DELINEATING THE IMPACT OF PERCEIVED COGNITIVE AND EMOTIONAL DIFFICULTIES ON QUALITY OF LIFE IN MENOPAUSE

ANTONIETTA MANDATORI

A THESIS SUBMITTED TO

THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF ARTS

GRADUATE PROGRAM IN PSYCHOLOGY

YORK UNIVERSITY

TORONTO, ONTARIO

July 2026

©Antonietta Mandatori, 2026

Abstract

While cognitive and emotional difficulties during menopause can be pervasive and distressing, the contributions of these symptoms to functional impairment remains to be fully understood. Thus, the present study explored how subjective cognitive difficulties (SCD) and emotional difficulties (ED) may shape the relationship between menopause-related symptom (MRS) severity and quality of life (QoL) of individuals self-identifying as being in peri/postmenopause (n=572). A moderated mediation analysis revealed a significant relationship between MRS and QoL, which was partially mediated by SCD. This indirect effect was moderated by ED, where the impact of MRS on QoL through SCD was more pronounced in individuals endorsing more severe ED. These findings suggest that day-to-day cognitive concerns may represent an avenue through which the functional impact of MRS manifests in menopause. Furthermore, vulnerability to emotional distress may particularly worsen QoL in that context. Therefore, SCD and ED likely represent clinical intervention targets for improving QoL in menopause.

Keywords: menopause, quality of life, subjective cognitive difficulties, emotional difficulties

Acknowledgments

I would like to thank my research supervisor, Dr. Achala H. Rodrigo, for his thoughtful mentorship and support. His continuous encouragement throughout my studies has taught me to approach the literature with curiosity, and to believe that my research can make a difference in the clinical field. I would also like to thank the members of the Stress, Trauma, and Resilience (STaR) lab, for their unwavering support, and Dr. John D. Eastwood, my committee member, for his thoughtful questions and constructive feedback. I would also like to thank the many individuals who participated in this study and willingly shared their experiences navigating menopause. Lastly, I would like to thank the Natural Sciences and Engineering Research Council of Canada (NSERC) and the Queen Elizabeth II Graduate Scholarship in Science and Technology (QEIIGSST) for funding support throughout my master's degree.

Table of Contents

Abstract ii
Acknowledgments iii
Table of Contents iv
List of Tables vi
List of Figures vii
1. Introduction 1
1.1 The Menopausal Transition 1
1.2 Menopause-Related Cognitive Difficulties 3
1.3 Menopause-Related Emotional Difficulties 6
1.4 Present Study 8
1.4.1 Hypothesis 1. Menopause-Related Symptom Severity will be Associated with Quality of Life. 8
1.4.2 Hypothesis 2. The Relationship Between the Severity of Menopause Symptoms and Quality of Life will be Partially Mediated by Perceived Cognitive Difficulties. 8
1.4.3 Hypothesis 3. The Relationship Between Perceived Cognitive Difficulties and Quality of Life will be Moderated by Emotional Difficulties. 9
1.4.4 Hypothesis 4: The Strength of the Indirect Effect of Menopause-Related Symptom Severity on Quality of Life, Through Perceived Cognitive Difficulties, will be Moderated by Emotional Difficulties. 9
2. Methods 10
2.1 Participants 10
2.2 Procedure 11
2.2.1 Menopause-Related Symptom Severity. 12
2.2.2 Quality of Life. 12
2.2.3 Self-Reported Cognitive Difficulties. 13
2.2.4 Emotional Difficulties. 13
2.3 Data Analytical Approach 14

3. Results 15
4. Discussion 16
4.1 Impact of Menopause on Quality of Life 17
4.2 Subjective Cognitive Difficulties 19
4.3 Emotional Difficulties 21
4.4 Other Considerations 23
4.5 Limitations 24
4.6 Future Directions 26
5. Conclusion 27
6. References 28
Tables 60
Figures 63
Appendices 65
Appendix A: Checklist for Reporting Results of Internet E-Surveys (CHERRIES) 65
Additional Information Pertaining to CHERRIES 73
Appendix B: Additional Analyses 76

