et al., 2012), Brazil (Cabral et al., 2012, 2013; Dombek et al., 2016; Fausto et al., 2023; Trento et al., 2021), Iran (Abdollahi et al., 2025; Ghazanfarpour et al., 2015; Nazarpour et al., 2018; Rafiei et al., 2025; Shahrahmani et al., 2025), China (Ling & Wang, 2023), Turkey (Andac & Aslan, 2017; Gozuyesil et al., 2018; Yanikkerem et al., 2012, 2018), India (Mundhra et al., 2024; Muralikrishna et al., 2025), Latin America (Urrunaga-Pastor et al., 2022), Saudi Arabia (Saleh et al., 2024), Peru (Mezones-Holguin et al., 2011) and Portugal (Pimenta et al., 2012).

Most studies were quantitative with a cross-sectional design, except for one case-control study (Ling & Wang, 2023), two qualitative studies (Rafiei et al., 2025; Shahrahmani et al., 2025) and two mixed-methods studies (Muralikrishna et al., 2025; Yanikkerem et al., 2012). Methodological quality, assessed using the JBI tool, was high: 60% of cross-sectional studies achieved a perfect score (8/8), one study obtained 7/8, and the remaining obtained 6/8. The case–control study scored 8/10, while the qualitative studies scored 8/10 and 9/10, with two studies achieving a score of 10/10.

The primary measurement instruments included the Menopause Rating Scale (MRS) (Heinemann et al., 2004), the Female Sexual Function Index (FSFI) (Rosen et al., 2000), the Sexual Quality of Life–Female (SQOL-F) (Symonds et al., 2005), the Menopause-Specific Quality of Life Questionnaire (MENQOL) (Hilditch et al., 1996), and the Attitudes Toward Menopause Scale (ATM) scale (Neugarten et al., 1963). Key sociodemographic variables analyzed were age, marital status, educational level, employment status, parity, body mass index (BMI), menopausal status (pre-, peri-, or postmenopause), place of residence, income level, and menopausal duration. Psychological

assessments included the Hospital Anxiety and Depression Scale (HADS), the Body Image Scale (BIS), and the Beck Depression Inventory (BDI).

Tables 2 and 3 summarize the key characteristics, variables, and outcomes of the included studies.

Prevalence of Sexual Dysfunction in Postmenopausal Women

Studies conducted in countries such as Spain, Brazil, Iran, Turkey, India, and Peru consistently report a high prevalence of FSD among postmenopausal women. While prevalence rates vary across regions, the influence of physical, psychological, and sociodemographic factors is consistently observed.

In Spain, Pérez-López et al. (2012) reported a prevalence of 36.9% (n:66/N:179), associated with age, urogenital symptoms, and mood disorders. In contrast, Pérez-Herrezuelo et al. (2020) found a much higher prevalence of 70.88% (n:140/N:182), with significant associations with psychological and urogenital symptoms ($p<0.001$).

In Brazil, several studies reported similarly high figures: Cabral et al. (2012) found a 67% (n:248/N:370) prevalence; Dombek et al. (2016) reported 70.3% (n:78/N:111), emphasizing lubrication loss; and Trento et al. (2021) identified a 64% (n:243/N:380) prevalence linked primarily to psychological factors. Fausto et al. (2023) found a 56.3% (n: 54/N:96) risk of FSD.

In Iran, Nazarpour et al. (2018) reported a 61% (n:247/N:405) prevalence, noting an inverse relationship between menopausal symptoms and sexual function. Ghazanfarpour et al. (2015) highlighted reduced sexual desire and vaginal dryness as predominant issues.

Turkey presented the highest reported prevalence rates: Andac and Aslan (2017) reported 79.4% (n:224/N:282), Yanikkerem et al. (2018) 86.4% (n:494/N:572), and Gozuyesil et al. (2018) 82% (n:260/N:317). These studies consistently linked FSD with factors such as advanced age, unemployment, low income, and decreased quality of life.

In India, Mundhra et al. (2024) observed an age-related increase in FSD prevalence, reaching 45% (n:43/N:143) in the 51–53 age group. In Peru, Mezones-Holguín et al. (2011) reported a 35.2% (n:118/N:335) prevalence, associated with depressive symptoms and relationship difficulties.

A meta-analysis of 15 studies (Andac & Aslan, 2017; Cabral et al., 2012, 2013; Dombek et al., 2016; Fausto et al., 2023; Gozuyesil et al., 2018; Ling & Wang, 2023; Mezones-Holguin et al., 2011; Mundhra et al., 2024; Nazarpour et al., 2018; Pérez-Herrezuelo et al., 2020; Pérez-López et al., 2012; Trento et al., 2021; Urrunaga-Pastor et al., 2022; Yanikkerem et al., 2018) involving 9,319 women yielded a pooled FSD prevalence of 61.24% (95% CI: 46.15%–75.29%), as measured by the FSFI. Significant publication bias was detected (Egger's test, $p=0.0085$), along with high heterogeneity ($I^2 = 99.4\%$), supporting the use of a random-effects model (Fig. 2).

To explore potential sources of heterogeneity, we performed subgroup analyses according to broad geographic regions and study design. Countries were grouped into three broader regions to ensure sufficient sample size within each subgroup: Asia/Africa ($k=7$), Latin America ($k=4$), and Europe ($k=2$). The pooled prevalence estimates were as follows: Asia/Africa: 63.6% (95% CI 44.3–79.3), $I^2 = 98.1\%$; Latin America: 48.8% (95% CI 28.8–69.1), $I^2 = 95.8\%$; Europe: 54.4% (95% CI 22.7–82.8), $I^2 = 97.5\%$.

The between-group heterogeneity test was statistically significant ($Q=72.25$, $df=2$, $p<0.001$), indicating that prevalence estimates differed significantly across regions. These results suggest that contextual factors related to region may partially explain the variability observed across studies. When stratifying by study design (categorized as cross-sectional vs. other designs), prevalence estimates remained heterogeneous, and no consistent pattern was observed between design type and prevalence.

Given the relatively small number of studies ($k=13$), meta-regression was not conducted, as it would have limited statistical power and could yield unstable or misleading estimates. Moreover, meta-regression analyses identify associations rather than causal relationships. The exploratory meta-regression performed for sensitivity suggested a possible association between study sample size and prevalence (larger studies tended to report higher prevalence), which may reflect design- or reporting-related bias rather than a true causal effect. Further research with larger datasets and consistent measurement methods would be necessary to clarify these associations.

Regarding severe menopausal symptoms, assessed using the MRS in 10 studies (Andac & Aslan, 2017; Cabral et al., 2013; Fausto et al., 2023; Ling & Wang, 2023; Mezones-Holguin et al., 2011; Nazarpour et al., 2018; Pérez-Herrezuelo et al., 2020; Pérez-López et al., 2012; Trento et al., 2021; Urrunaga-Pastor et al., 2022) with 7,806 women, the pooled prevalence was 30.93% (95% CI: 22.59%–39.95%). No publication bias was observed ($p=0.3273$), although heterogeneity remained high ($I^2 = 97.5\%$).

Seven studies (Andac & Aslan, 2017; Ling & Wang, 2023; Mezones-Holguin et al., 2011; Mundhra et al., 2024; Nazarpour et al., 2018; Pérez-López et al., 2012; Yanikkerem et al., 2018) examined the correlation between menopausal symptoms and FSD, reporting a significant negative association (mean $r = -0.3761$; 95% CI: -0.4828 to -0.2693; $p<0.0001$), with individual correlation coefficients ranging from −0.6141 to -0.2237. Despite moderate-to-high heterogeneity ($I^2 = 82.73\%$), the results were consistent and showed no evidence of publication bias (Fig. 2).

Table 2 Characteristics and results of the studies

Author, Reference Year and Country	Objective of the research	Study Design 1. Type of research 2. Type of intervention 3. Main variables of interest	Sample	Main results and conclusions	JBI
(Rafiei et al., 2025) Iran	This research aims to identify key factors and strategies for enhancing the sexual health and well-being of postmenopausal women by exploring the lived experiences of women and the perspectives of sexology experts.	1- Qualitative research using a content analysis approach. 2- Data were gathered through in-depth, semi-structured interviews following the Graneheim and Lundman method. 3- The analysis focused on a multidimensional view of sexual quality of life to include biological, psychological, social, and cultural determinants. The research was structured around three emergent themes: (1) managing environmental and cultural barriers; (2) increasing physiological awareness to shift attitudes; (3) fostering adaptive behaviors for the acceptance of postmenopausal transitions.	The study utilized purposive sampling to recruit a total of 21 participants, categorized into two distinct groups: - Postmenopausal Women ($n=15$). Women aged 50 to 62 (mean age: 55.69) with a mean postmenopausal duration of 5 years (range: 2–10 years). - Sexology Experts ($n=6$): To provide a professional dimension, the study included specialists with extensive experience in delivering sexual health services specifically tailored to postmenopausal women.	The findings highlight postmenopausal sexual health as a multifaceted process that requires an integrated biopsychosocial approach. Three key themes emerged: the impact of individual, family, and environmental factors; the importance of awareness and relational perspectives; and the need for adaptation and proactive management. Sexual wellbeing is often limited by cultural taboos, economic constraints, and lack of privacy, while education for women and their partners helps sustain sexual confidence and expand intimacy beyond intercourse. The study concludes that resilience in postmenopausal sexuality depends on accepting physical changes and adopting proactive strategies such as communication, behavioral adjustments, and professional support. These results emphasize the need to incorporate sexual health into routine postmenopausal care through personalized education and ongoing screening, promoting emotional intimacy and healthy sexual aging.	10/10
(Shahrahmani et al., 2025) Iran	The primary objective of this research was to explain the concept of sexual satisfaction from the perspective of postmenopausal Iranian women	1- Qualitative, exploratory study using a conventional content analysis approach following the Graneheim and Lundman framework. 2- Information was gathered via in-depth, semi-structured face-to-face interviews, which continued until data saturation was achieved. 3- The analysis identified seven categories that define sexual satisfaction: (1) Socio-Cultural and Religious Influences; (2) Individual and Contextual Factors; (3) Psychological Well-being; (4) Marital Dysfunction; (5) Positive Relational Interactions; (6) Sexual Helplessness; (7) Evolving Sexual Values.	The study sample consisted of 22 married postmenopausal Iranian women recruited from health centers. The participants' ages ranged from 40 to 70 years (mean age: 54.5), with an average age of menopause onset at 49.72 years. Marriage duration varied significantly, from 10 to 44 years, and parity ranged from 0 to 6 children. Women had no history of known mental health disorders, no use of hormone replacement therapy and no use of libido-enhancing treatments, such as testosterone.	The qualitative analysis identified seven key categories of sexual satisfaction, showing that for postmenopausal Iranian women, sexuality is shaped predominantly by sociocultural and psychological factors rather than physiology alone. Although positive relational dynamics enhance satisfaction, cultural taboos, religious practices, and marital dysfunction often limit sexual wellbeing. Physical challenges such as dyspareunia and reduced libido contribute to feelings of sexual helplessness, prompting a shift toward valuing emotional intimacy, communication, and shared identity over penetrative sex. Overall, sexual satisfaction during menopause emerges as a subjective, multidimensional, and relational construct that prioritizes emotional closeness. Restrictive cultural beliefs and poor partner communication remain major barriers, underscoring the need for culturally tailored education and counseling approaches that address psychological, relational, and contextual factors beyond medical treatment.	10/10

Table 2 (continued)

Author, Reference Year and Country	Objective of the research	Study Design 1. Type of research 2. Type of intervention 3. Main variables of interest	Sample	Main results and conclusions	JBI
(Murali-krishna et al., 2025) India	The primary objective of this research is to evaluate the prevalence of menopausal symptoms and to analyze the knowledge and attitudes of perimenopausal and postmeno-pausal women regarding menopause.	1- Mixed methods design. 2- This study used the MRS for the quantitative phase and integrated qualitative data from focus group discussions. 3- The study evaluated the fol-lowing variables: - MRS: Somatic, Psychologi-cal, and Urogenital Symptoms. - Knowledge and Attitudes: Evaluated through pre-tested questionnaires. - Socio-clinical predictors: age, BMI, parity, and physical activity.	The study included 300 women (mean age 49.4 ± 4.6 years) attending a tertiary care hospital in India. The sample was predominantly post-menopausal (70%; $n=210$), with a mean age at menopause of 48.7 years. The majority were homemakers (71.7%) and multiparous (86%). A high prevalence of overweight (50.3%) and obesity (28.4%) was observed, with a mean BMI of 29.5 kg/m². 76% of the participants were physically inactive.	Postmenopausal women reported signifi-cantly higher symptom prevalence and severity than perimenopausal women (mean MRS scores: 13.71 vs. 8.95). Somatic symptoms were most prominent, particularly joint and muscular discomfort (86.6%) and sleep disturbances, alongside frequent psychological symptoms such as depressive mood and physical exhaus-tion. Logistic regression identified low menopause-related knowledge (AOR: 2.78), primiparity (AOR: 2.49), and age under 50 (AOR: 1.78) as the main predic-tors of severe symptomatology. Qualitative findings revealed a dual experi-ence in which women described both relief from menstruation and a sense of empow-erment linked to maturity, while simultane-ously reporting marked physical exhaustion and irritability. Overall, the menopausal transition emerged as a culturally meaning-ful milestone that requires strong familial and emotional support to buffer the impact of somatic symptoms.	7/8 (cross sec-tional) 8/10 (qual-ita-tive)
(Abdollahi et al., 2025) Iran	The main objective of this study was to examine the relation-ship between the percep-tion of aging, attitudes toward menopause, and sexual quality of life in older women.	1- Cross-sectional design. 2- Three questionnaires were used in this study: SQOL-F, AQP and ATM. 3- The study evaluated the fol-lowing variables: - SQOL-F: Assessed as the outcome or dependent variable. - APQ: progressive course, positive/negative conse-quences, and emotional reactions. - ATM: negative feelings, improvement in post-meno-pausal quality of life, and symptom control, among others. - Sociodemographic Variables: age, aging perception, educa-tional level, economic status, and the presence of chronic diseases.	The sample consisted of 342 women aged 60 to 75 (mean: 64.74; SD ± 3.84), selected via pro-portional stratified random sampling in health centers in Gonabad, Iran. All participants were married, living with their spouses, and had an average of 4.3 children. The sample was characterized by a low educational level (67.2% illiterate or semi-illiterate) and a predominantly middle-income. 91.2% suffered from chronic conditions, most notably muscu-loskeletal pain and hypertension.	Participants showed generally positive per-ceptions of aging (M = 57.83) and attitudes toward menopause (M = 79.45); however, only 25% reported good sexual quality of life (SQOL-F). SQOL-F was positively correlated with perceptions of aging ($r=0.469$) and attitudes toward menopause ($r=0.158$). In regression analyses, percep-tion of aging ($\beta=0.391$, $p<0.001$) and age ($\beta=-0.092$, $p=0.049$) emerged as the main predictors of sexual wellbeing, while atti-tude toward menopause was not significant in the final model. Given the high prevalence of chronic illness (91.2%), the findings highlight the need for culturally sensitive educational interventions in geriatric care. Improving psychosocial perceptions of aging appears critical for sexual health, and further longitudinal and interventional studies are recommended.	7/8

Table 2 (continued)