List of Tables

Table 1……60

Table 2……61

Table 3……62

List of Figures

Figure 1……....63

Figure 2...……..64

1. Introduction

For individuals born with female reproductive biology, menopause is a significant life transition that marks the end of the reproductive life cycle. Although a natural sequence, menopause is characterized by a range of symptoms (Khoudary et al., 2019) that are often debilitating, distressing, and pervasive (Harper et al., 2022). As a result, it is predictably associated with poorer quality of life cross-culturally (Arar & Erbil, 2023; Blumel et al., 2000; Brotto et al., 2026; Chedraui et al., 2008; Coronado et al., 2025; Hess et al., 2012; Jafari et al., 2014), with a greater symptom burden often correlating with larger impairments on daily functioning (Ahmadi et al., 2026; Hutchings et al., 2023; Ramyashree et al., 2024; Vallejo et al., 2026; Whiteley et al., 2013). In Canada, 50% of the population is accounted for by females, with one in two aged 40 years or older (Menopause Foundation of Canada, 2022; Statistics Canada, 2025). This represents a substantial proportion of the population that will be, or are currently, navigating menopause and its associated sequelae. As such, understanding factors that may underscore the relationship between menopause-related symptom severity and quality of life represents a necessary area of exploration for improving daily outcomes in those currently navigating this major life transition, as well as for those approaching it in the future. To target, and adequately improve, quality of life, it is essential to understand the multifaceted nature of menopause on daily living.

1.1 The Menopausal Transition

Spontaneous menopause is the most common type of menopause experienced and involves a gradual transition from perimenopause to post-menopause. Perimenopause depicts the first stage entered, as it is the transitional period, typically occurring around the age of 47 (McKinlay et al., 1992). This period biologically translates to a significant reduction in oocyte

quantity, changes in menstrual cycles by seven or more days, and alterations to ovulation frequency (Bruce & Rymer, 2009; Davis et al., 2023; Harlow et al., 2012; S. O'Neill & Eden, 2012; Talaulikar, 2022). This phase encompasses significant fluctuations in ovarian hormones estrogen and progesterone, and elevations in follicle-stimulating hormone (FSH) (Cutts & Fennessy, 2025; Grub et al., 2021; Khoudary et al., 2019; Verrilli & Berga, 2020). Perimenopause may occur for 4-8 years (Paramsothy et al., 2017), or as long as 10-14 years (Lega et al., 2023; McCarthy & Raval, 2020; Santoro et al., 2020), until complete menstrual cessation, or amenorrhea, for 12 months, for which individuals enter post-menopause. Post-menopause represents the cessation of menstruation for at least 12 months (Harlow et al., 2012; Khoudary et al., 2019), and the end of the female's reproductive life cycle, typically occurring at 50-51 years of age in Western countries (Davis et al., 2023; McKinlay et al., 1992). Endocrine changes continue into this stage, as estrogen and progesterone decline, and FSH levels continue to increase. Approximately two years after the final menstrual period, estrogen, progesterone, and FSH stabilize; estrogen and progesterone remain chronically low, while FSH remains chronically high (Harlow et al., 2012; Khoudary et al., 2019; Motlani et al., 2023; Thurston et al., 2025).

Although spontaneous menopause in midlife is the most common experience, menopause can also occur beyond this context. Specifically, some individuals may experience premature or early menopause (e.g., prior to the age of 40 or between the ages of 40-45; Davis et al., 2023; Shuster et al., 2010). Premature (i.e., premature ovarian insufficiency) and early menopause can occur spontaneously, or due to medical or surgical interventions, such as chemotherapy/radiation treatment or a bilateral oophorectomy (Cox & Liu, 2014; Faubion et al., 2015; see Table 1 for a review of premature and early menopause). These earlier experiences of menopause are often

associated with worse health outcomes (Faubion et al., 2015; Mishra et al., 2024; Ryan et al., 2014; Shuster et al., 2010); thus, underscoring the impact of menopause on quality of life, and well-being, beyond age-related changes.