Author, Reference Year and Country	Objective of the research	Study Design 1. Type of research 2. Type of intervention 3. Main variables of interest	Sample	Main results and conclusions	JBI
(Pérez-Herrezuelo et al., 2020) Spain.	The aim of this study was to examine female sexual functioning and its association with menopausal symptoms among women Spanish postmenopausal women.	1- Cross-sectional design. 2- Three questionnaires were used in this study: MRS, FSFI in Spanish and HADS in Spanish. 3- The study evaluated the following variables: - MRS: Somatic, Psychological, and Urogenital Symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - HADS: Depressive Symptoms. - Sociodemographic variables: Age, place of residence, professional status.	The total sample is 182 postmenopausal women. The mean age was 65.59 years and the SD ± 7.93. The population is characterized by women with 12 months of amenorrhea, without taking contraceptives and not suffering from chronic or neuropsychiatric disease.	In this study, it is observed that 31.32% of the participants show severity of menopausal symptoms according to the total MRS score. 70.88% of the participants had sexual dysfunction. Severe psychological symptoms of menopause are related to arousal, orgasm, and FSFI total scores. However, severe urogenital symptoms are associated with all FSFI total scores except pain and craving. Older age, being unemployed, and residing in an urban area are associated with poorer sexual function. As for depression, women with more severe symptoms show poorer sexual function.	8/8
(Fausto et al., 2023) Brazil.	To analyse the possible association between menopausal symptoms (somatic-vegetative, psychological and urogenital) and sexual function with the maintenance of sexual activity in menopausal women.	1- Cross-sectional design. 2- Two questionnaires were used in this study: MRS, FSFI. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - Sociodemographic variables: Age, marital and economic status, sexual activity and years of menopause.	The total sample is 96 menopausal women aged between 40–59 years, 63% of whom are postmenopausal. The mean age of this population is 52.88 years and the SD ± 4.05. The population is characterized by being at least 12 months with amenorrhea, without taking hormone replacement therapy. Not suffer from gynecological disease or mental disorder.	In this study, it was observed that 96.3% of women who did not have sexual intercourse had severe menopausal symptoms. The resulting MRS scores were compared according to sexual activity, and it was shown that those who had sex obtained better scores in the domains of arousal, lubrication, orgasm and pain and lower scores in desire. Women who were not sexually active showed greater sexual desire. Women who were not sexually active scored 15.2 points on the FSFI. The study found no significant differences in these sociodemographic variables between women who were sexually active and those who were not. This shows that maintaining sex life in this period reduces menopausal symptoms and improves sexual function.	8/8
(Nazarpour et al., 2018) Iran.	Investigate the relationship between the severity of menopausal symptoms and sexual function.	1- Cross-sectional design. 2- Two questionnaires were used in this study: MRS, FSFI. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, pain, orgasms satisfaction. - Sociodemographic variables: Age, parity, years of menopause, parity, occupation.	The total study sample was 405 postmenopausal women aged between 45 and 65 years. The mean age of the women was 52.8 years and the SD was ± 3.7. The population is characterized by having been in menopause for at least 3 years without taking hormone supplements. Not suffer from gynecological disease or mental disorders.	61% of women have sexual dysfunction according to the FSFI questionnaire. 29% of participants present with severe menopausal symptoms with an MRS score ≥ 17. The urogenital domain score of the MRS had a negative correlation with that of sexual function. It is shown that the severity of menopausal symptoms was inversely related to total sexual function scores, as well as scores in all FSFI domains. The adverse relationships of menopausal symptoms with sexual function could be strongly influenced by women's attitudes, beliefs, and perceptions toward menopause.	8/8

Table 2 (continued)

Author, Reference Year and Country	Objective of the research	Study Design 1. Type of research 2. Type of intervention 3. Main variables of interest	Sample	Main results and conclusions	JBI
(Ling & Wang, 2023) China.	To investigate the mediating effect of depressed mood and body image on menopausal symptoms and sexual function in menopausal women.	1- Case-control design. 2- In this study, 4 questionnaires were used: MRS, FSFI, BIS, HADS. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - BIS: Degree of body image. - HADS: level of depression. - Sociodemographic variables: Age, education level, BMI, marital status.	The total study sample was 186 women, 65% of whom were postmenopausal. The population was divided into two groups: Case group (FSD): 134 women with a mean age of 48.49 and SD ± 3.65. Control group: 52 women with a mean age of 49.49 and SD ± 3.65. The population is characterized by not suffering from gynecological disease, mental disorder or taking hormone replacement therapy.	The present study demonstrates that HADS and BIS scores are higher in the FSD group than in the control group. In addition, BIS and HADS scores are independent risk factors for FSD. BIS and HADS scores are lower in groups with menopausal symptoms of mild and moderate severity than in the severe group. The FSFI score is higher in the groups with mild and moderate menopausal symptoms than in the severe group. Body image and depressed mood are part of the partial mediating effect on menopausal symptoms and sexual function. This study suggests that improved sexual function could be achieved with the treatment of menopausal symptoms along with improved body image and mood, as well as self-awareness and negative emotions.	9/10
(Andac & Aslan, 2017) Turkey.	To determine women's sexual roles in the climacteric and the influence of menopausal symptoms on sexual functions.	1- Cross-sectional design. 2- Three questionnaires were used in this study: MRS, FSFI, SSS-W. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - SSS-W Questionnaire: Satisfaction, communication, compatibility, relational and personal interest. - Sociodemographic variables: Age, educational level, employment status, BMI.	The total study sample consisted of 282 women aged between 45–65 years, 74.5% of whom were postmenopausal. The average age of the population is 58.59 years and the SD ± 7.15. The population is characterized by not suffering from gynecological disease or mental disorders.	The present study shows that 48.2% experienced mild menopausal symptoms, 21.6% moderate symptoms, 21.6% severe symptoms, 1.8% very severe symptoms. With respect to the subscales of the MRS, 30.5% had changes in sexual desire, 30.5% pain, 27.3% orgasm problems, 25.2% lubrication problems and 24.1% arousal problems. 79.4% of the women had sexual dysfunction according to the FSFI. Being older and BMI and being separated is shown to increase the severity of menopausal symptoms and decrease sexual function, but sexual desire does not change. The severity of menopausal symptoms negatively affects sexual functions and reduces sexual satisfaction.	7/8
(Yanikkerem et al., 2018) Turkey.	To assess the influence of physical and depressive symptoms on women's sex lives in the climacteric period.	1- Cross-sectional design. 2- Three questionnaires were used in this study: MRS, FSFI, BIS. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - BIS: Emotional, somatic, cognitive and motivational symptoms. - Sociodemographic variables: Age, educational level, employment and menopausal status and parity.	The total sample of the study was 572 women, 73% of whom were postmenopausal. The sample is grouped into age ranges between 50–55 years, 56–60 years, 61–65 years. The mean age of the women was 52.4 years and the SD ± 5.8. In addition, this population is characterized by not suffering from any mental disorder or gynecological disease.	In this study, the prevalence of sexual dysfunction was 86.4% according to the FSFI, and 54.9% of women showed symptoms of depression. Women with older education, as well as those who had four or more pregnancies, scored lower on the FSFI and higher on the MRS and BDI. There was a negative relationship between the FSFI total score and the MRS and BDI scores. Higher scores were obtained in the FSFI subscales in the population characterized by having work activity and satisfactory sexual activity. It is found that the risk of sexual dysfunction decreases among women who are satisfied with emotional closeness and communication during sexual intercourse.	6/8

Table 2 (continued)