Regardless of the type of menopause, those undergoing this transition often experience an array of unpleasant symptoms that span multiple domains (Gupta et al., 2006; Khoudary et al., 2019). Menopause-related endocrine changes may evoke the onset of musculoskeletal pain (i.e. adhesive capsulitis; Wright et al., 2024), vasomotor difficulties (i.e. hot flashes and night sweats; Khan et al., 2023), urogenital symptoms (i.e. vaginal dryness, dyspareunia, etc.; Calleja-Agius & Brincat, 2015), and psychological difficulties (i.e. emotional difficulties, cognitive challenges, etc.; Cho et al., 2025; Russell et al., 2019), as ovarian hormones contribute to bone health, thermoregulation, the genitourinary system, and neural health (Charkoudian & Stachenfeld, 2016; Fidecicchi et al., 2024; Gandhi et al., 2016; Motlani et al., 2023; Rasul et al., 2025; Russell et al., 2019; Z. Zhang et al., 2021). On average, seven menopause-related symptoms are experienced (Menopause Foundation of Canada, 2022), progressively worsening through the transition (Davis et al., 2023; Santoro et al., 2015). These symptoms may occur prior to perimenopause and remain into the post-menopausal period (Berecki-Gisolf et al., 2009; Blümel et al., 2012; Lega et al., 2023). While symptoms experienced in menopause can vary amongst individuals, psychological symptoms, pertaining to difficulties in neurocognitive and emotional functioning, are widely reported, and noted to be very distressing (Conde et al., 2021; Garg & Munshi, 2025; Harper et al., 2022; He et al., 2025).

1.2 Menopause-Related Cognitive Difficulties

Within the domain of neurocognitive functioning, perceived cognitive difficulties, termed subjective cognitive difficulties (SCDs), are commonly experienced during menopause (Conde et

al., 2021). These difficulties involve concerns across attention, executive functioning, verbal learning, and memory domains (He et al., 2025), particularly experienced as day-to-day difficulties with concentration, multitasking, forgetfulness, and mental inefficiency (Conde et al., 2021; He et al., 2025). Specific difficulties may differ across individuals, though word finding problems, misplacing items, difficulty with remembering names, distractibility, and forgetting appointments are reported (Mitchell & Woods, 2001; Proctor et al., 2026). The collection of these subjective experiences is referred to as "brain fog" (Maki & Jaff, 2022), a symptom often experienced that increases in frequency throughout the menopausal stages (Harper et al., 2022; Naysmith et al., 2026; M. T. O'Neill et al., 2023; Schaafsma et al., 2010). These challenges, at least in part, may represent a cognitive consequence of the fluctuations in endocrine functioning that occur through the menopausal transition (Conde et al., 2021; Maki & Jaff, 2022) as well as the structural and functional brain alterations that have been linked to the menopausal stages (Jacobs et al., 2016; Ramli et al., 2023; Vega et al., 2016). Although SCDs may not consistently reflect objective deficits (Furey et al., 2025; Greendale et al., 2009; Naysmith et al., 2026; Schaafsma et al., 2010; Than et al., 2023; Unkenstein et al., 2016; M. T. Weber et al., 2012, 2013), they may be amongst the most severe symptoms experienced in menopause (Arar & Erbil, 2023; Berg et al., 2008), evoking significant negative emotional reactions (He et al., 2025). Additionally, previous literature has also established a significant positive relationship between the severity of SCDs and the severity of other menopause-related difficulties, such as the overall menopausal burden, or vasomotor symptoms, specifically (Crockford et al., 2024; Liu et al., 2024; Reuben et al., 2021).