Author, Reference Year and Country	Objective of the research	Study Design 1. Type of research 2. Type of intervention 3. Main variables of interest	Sample	Main results and conclusions	JBI
(Mundhra et al., 2024 India.	To identify the frequency of FSD in middle-aged women and to assess its relationship with obesity and menopausal symptoms.	1- Cross-sectional design. 2- Two questionnaires were used in this study: MRS, FSFI. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - Sociodemographic variables: Age, years with menopause, parity, BMI.	The total sample of the study was 143 women, 72.03% of whom were postmenopausal. The sample is grouped into age ranges between 40–45 (group 1), 46–50 (group 2), 51–55 (group 3) years. The mean age of the women was 49.4 years and the SD was ±3.05 years. The population is characterized by not having mental disorders or gynecological diseases.	In this study it is observed that sexual dysfunction increases as the population ages, group 1, 2 and 3 present 10%, 23% and 45.45% respectively in sexual dysfunction. With respect to the FSFI domains, it is found that there is no significant difference in desire, orgasm, lubrication, satisfaction, and pain in age groups 1 and 2. However, there is a significant difference in these domains in group 3 compared to group 1. A significant negative correlation of somatic, urogenital, psychological, and total MRS scores was observed with the domains of female sexuality. It should be noted that in India, talking about sexual health is still considered taboo and women are less likely to discuss their sexual problems with their partners.	6/8
(Dombek et al., 2016) Brazil.	To assess sexual function in postmenopausal women and identify other factors associated with sexual dysfunction in this population.	1- Cross-sectional design. 2- Two questionnaires were used in this study: MRS, FSFI. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - Sociodemographic variables: Age, marital status, educational level, age with menopause, parity, BMI.	The total sample of the study was 111 women aged between 45–65 years, 68.7% of whom were postmenopausal. The mean age of the women was 55.91 years and the SD±4.84. The population is divided into two groups: women with sexual dysfunction and women without sexual dysfunction. In addition, they are characterized by not suffering from mental or gynecological illness and not taking hormone replacement treatment.	In this study, it was observed that 70.3% of the women showed sexual dysfunction, with the most associated risk factor being the loss of vaginal lubrication. It was observed that the FSFI domains that contributed the most to the low scores presented by women with sexual dysfunction were desire (2.40) and arousal. The somatic and urogenital domains of the MRS were higher in the sexual dysfunction group. Multiple linear regression analysis to determine the main factors associated with sexual dysfunction during the postmenopausal period concluded that the factors were: marital status (married women) associated with psychosocial problems and difficulties in the marital relationship, urogenital dominance on the MRS, bladder surgery, and sexual abuse.	7/8
(Pérez-López et al., 2012) Spain.	To assess sexual function and related factors (including menopause-related quality of life and mood) in middle-aged Spanish women.	1-Cross-sectional design. 2- In this study, 3 questionnaires were used: MRS, FSFI, HADS. 3- Variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - HADS: level of depression. - Sociodemographic variables: Age, education level, marital status, menopausal status.	The total sample of the study was 179 women aged between 40–65 years, 65.3% of whom were postmenopausal. The mean age of the population was 51 years with an SD±9. The population is characterized by not suffering from gynecological disease or mental disorder.	In this study, it was observed that 36.9% of the sample had total FSFI scores equal to or less than 19, 40.2% had mood morbidity, and 23.5% had impaired quality of life. FSFI total scores were positively correlated with the woman's and couple's education, and inversely with the woman's age, total scores on the MRS highlighting urogenital and somatic domains and HADS, in addition to relationship problems (alcohol abuse and erectile dysfunction).	6/8

Table 2 (continued)

Author, Reference Year and Country	Objective of the research	Study Design 1. Type of research 2. Type of intervention 3. Main variables of interest	Sample	Main results and conclusions	JBI
(Urrunaga-Pastor et al., 2022) Latin American Countries.	To assess the association between climacteric symptoms severity and orgasmic dysfunction controlled by demographic, clinical, and couple variables.	1- Cross-sectional design. 2- In this study, 2 questionnaires were used: MRS, FSFI. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - Sociodemographic variables: Age, parity, education level, marital status, menopausal status.	The total sample of the study was 5391 women aged between 40–59 years, 55% of whom were postmenopausal. The mean age of the population was 48.2 years and the SD ± 5.5. The population is characterized by not suffering from mental disorders or gynecological disease.	This study shows that, in terms of menopausal symptoms, 24.8% had severe symptoms and the overall prevalence of severe somatic, psychological and urogenital symptoms is 10.8%, 28.4% and 32.9% respectively. Severe urogenital symptoms had a significant association with OD, followed by somatic and psychological symptoms. The prevalence of OD in women with severe overall menopausal symptoms was 43.9%, higher than in women without severe climacteric symptoms (43.9% vs. 19.3%;$p < 0.001$).	6/8
(Saleh et al., 2024) Saudi Arabia.	To assess the association between menopausal symptoms and sexual dysfunction among menopausal women and to identify the mediating effects of depression and anxiety in this association.	1-Cross-sectional design. 2- In this study, 3 questionnaires were used: MRS, FSFI, HADS. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - HADS Questionnaire: level of depression. - Sociodemographic variables: Age, place of residence, marital status, educational level.	The total sample of the study is 149 women aged between 45–55, 65.5% of whom are postmenopausal. The mean age of the population was 49.28 years and the SD ± 3.51. The population is characterized by not suffering from gynecological disease or mental disorder and not taking hormone replacement treatment.	This study shows that when studying the relationship between MRS and HADS, menopausal symptoms were significantly high among women with high anxiety scores. The most common menopausal symptoms among the women studied were joint and muscle discomfort, anxiety, irritability, and physical and mental exhaustion. In terms of the relationship between MRS and FSFI, women with anxiety and physical and mental exhaustion had significantly lower FSFI scores. In addition, there were statistically significant negative correlations between depression scores and sexual desire, arousal, and FSFI total scores. The age of the woman. Educational and economic level and marital status had a negatively significant correlation with women's sexual function. People who suffer from depression tend to engage less in sexual activities, and if they do, they experience greater pain during sex.	8/8
(Mezones-Holguin et al., 2011) Peru.	To determine the association between sexual function and depression in sexually active middle-aged women, controlling for the same.	1- Cross-sectional design. 2- Three questionnaires were used in this study: MRS, FSFI, BDI. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - BDI: Emotional, somatic, cognitive and motivational symptoms. - Sociodemographic variables: Age, educational level, marital status, parity, menopausal status.	The total sample of the study was 335 women, aged between 40–59 years, 60% of whom were postmenopausal. The mean age of the population was 49 years and the SD ± 5.5. The population is characterized by not suffering from mental disorders, gynecological disease, not taking hormone replacement treatment.	This study found that 35.2% of women had FSFI total scores for impaired sexual function. In 5.7% of cases, the total MRS scores were severe, and in 37.6%, depressed mood was identified with the BDI. FSFI total scores showed significant correlations with BDI and MRS scores (total, psychological, and urogenital). Sexual function is inversely associated with depression. In addition, it is inversely correlated with the couple's sexual dysfunction and with psychological scores of the MRS.	8/8

Table 2 (continued)

Author, Reference Year and Country	Objective of the research	Study Design 1. Type of research 2. Type of intervention 3. Main variables of interest	Sample	Main results and conclusions	JBI
(Cabral et al., 2013) Brazil.	To assess the influence of climacteric symptoms on sexual function in middle-aged women.	1- Cross-sectional design. 2- Two questionnaires were used in this study: MRS, FSFI. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - Sociodemographic variables: Age, educational level, marital status, BMI, menopausal status.	The total sample of the study was 370 women aged between 40–65 years, 66% of whom were postmenopausal. The average age of the population is 53 years and the SD ± 9. The population is not affected by mental disorders, gynecological diseases.	This study shows that 67% of the women had sexual dysfunction. The domains that contributed the most to the low scores presented by women with dysfunction were arousal, orgasm and pain. MRS domain scores were higher in the group of women with sexual dysfunction compared to those without sexual dysfunction. These differences were significant for all domains (psychological, somato-vegetative and urogenital) of the MRS, with the psychological domain presenting the highest mean, followed by the somato-vegetative domain and, finally, the urogenital domain.	6/8
(Gozuyesil et al., 2018) Turkey.	This study aims to assess the relationship between sexual functions and quality of life and problems during the menopausal period.	1- Cross-sectional design. 2- Three questionnaires were used in this study: MRS, FSFI, SQLQ-F. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - SQLQ-F Scale: Lack of interest, lack of lubrication, difficulty getting aroused, pain, difficulty reaching orgasm. - Sociodemographic variables: Age, educational level, occupation, marital status, BMI, menopausal status.	The total sample of the study was 317 women between 40 and 60 years old, 62.8% of whom were postmenopausal women. The average age of the population is 49.5 and the SD ± 6. The population is characterized by not suffering from gynecological disease or mental disorder.	In this study, it was observed that according to the FSFI, 82% of women had sexual dysfunction. As menopausal symptoms increase, sexual function decreases and women's sexual quality of life is altered. In the study population, menopause is considered an unfavorable period, with negative beliefs such as the end of fertility, the beginning of aging, and the end of sexuality. This has negative repercussions on coping and exacerbation of menopausal clinical manifestations, decreasing vital well-being.	6/8
(Yanikkerem et al., 2012) Turkey.	To assess women's menopausal symptoms and describe the relationship between attitudes towards menopause and quality of life.	1- Mixed methods design. 2- The MENQOL questionnaire was used in this study. 3- The study evaluated the following variables: - MENQOL Questionnaire: Vasomotor, physical, psychological, sexual domain. - Sociodemographic variables: Age, educational level, occupation. marital status, economic status, and menopausal status.	The total sample of the study was 494 women aged between 35–60 years, 64.85% of whom were postmenopausal. The mean age of the population is 53.5 years and the SD ± 6.1. The population is characterized by not suffering from gynecological disease or mental disorders.	Women with no education and housewives obtained the highest scores for the vasomotor, psychosocial and physical groups. It was observed that the employment situation significantly affected the symptoms of menopause. With respect to menopausal symptoms, according to the MENQOL, the domain with the highest score was vasomotor, followed by tiredness and anxious and nervous state. Sexual dominance was found to have the lowest score. 76.6% of women perceive menopause as a sign of aging. Women with a negative attitude towards menopause were associated with a higher frequency of symptoms compared to women with a positive attitude.	6/8 (cross sectional) 9/10 (qualitative)