These perceived cognitive struggles are a significant concern (Mitchell & Woods, 2001), and arguably one of the most frequently reported (AlDughaither et al., 2015; Conde et al., 2021;

Harper et al., 2022; Hutchings et al., 2023; M. T. O'Neill et al., 2023; L. Zhang et al., 2021), and unexpected (Currie & Moger, 2019), menopause symptom, with a likely prevalence as high as 62% (Conde et al., 2021). In fact, onset of these cognitive challenges may evoke negative self-evaluations, as individuals experiencing SCDs often describe these difficulties as having deleterious impacts on their self-efficacy and sense of competency (He et al., 2025). Additionally, these concerns reliably and negatively impact social and occupational functioning (Griffiths et al., 2013; Gupta et al., 2006; He et al., 2025; M. T. O'Neill et al., 2023; Woods & Mitchell, 2011), as SCDs may evoke an urge to reduce engagement in social situations, due to embarrassment associated with lapses (He et al., 2025), as well as contribute to the larger array of symptoms impairing perceived vocational performance (M. T. O'Neill et al., 2023). Within this context, it is not surprising that these difficulties are amongst the top three symptom priorities for those seeking treatment for related menopausal difficulties (Carpenter et al., 2015).

Beyond menopause, SCDs, more generally, have been significantly associated with poorer quality of life (Hill et al., 2017; Montejo et al., 2012; Pavel et al., 2023; Roehr et al., 2017; Stites et al., 2018; Sun et al., 2023) and functional difficulties (Samuelson et al., 2017). Furthermore, the presence of SCDs is implicated in worse quality of life even in cognitively healthy individuals, more so than those with objective cognitive decline (i.e., those diagnosed with mild cognitive impairment and dementia caused by Alzheimer's disease; Sun et al., 2023). Given the frequent and distressing impact of SCDs in menopause, SCDs likely represent a pathway through which the burden of menopause-related difficulties may translate into poor functional outcomes.

1.3 Menopause-Related Emotional Difficulties

Alongside cognitive difficulties, emotional difficulties are an additional symptom cluster often experienced across perimenopause and post-menopause. A considerable number of individuals navigating menopause experience a range of emotional difficulties, including, but not limited to, affective difficulties (i.e. depression and anxiety), mood swings, suboptimal emotional regulation, and irritability (AlSwayied et al., 2024; Bromberger & Kravitz, 2011; Deshpande & Rao, 2025; Garg & Munshi, 2025; Harper et al., 2022; Ramyashree et al., 2024; Refaei et al., 2022). In exploring these emotional difficulties by the stage of menopause, individuals in perimenopause may experience greater levels of psychological distress (Bromberger et al., 2001), characterized by mood instability, irritability, nervousness, and depression (Badawy et al., 2024; Bromberger et al., 2003; Cohen et al., 2006; Goonaratna et al., 1999; Harper et al., 2022; Jagtap et al., 2016). Although perimenopause is denoted as a period of peak vulnerability to these emotional difficulties (Badawy et al., 2024; Bromberger et al., 2001; Santoro et al., 2015), those navigating post-menopause experience irritability (Mühlen et al., 1995; Spyropoulou et al., 2009) and greater psychiatric difficulties (Jafari et al., 2014; Mühlen et al., 1995) as well. Like cognitive challenges, these difficulties with emotional functioning also impact social and occupational domains (Griffiths et al., 2013; Gupta et al., 2006; M. T. O'Neill et al., 2023; Woods & Mitchell, 2011).

In the context of menopause, neurocognitive and emotional difficulties co-occur and are negatively associated with quality of life; though, they are often conceptually integrated into a single psychological symptom domain (Hooper et al., 2022; Raczkiewicz et al., 2026; Rathnayake et al., 2019). Although this integration greatly implicates the psychological difficulties associated with menopause as an important domain of exploration, it simplifies the

nature in which menopause, and its associated neurocognitive and emotional sequalae, contribute to poorer daily outcomes. Specifically, it overlooks a significant interaction that may occur between these two domains.