Table 2 (continued)

Author, Reference Year and Country	Objective of the research	Study Design 1. Type of research 2. Type of intervention 3. Main variables of interest	Sample	Main results and conclusions	JBI
(Pimenta et al., 2012) Portugal.	Explore whether life events predict menopausal symptoms.	1- Cross-sectional design. 2- In this study, the Life Experience Survey (MSSI-38) was used. 3- The study evaluated the following variables: - MSSI-38: Psychological State, Physical Changes, Vasomotor, Urinary, Sexual Symptoms. - Lifestyle: alcohol consumption, coffee consumption, smoking, physical activity, BMI. - Sociodemographic variables: Age, marital status, parity, educational level, economic status.	The total sample of the study was 992 women aged between 42–60 years, 62% of whom were postmenopausal. The mean age of the study was 48.9 years and the SD ± 3.7 years. The population is characterized by not suffering from gynecological disease, mental disorder, or taking hormone replacement therapy.	Postmenopausal women had significantly higher scores in vasomotor, sexual, and urinary symptoms. Higher educational attainment, higher income, and higher numbers of children were associated with lower severity of menopausal symptoms. Women who were married or partnered and had a higher BMI were associated with more severe physical and sexual symptoms. Women who rated their life events more positively reported less severe menopausal symptoms.	6/8
(Cabral et al., 2013) Brazil	To assess the determinants of sexual dysfunction in middle-aged women.	1-Cross-Sectional Design. 2-FSFI, BKMI, IPAQ and WHOQOL-Brief were used in this study. 3-The study evaluated the following variables: - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - BKMI: Vasomotor, psychological, physical symptoms. - IPAQ: Types of physical activity, intensity of physical activity, frequency and duration of physical activity. - WHOQOL-Brief.: Physical, social, psychological, environmental. - Sociodemographic variables: Age, marital status, educational level, economic status.	The total sample of the study was 370 women aged between 40 and 65 years, 60.5% of whom were postmenopausal. The mean age of the sample studied was 49.8 years and the SD ± 8.1. The population is characterized by not having gynecological disease, mental disorder and not taking hormone replacement therapy.	In this study, according to the FSFI, 67% of the participants reported sexual dysfunction, with the prevalence of FD being higher in the group of women aged 56 to 65 years. Sedentary, separated, and poorly educated women presented menopausal symptoms of moderate intensity, with a higher prevalence of sexual dysfunction (82.7%). Women with low quality of life were 6.6 times more likely to experience sexual dysfunction. The study population states that lack of information, as well as feelings of guilt or shame about sexual desire, marital difficulties, and uncertainty caused by physical and psychological changes interfere with family relationships, sexual adjustment, and social integration.	6/8

Table 2 (continued)

Author, Reference Year and Country	Objective of the research	Study Design 1. Type of research 2. Type of intervention 3. Main variables of interest	Sample	Main results and conclusions	JBI
(Ghazanfarpour et al., 2015) Iran.	To assess the relationship between women's attitudes towards menopause and menopausal symptoms.	1- Cross-sectional design. 2- In this study, the MENQOL and ATM questionnaires were used. 3- The following variables were evaluated: - MENQOL Questionnaire: Vasomotor, physical, psychological, sexual domain. - Sociodemographic variables: Age, educational level, marital status, parity, economic status, smoking.	The total sample of the study was 349 women aged between 45–68 years, 82% of whom were postmenopausal. The average age of the population was 54.87 years and the SD ± 5.50 years. The population is characterized by not having gynecological disease, mental disorders and not taking hormone replacement therapy.	The most frequent menopausal symptoms were hot flashes, sweating. joint and muscle pain. In the psychosocial domain, anxiety and nervousness affected 74.2% of women. In the sexual domain, the reduction of sexual desire and the avoidance of sexual intercourse together with vaginal dryness were the items with the highest percentage of affected. It was observed that the marital status and educational level of the husband influence the severity of menopausal symptoms. Social environment such as family support can have a significant impact on how women experience menopause and their quality of life. The study showed that women who experienced certain menopausal symptoms had a more negative attitude towards menopause, negatively affecting their quality of life. Research suggests that attitude, perception, and beliefs toward menopause influence the severity of climacteric symptoms.	6/8
(Trento et al., 2021) Brazil	Investigating sexual function and associated factors in postmenopausal women.	1- Cross-sectional design. 2- Two questionnaires were used in this study: MRS, FSFI. 3- The study evaluated the following variables: - MRS: Somatic, psychological, urogenital symptoms. - FSFI: Desire, lubrication, orgasms, satisfaction, pain. - Sociodemographic variables: Age, age with menopause, parity, educational level, economic status, marital status.	The total study sample was of 380 women, 68.4% of whom were postmenopausal. The average age of the population was 53.83 years, SD ± 6. The population is characterized by not having gynecological disease or mental disorders.	In this study, according to the FSFI, 64% of the women had sexual dysfunction. Among the domains with the greatest affectation, sexual desire and interest, comfort, orgasm and satisfaction arose. 38.2% of the women had severe climacteric symptoms. The most reported symptoms were muscle/joint problems (75.3%), anxiety (67.2%) and sexual problems (64.7%), with a predominance of the urogenital domain (78.9%). Factors associated with an increased risk of sexual dysfunction were: sleep problems, depressive mood, sexual complaints, vaginal dryness. The presence of a partner and having a low level of income was associated with an increased risk of sexual dysfunction. A statistically significant association was found between the psychological, somatovegetative and urogenital domains with the presence of sexual dysfunction ($p < 0.001$).	6/8

APQ Perception of Aging, *ATM* Attitudes Towards Menopause, *BDI* Beck Depression Inventory, *BKMI* Kupperman-Blatt Menopausal Index, *BIS* Body Image Assessment, *BMI* Body mass index, *FSD* Female sexual dysfunction, *FSFI* Female Sexual Function Index, *HADS* Hospital Anxiety and Depression Scale, *IPAQ* International Physical Activity Questionnaire, *MENQOL* Menopause-specific Quality of Life, *MRS* Menopause Rating Scale, *MSSI-38* Menopause Symptoms' Severity Inventory, *SQLQ-F* Sexual Quality of Life Questionnaire-Female, *SSS* Sexual Satisfaction Scales for Women, *WHOQOL-Brief* WHO Quality of Life Questionnaire

Sociodemographic Variables Associated with Sexual Dysfunction in Postmenopausal Women

Multiple sociodemographic factors are associated with sexual difficulties and FSD during postmenopause. Among the most relevant are age, educational level, marital status, employment status, parity, BMI, place of residence, and socioeconomic status.

Age is one of the strongest predictors of FSD. Mundhra et al. (2024) reported a progressive increase in FSD prevalence,

Table 3 Key variables identified in the review

Variables	Consequences on Female Sexual Dysfunction (FSD) and Menopausal Symptoms	References
Age	As age increases, the higher the prevalence of FSD. Sexual function declines with age.	(Andac & Aslan, 2017; Mundhra et al., 2024; Pérez-Herrezuelo et al., 2020)
Marital status	Married women experience increased risk of FSD due to psychosocial and marital problems. The presence of a partner may increase the risk of FSD and the severity of menopausal symptoms. Single women report fewer sexual problems.	(Dombek et al., 2016; Ghazanfarpour et al., 2015; Pimenta et al., 2012; Trento et al., 2021)
Educational Level	A low educational level is associated with worse FSFI scores and a higher prevalence of FSD. Higher education is associated with less severity of menopausal symptoms.	(Cabral et al., 2012; Rafiei et al., 2025; Yanikkerem et al., 2012)
Employment Status	Being unemployed is associated with poorer sexual function. Being active at work and sexually active is associated with higher FSFI scores. Employment can act as a stressor, exacerbating certain menopausal symptoms.	(Andac & Aslan, 2017; Ghazanfarpour et al., 2015; Pérez-Herrezuelo et al.,2020)
Number of pregnancies	A higher number of pregnancies (four or more) is associated with lower FSFI scores and higher MRS and BDI scores, indicating a higher prevalence of menopausal symptoms and FSD.	(Pimenta et al., 2012; Yanikkerem et al., 2012)
Body Mass Index (BMI)	A higher BMI is associated with poorer sexual function and more intense climacteric symptoms. It is also related to more severe physical and sexual symptoms. Women with obesity have a higher prevalence of FSD and vasomotor symptoms.	(Cabral et al., 2012; Mundhra et al., 2024)
Climacteric stage	Postmenopausal women have a higher prevalence of FSD. Menopausal symptoms intensify over time, primarily affecting the arousal, orgasm, and lubrication domains.	(Nazarpour et al., 2018; Trento et al., 2021; Urrunaga-Pastor et al., 2022)
Place of Residence	Living in an urban area is associated with worse sexual function compared to living in a rural area.	(Ghazanfarpour et al., 2015; Pérez-Herrezuelo et al., 2020)
Socioeconomic Level	Women with lower incomes are at higher risk of FSD.	(Trento et al., 2021; Yanikkerem et al., 2012)
Somatic Symptoms	Negative correlation with all domains of sexual function. Severe somatic symptoms are related to arousal, orgasm, and total FSFI scores.	(Fausto et al., 2023; Pérez-Herrezuelo et al., 2020)
Urogenital Symptoms	They are significantly associated with FSD, specifically with the domains of lubrication, orgasm, and satisfaction. Severity of urogenital symptoms worsens sexual dysfunction.	(Dombek et al., 2016; Yanikkerem et al., 2018)
Psychological Symptoms	They are associated with lower scores on arousal, orgasm, and FSFI total score. Anxiety and depressed mood are significantly associated with sexual dysfunction, especially with sexual desire and interest, comfort, orgasm, and satisfaction.	(Mezones-Holguin et al., 2011; Muralikrishna et al., 2025; Shahrahmani et al., 2025; Trento et al.,2021)
Negative Attitudes Toward Menopause	Negative Attitudes are related to a more severe perception of symptoms, especially psychological ones. They affect women's sexual well-being.	(Ghazanfarpour et al., 2015; Yanikkerem et al., 2012)
Perception of Menopause as a Sign of Aging	It is associated with a greater frequency and intensity of physical symptoms.	(Abdollahi et al., 2025; Gozuyesil et al., 2018)
Discomfort When Talking About Sexuality	It prevents open communication about sexual health, aggravating sexual problems and generating feelings of guilt and shame.	(Mundhra et al., 2024)
Lack of Information and Feelings of Guilt/Shame	It interferes with family relationships, sexual adjustment, and social integration.	(Cabral et al., 2013)
Perception of Menopause as an Unfavorable Period	It has negative repercussions on coping and exacerbation of menopausal symptoms, reducing vital well-being.	(Nazarpour et al., 2018; Yanikkerem et al., 2012)

Beck Depression Inventory (BDI); Body Mass Index (BMI); Female Sexual Dysfunction (FSD); Female Sexual Function Index (FSFI); Menopause Rating Scale (MRS)

from 10% in women aged 40–45 to 45% in those aged 51–55. Other authors (Nazarpour et al., 2018; Trento et al., 2021; Urrunaga-Pastor et al., 2022) confirmed that progression into the postmenopausal stage is accompanied by lower FSFI scores, particularly in the desire, lubrication, and orgasm domains, largely due to the exacerbation of urogenital symptoms.

Marital status also plays a key role. Married women tend to report a higher risk of FSD, often associated with psychosocial factors such as marital dissatisfaction or lack of communication (Shahrahmani et al., 2025). Conversely, women without a partner report fewer sexual problems, possibly reflecting reduced relational stress or different expectations regarding sexual activity (Dombek et al., 2016; Ghazanfarpour et al., 2015; Pimenta et al., 2012).

Educational level functions as a protective factor. Women with higher levels of education show a lower prevalence of

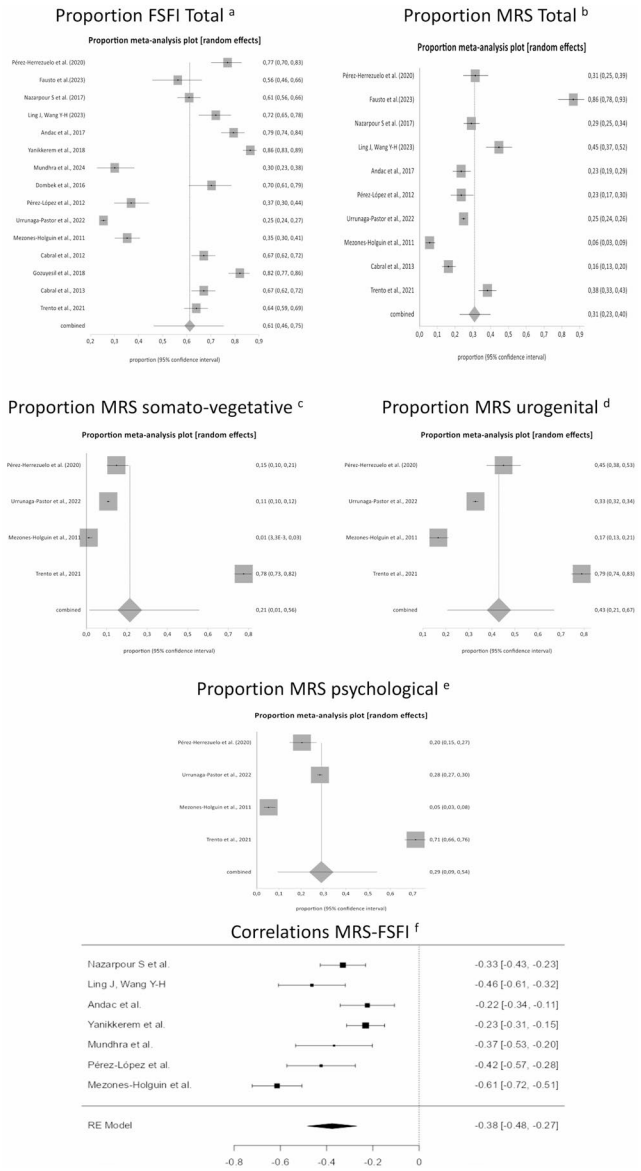


Fig. 2 Forest plot of prevalence meta-analyses and correlations. Legend: Forest plots of (**a-e**) prevalence estimates and (**f**) correlations between MRS and FSFI scores. Prevalence meta-analyses were conducted using random-effects models with the DerSimonian–Laird estimator and inverse-variance weighting. Effect sizes represent proportions based on the FSFI cut-off (< 26.55) and the MRS total and subdomain scores. The correlation meta-analysis was performed using random-effects models with heterogeneity estimated via REML, weighting based on REML, and Fisher's r-to-z transformed Pearson correlation coefficients. 95% confidence intervals are considered. The number of studies contributing to each pooled estimate is indicated: (**a**) 15 studies; (**b**) 10 studies; **c**:4 studies: **d**: 4 studies: **e**: 4 studies: **f**: 7 studies

FSD and report better FSFI scores. Additionally, the partner's education level may also positively influence women's self-perceived sexual health (Cabral et al., 2012; Rafiei et al., 2025; Yanikkerem et al., 2018).