Cognitive difficulties, generally, reliably correlate with emotional difficulties in menopause (e.g., depression, anxiety, and psychological stress), across both objective (i.e., processing speed, psychomotor speed, working memory, and verbal memory) and subjective (i.e., perceived memory difficulties, and concentration difficulties) areas (Greendale et al., 2010; Mitchell & Woods, 2011; Zhu et al., 2022), with SCDs perhaps correlating more greatly with emotional difficulties, than with objective deficits (Naysmith et al., 2026). These relationships are also noted in the population, as individuals greatly attribute their daily cognitive lapses to increased levels of stress and burden experienced upon navigating the transition (Mitchell & Woods, 2001, 2011). Furthermore, a cyclical relationship is also identified, with the anxiety experienced following SCDs as being perceived to further worsen the severity of them (Johnson & Ogden, 2025). These reported reciprocal interactions align with the broader literature in affective science demonstrating the detrimental impact of negative emotions on cognitive functioning (Shields, Moons, et al., 2016; Shields, Sazma, et al., 2016; Yang et al., 2023). Thus, the increased vulnerability to experience negative affect in menopause may especially contribute to the presence of SCDs (Gurvich et al., 2026). Despite these observations, previous literature is limited in exploring the interactions of neurocognitive and emotional difficulties in menopause. Particularly, this has not been explored in the context of the menopause-related symptom burden and quality of life deficit relationship. Emotional difficulties may represent an important factor in which SCDs contribute to functional outcomes and overall wellbeing in individuals navigating the menopausal transition.

1.4 Present Study

Despite their likely involvement in determining quality of life of individuals navigating menopause, the roles that SCDs and emotional difficulties may play is yet to be fully elucidated. Specifically, previous literature has yet to explore whether SCDs may underscore the negative relationship between menopause-related symptom severity and quality of life, and if it is altered by one's vulnerability to experience emotional distress. Clarifying mechanisms that subserve the deleterious outcomes in menopause represents an important first step in improving care, by providing key insights for optimizing existing treatment programs and for developing novel psychosocial interventions. Therefore, the present study attempted to delineate the likely nuanced relationship between menopause-related symptom severity, quality of life, subjective cognitive difficulties (SCDs), and emotional difficulties in individuals navigating menopause. As such, the following hypotheses were investigated as part of a moderated mediation model (please see Figure 1):

1.4.1 Hypothesis 1. Menopause-Related Symptom Severity will be Associated with Quality of Life.

In line with previous research, it was hypothesized that the severity of menopause-related symptoms would be associated with overall quality of life reported by participants, where higher menopause-related symptom severity would predict poorer quality of life.

1.4.2 Hypothesis 2. The Relationship Between the Severity of Menopause Symptoms and Quality of Life will be Partially Mediated by Perceived Cognitive Difficulties.

Given that SCDs likely represent a significant mechanism through which menopause-related difficulties may translate into suboptimal functional outcomes, it was hypothesized that the relationship between menopause-related symptom severity and quality of life would be

partially mediated by the severity of SCDs reported by participants. This indirect effect was only expected to be partial, in recognition of the likelihood that menopause-related symptoms may influence quality of life through a constellation of interrelated factors, of which SCDs represent only one component.

1.4.3 Hypothesis 3. The Relationship Between Perceived Cognitive Difficulties and Quality of Life will be Moderated by Emotional Difficulties.

Emotional difficulties represent a factor that may worsen quality of life in menopause, specifically through amplifying the impact of SCDs on quality of life. As such, it was hypothesized that emotional difficulties will moderate the relationship between SCDs and quality of life, where the deleterious impact of SCDs on perceived quality of life would be stronger in the presence of more severe emotional difficulties.