Employment status is associated with better sexual functioning, although its implications may vary depending on specific working conditions. While employment promotes autonomy and social integration, job-related stress may worsen climacteric symptoms (Ghazanfarpour et al., 2015; Pérez-Herrezuelo et al., 2020).

Parity has mixed consequences. Women with four or more children tend to have higher rates of FSD and depressive symptoms (Yanikkerem et al., 2018). However, a higher number of children has also been associated with fewer vasomotor symptoms in some cases (Muralikrishna et al., 2025; Pimenta et al., 2012), suggesting that reproductive history interacts with other contextual variables.

BMI shows a negative association with sexual function. Obesity is linked to a higher prevalence of FSD and increased severity of physical symptoms (Mundhra et al., 2024; Pimenta et al., 2012).

The place of residence can influence sexual health. Women living in urban areas (> 150 inhabitants per km^2) often report poorer sexual function, possibly due to higher stress levels (Pérez-Herrezuelo et al., 2020). Conversely, rural settings that provide greater social or family support may act as protective factors (Ghazanfarpour et al., 2015; Pérez-Herrezuelo et al., 2020).

Finally, socioeconomic status is a major determinant. Women from low-income backgrounds tend to report higher FSD prevalence, largely due to reduced access to healthcare services, greater exposure to chronic stress, and fewer resources to cope with menopausal symptoms (Trento et al., 2021; Yanikkerem et al., 2018).

Somatic Clinical Manifestations Associated with Sexual Dysfunction in Postmenopausal Women

Evidence consistently demonstrates a significant association between somatic and urogenital symptoms and FSD in postmenopausal women. These symptoms negatively affect various dimensions of sexual function, including desire, arousal, lubrication, orgasm, satisfaction, and pain.

Several studies have highlighted the influence of urogenital symptoms, such as vaginal dryness, burning, and dyspareunia, which are among the most influential physical factors in the deterioration of sexual function (Andac & Aslan, 2017; Dombek et al., 2016; Fausto et al., 2023; Mundhra et al., 2024; Muralikrishna et al., 2025; Nazarpour et al., 2018; Pérez-Herrezuelo et al., 2020; Trento et al., 2021; Urrunaga-Pastor et al., 2022; Yanikkerem et al., 2018). For example, Fausto et al. (2023)d rez-Herrezuelo et al. (2020) found strong associations between these symptoms and reduced scores in FSFI domains related to lubrication, orgasm, and overall satisfaction.

In contrast, somatic symptoms like hot flashes, night sweats, and muscle or joint problems, while highly prevalent during the menopausal transition, show a weaker and more indirect relationship with sexual desire or arousal (Ghazanfarpour et al., 2015). Nonetheless, their cumulative burden contributes to general discomfort, which may indirectly affect sexual activity and satisfaction.

Notably, loss of vaginal lubrication emerges across studies as one of the most consistent physical predictors of FSD (Andac & Aslan, 2017; Dombek et al., 2016; Fausto et al., 2023; Mundhra et al., 2024; Muralikrishna et al., 2025; Nazarpour et al., 2018; Trento et al., 2021; Urrunaga-Pastor et al., 2022; Yanikkerem et al., 2018). This symptom not only hampers sexual experience but also leads to avoidance behaviors, fear of pain, and reduced intimacy.

Two meta-analyses were conducted with data from 6,288 postmenopausal women. The findings revealed a prevalence of 21.45% (909/6288) (95% CI: 13.14%–31.31%) for somatic symptoms and 43.02% (2211/6288) (95% CI: 28.15%–58.59%) for urogenital symptoms according to MRS. Both analyses showed high heterogeneity, but no signs of publication bias, indicating consistency in findings across diverse populations and contexts (Fig. 2).

Psychological Factors Associated with Sexual Dysfunction in Postmenopausal Women

Psychological symptoms such as anxiety, depression, and low body self-image are directly associated with FSD. Various studies, including those by Pérez-Herrezuelo et al. (2020) and Ling and Wang (2023), have demonstrated inverse correlations between these symptoms and sexual function, particularly in key domains such as arousal, orgasm, and satisfaction. Depression and anxiety have been shown to negatively affect both sexual desire and physiological response (Muralikrishna et al., 2025; Saleh et al., 2024; Trento et al., 2021).

Moreover, a negative perception of body image, often influenced by emotional and sociocultural factors, has been associated with lower self-esteem and a significant reduction in sexual satisfaction. Ling and Wang (2023) found that both negative self-image and depressed mood mediate the relationship between menopausal symptoms and sexual function. Similarly, Mezones-Holguín et al. (2011) and Pérez-López et al. (2012) reported a significant correlation between depressed mood and lower FSFI scores.

A meta-analysis including 6,288 women revealed a prevalence of psychological symptoms (MRS) of 29% (1856/6288), although with substantial heterogeneity across studies and no evidence of publication bias ($p = 0.8592$) (Fig. 2).

Influence of Cultural Beliefs and Attitudes on Postmenopausal Sexual Health

Multiple studies conducted in sociocultural settings such as Iran, Turkey, Brazil, and India (Cabral et al., 2013; Mundhra et al., 2024; Nazarpour et al., 2018; Shahrahmani et al., 2025; Yanikkerem et al., 2012) reported that negative attitudes toward menopause were associated with increased severity of psychological and vasomotor symptoms, as well as with lower quality of life and reduced sexual well-being. Additional factors identified included limited information about menopause, persistence of cultural taboos surrounding sexuality, and poor communication with partners, which were linked to higher levels of shame, isolation, and guilt (Rafiei et al., 2025; Shahrahmani et al., 2025). Social and familial support was consistently reported as a factor associated with better emotional and social adjustment during this stage. Expanding on these findings, recent evidence highlights that while menopausal attitudes are influential, a woman's broader perception of the aging process itself serves as a more powerful and independent predictor of her sexual quality of life (Abdollahi et al., 2025).

Discussion

A substantial number of studies highlight the prevalence and associated factors of FSD during the postmenopausal stage at the international level. Our meta-analysis revealed a prevalence of 61.24%. These associated factors include sociodemographic variables (such as age, educational level, employment status, and marital status), hormonal decline, health conditions (e.g., urinary tract infections or incontinence), psychological and emotional factors (e.g., depression, anxiety, low self-esteem), and sociocultural influences (e.g., restrictive education and sexual taboos in adulthood).

These associations have been confirmed by various studies. For instance, a 2021 review estimated a global prevalence of FSD at 64% among menopausal women, identifying dyspareunia and reduced sexual desire as predominant symptoms linked to hormonal, medical, emotional, and sociocultural factors (Khani et al., 2021). Similarly, the review by Parish and Hahn (2016) reported a higher prevalence of FSD in women aged 55–64, emphasizing a decreased quality of life, dissatisfaction with partners, and emotional distress.

Contextual Factors

Likewise, studies by Moral et al. (2018) and Espitia (2023) found an inverse relationship between quality of life and FSD, underlining the importance of individualized

approaches and early sex education. These findings emphasize the need to understand the multiple factors involved in FSD in order to offer comprehensive care that enhances women's quality of life during this transition. Paramsothy et al. (2017) and Lee et al. (2010) also identified a positive relationship between a woman's or her partner's level of education and sexual function, suggesting that education may increase self-confidence and improve health perception, thereby positively influencing sexual function (Cabral et al., 2012; Shahrahmani et al., 2025; Yanikkerem et al., 2018).

Regarding employment and marital status, studies by Paramsothy et al. (2017) and Yılmaz & Avci (2022) revealed that married women presented a higher prevalence of FSD, attributed to psychosocial and marital factors, while unmarried women reported a lower incidence. Employment also appears to have a dual consequence: while it can promote well-being and autonomy, it may also act as a stressor that exacerbates menopausal symptoms (Nazarpour et al., 2018; Yanikkerem et al., 2012).