1.4.4 Hypothesis 4: The Strength of the Indirect Effect of Menopause-Related Symptom Severity on Quality of Life, Through Perceived Cognitive Difficulties, will be Moderated by Emotional Difficulties.

Given that cognitive and emotional difficulties demonstrate a reciprocal relationship in menopause, it was hypothesized that the impact of menopause-related symptom severity on quality of life, through subjective cognitive difficulties, will be moderated by emotional difficulties. Specifically, it was hypothesized that the strength of the indirect effect of menopause-related symptom severity on quality of life, through subjective cognitive difficulties, would be stronger in the presence of more severe emotional difficulties.

2. Methods

2.1 Participants

Individuals who self-identified as being in perimenopause or post-menopause were recruited through convenience sampling using social media ads on Facebook and Instagram, to complete a series of self-report questionnaires. The study included individuals who self-identified as in perimenopause and post-menopause, including individuals who underwent spontaneous menopause and post-surgical menopause. A total of 1,192 individuals navigated to the informed consent page, of whom 1,034 were unique site visitors. Because participants were recruited through social media using a general anonymous link, recruitment rate was not possible to acquire; however, 70% of individuals who navigated to the survey link, proceeded to the informed consent page. The number of individuals who provided consent were 722, and of these 722 participants, 665 completed the final page of the study, yielding a completion rate of 92.1%. Entries were excluded if the participant failed any of the attention checks, submitted questionnaires with more than 25% of missing data, completed the survey in less than 180 seconds, and did not self-identify as being in perimenopause or post-menopause. Multiple entries from the same IP address were also excluded.

The final sample included in the analyses consisted of 572 participants, consisting of 297 (51.9%) participants who self-identified as being in perimenopause and 275 (48.1%) self-identified as being in post-menopause. Participants age ranged from 30 to 61 years (M=50.9, SD= 4.58) with a majority of the sample located in North America (78.4%). Other regions participants were located included Europe (16.4%), Oceania (4.5%), Africa (<0.01%), and South America (<0.01%). Race and ethnicity were not formally collected in this survey, however, 10.5% of the sample self-identified as a person of colour. Additionally, 29.1% identified as

bilingual or multilingual. Regarding perceived financial situation, most participants described their financial situations as *good* or *very good* (61.8%) and 66.5% reported having a bachelor's degree or higher. Please see Table 2 for additional details about participant characteristics.

2.2 Procedure

Using an online survey platform, a brief survey was developed for participants to easily access through a link posted in the social media ad. In the survey, participants were asked to provide informed consent, report demographic information, and complete self-report questionnaires to quantify menopause-related symptom severity, quality of life, subjective cognitive difficulties, and emotional difficulties. Data was collected from participants between April 27, 2025, to June 8, 2025.

In the online informed consent form, participants were notified regarding the purpose of the study, average length of time to complete the survey, compensation, data storage and deletion procedures, data security, contact information of the principal investigator, and contact information for the research ethics committee at York University that approved study procedures. Anyone who navigated to the survey link was invited to participate, and completion of the survey was voluntary.

In total, the survey consisted of 95 questions, four of which were adaptive questions (i.e., four questions were conditional and depended on answers to the preceding questions), and all questions were completed in the same order. Participants could not navigate to previous questions to review, or alter, answers. Questions collecting demographic information included a non-response option, except age and perceived financial situation, though, self-report questionnaires quantifying variables of interest did not include a non-response option, as they are

not included in original measures. In completing the survey, participants had the choice to be entered into a chance to win one of five $100 Amazon gifts cards.

To prevent multiple entries, the survey platform assigned cookies to the participant's browser after submission. Participants were unable to re-access the survey if cookies are present. Following data collection, data acquired from duplicate IP addresses was also excluded to confirm that each participant was a unique survey visitor. Data submitted by participants were collected automatically, and stored in the survey platform, later to be downloaded, and securely stored, on a password-protected computer at York University. All procedures were approved by the Human Participants Review Sub-Committee at York University (ORE Certificate #: e2025-115). Please see Appendix A for additional information consistent with the Checklist for Reporting Results of Internet E-Surveys (CHERRIES; Eysenbach, 2004, 2012).