Clinical Factors

The presence of menopausal symptoms, assessed through the MRS, has been frequently reported in several of the studies included in this review (Andac & Aslan, 2017; Dombek et al., 2016; Mundhra et al., 2024; Nazarpour et al., 2018; Trento et al., 2021; Yanikkerem et al., 2018). Factors such as sleep disturbances, fatigue, and cognitive impairment negatively affect quality of life and sexual function, particularly in women with a history of depression (Dorador-González & Orozco-Calderón, 2018). Additionally, vasomotor symptoms may persist beyond the natural age of menopause, highlighting the long-term severity of genitourinary symptoms during the postmenopausal stage (Espitia de la Hoz, 2024). Increased incidence of pelvic organ prolapse, higher prevalence of fractures due to changes in bone metabolism, and elevated risk of coronary heart disease, doubled as a result of estrogen deficiency and elevated lipid profiles, are also notable consequences (Arley Hernández, 2017).

Psychological Factors

In terms of psychological symptoms, evidence shows that depression and anxiety can negatively affect sexual function in postmenopausal women (Ling & Wang, 2023; Mezones-Holguin et al., 2011; Pérez-Herrezuelo et al., 2020; Saleh et al., 2024; Yanikkerem et al., 2018). Other studies (Heidari et al., 2017; Yazdanpanahi et al., 2018) indicate that mood changes may lead to reduced self-esteem, a negative self-image, and decreased sexual desire and responsiveness. For many women, body dissatisfaction, often associated with weight gain and metabolic changes related to aging, contributes significantly to diminished sexual satisfaction (Heidari et al., 2017; Yazdanpanahi et al., 2018).

Sociocultural Factors

The literature also suggests that cultural context plays a central role in shaping the experience of menopause. Anxiety may be exacerbated by factors such as the empty nest syndrome, aging, and the societal perception of menopause (Núñez-Pizarro et al., 2017). Several studies (Hashemi et al., 2013; Martorell Poveda et al., 2020; Rafiei et al., 2025) have shown that sexual function is influenced by cultural norms, religious beliefs, and social attitudes. In many traditional societies, older women tend to prioritize family responsibilities and religious practices over sexuality. Additionally, racial and cultural factors may affect FSD, as social expectations shape self-image and female identity, influencing perceptions and expressions of sexuality in postmenopausal women.

In many cultures, knowledge about menopause is primarily acquired through the exchange of experiences among women, emphasizing the role of social networks and cultural transmission (Bisognin et al., 2015). Moreover, the experience of menopause can vary based on access to healthcare services, reinforcing the idea that perceptions and biases are influential throughout this stage. Given the cultural component, the role of healthcare professionals, particularly nurses, is fundamental in providing comprehensive, individualized care aimed at improving women's quality of life. This includes implementing strategies that promote self-care, emotional support, and mental health (Sung & Lin, 2013).

Policy and Clinical Implications

This review highlights the importance of a biopsychosocial and integrative approach to sexual healthcare in postmenopausal women. Clinicians should conduct routine, multidimensional assessments that screen for sexual dysfunction using validated tools, evaluate psychological well-being, and consider partner dynamics and cultural influences (Pimenta et al., 2012). A multidisciplinary, individualized model of care is recommended, with robust referral pathways to gynecologists, endocrinologists, psychologists or sex therapists, nurses and physiotherapists when needed (Dugard, 2023).

Culturally sensitive sex education and empowerment strategies are essential, particularly where traditional roles affect sexual expression (Cabral et al., 2013; Ghazanfarpour et al., 2015). Clinicians should develop cultural competence to facilitate non-judgmental discussions, normalize sexual

changes, and provide tailored education on physiological effects and therapeutic options. Social support and accurate, culturally appropriate information positively influence women's adaptation to menopause (Bisognin et al., 2015; Hashemi et al., 2013; Martorell Poveda et al., 2020).

Health professionals play a central role in designing biopsychosocial interventions, leading educational programs, offering personalized counseling, and promoting transdisciplinary care (Rafiei et al., 2025; Villa Gómez et al., 2019). Specific training should focus on communication skills for sensitive topics, shared decision-making, and understanding therapeutic options (including lifestyle modifications, lubricants, holistic therapies, and psychological interventions) to manage postmenopausal sexual dysfunction effectively (Andac & Aslan, 2017; Yanikkerem et al., 2018).

Limitations

Most of the studies included in this review present notable methodological limitations. A particularly critical issue is the widespread use of non-probabilistic sampling methods, especially convenience and snowball sampling. This introduces selection bias and substantially limits the generalizability of the findings. The heavy reliance on convenience-sampled studies should be explicitly acknowledged and discussed in future research.

The predominance of cross-sectional designs further prevents the establishment of causal relationships between menopausal symptoms and FSD. Additionally, several studies relied on small sample sizes, which further constrain the external validity of their results. Women undergoing hormone therapy or with pre-diagnosed mental disorders were excluded to focus on a "baseline" postmenopausal population. This approach reduces variability introduced by these factors and allows for clearer interpretation of associations, although it may limit generalizability to women with these characteristics.

Another limitation relates to the use of self-administered questionnaires (e.g., FSFI, MRS, MENQOL), which may introduce information bias due to the subjective nature of self-reporting. Many studies also failed to adequately control relevant confounding variables, such as relationship quality or social support.

A key limitation of the meta-analyses conducted in this review, despite evidence of low publication bias, is the consistently high heterogeneity ($I^2 > 97\%$). This indicates that prevalence estimates vary substantially across studies, suggesting that the "true" prevalence of FSD is highly context-dependent rather than universal. Likely sources of heterogeneity include cultural differences and diverse sample characteristics. Therefore, pooled estimates should be interpreted as weighted averages across diverse settings, providing an overall perspective rather than definitive prevalence applicable to all populations.

Cultural diversity across studies complicates direct comparisons but also enriches the analysis by offering a valuable cross-cultural perspective. In conservative cultural contexts, stigma surrounding female sexuality may have influenced the honesty of participants' responses. Furthermore, key psychological variables, such as self-esteem and body image, were only partially addressed, despite their relevance as mediating factors in sexual function.

Finally, a major methodological limitation that this review could not fully address concerns the inconsistent handling of confounding variables. Associations between factors such as marital status or psychological conditions and FSD may be influenced by unmeasured variables, including relationship satisfaction, sexual activity, or partner health. Most studies relied on cross-sectional designs and unadjusted estimates, limiting causal inference. Consequently, the reported associations should be interpreted as observational links rather than independent risk factors. Future research should employ longitudinal designs and consistently adjust for key biopsychosocial confounders to strengthen causal insights and improve the robustness of meta-analytic synthesis.

Conclusions

Female sexual dysfunction in postmenopausal women shows a high prevalence (pooled prevalence of 61%) and is influenced by physical, psychological, sociodemographic, and cultural factors. Meta-analytic results indicate a significant negative correlation between menopausal symptoms and sexual function (MRS–FSFI r = -0.376), which reflects the impact of somatic, urogenital, and psychological symptoms.

The most affected sexual domains are desire, arousal, lubrication, orgasm, satisfaction, and pain. Somatic and urogenital symptoms, particularly vaginal dryness, dyspareunia, and lack of lubrication, are associated with a more pronounced impairment in sexual function, while psychological factors such as anxious or depressive symptoms, and negative body image further exacerbate the dysfunction. Age, lower educational attainment, marital status, economic hardship, higher BMI, as well as cultural beliefs, social support, and partner communication, also influence sexual health and the experience during the postmenopausal transition.

These findings highlight the need for a comprehensive, biopsychosocial, and culturally sensitive approach. Healthcare providers should offer multidimensional assessments, tailored counseling, and interventions that combine

physical, emotional, and relational aspects, while promoting transdisciplinary care, culturally sensitive education, and social support to enhance sexual health and quality of life in postmenopausal women.

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Data Availability all data are available within this article and its supplementary material.

Declarations

Competing interests The authors declare no competing interests.

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