2.2.1 Menopause-Related Symptom Severity.

Menopause-related symptom severity was measured using the Menopause Rating Scale (MRS; Hauser et al., 1994; Heinemann et al., 2003). This 11-item self-report questionnaire prompted participants to rate the severity of their menopause-related symptoms. Menopause-related symptoms listed on this scale cover psychological, somato-vegetative, and urogenital domains. Participants are provided with a 5-point Likert scale, from 0 "none" to 4 "very severe", with higher scores reflecting the presence of more menopause-related symptoms, and greater severity. This measure demonstrated good internal consistency (*Cronbach's* α = .83).

2.2.2 Quality of Life.

The Quality of Life Scale (QoLS; Burckhardt & Anderson, 2003; Flanagan, 1978, 1982) was used to quantify quality of life. This self-report questionnaire is a 15-item measure asking participants to rate their satisfaction across 5 categories: material and physical well-being;

interpersonal relationships; social, community, and civic activities; personal development; and recreation. Participants rated their satisfaction, or dissatisfaction, using a 7-point Likert scale from 1 "terrible" to 7 "delighted", where higher scores reflect higher quality of life. This measure demonstrated excellent internal consistency (*Cronbach's α* = .90)

2.2.3 Self-Reported Cognitive Difficulties.

Cognitive Functioning Self-Assessment scale (CFSS; Annunziata et al., 2012, 2018) was used to quantify subjective cognitive difficulties in the sample. This 18-item self-report questionnaire assesses self-perceived cognitive functioning using a 5-point Likert scale from 0 "never" to 4 "always". Participants were prompted to rate their cognitive functioning across attention, memory, and spatial temporal orientation. Higher scores on this measure indicate greater perceived cognitive difficulties. This measure demonstrated excellent internal consistency (*Cronbach's α* = .93)

2.2.4 Emotional Difficulties.

Emotional Reactivity Scale (ERS; Nock et al., 2008) was used to quantify emotional difficulties. This 21-item self-report measure, prompted participants to rate their relatability to items pertaining to the sensitivity towards experiencing negative emotions, tendency to experience them more intensely, and the likelihood for them to persist. Individuals rated using a 5-point Likert scale, with 0 indicating “not at all like me” and 4 being “completely like me”. Higher scores are indicative of greater vulnerability for experiencing emotional distress. This measure demonstrated excellent internal consistency (*Cronbach's α* = .96).

The MRS, CFSS, and ERS were positively correlated with each other (*r*s = .45 to .58, *p*s < .001), and they were negatively correlated with the QoL (*r*s = -.39 to -.47, *p*s < .001). Furthermore, participants self-identifying as in perimenopause were not significantly different

from those self-identifying as in postmenopause, across the MRS ($t(530.98) = 1.84$, $p = .06$), QoL ($t(539.06) = -1.38$, $p = .17$), CFSS ($t(541.66) = .06$, $p = .48$), and ERS ($t(538.13) = -1.37$, $p = .17$). Please see Table 3 for a summary of descriptive statistics for these measures.

2.3 Data Analytical Approach

A multiple regression framework was used to test the hypothesized moderated mediation model (Figure 1) using IBM SPSS for Windows and the PROCESS macro model 14 (Hayes, 2022), which estimated three separate models. Quality of life (i.e., total score on the QoLS) was entered as the dependent variable and menopause-related symptom burden (i.e., total score on the MRS) was entered as the independent variable across these analyses. Additionally, overall severity of SCDs (i.e., total score on the CFSS) was entered as the mediator for the association between the independent and dependent variables, while severity of emotional difficulties (i.e., total score on the ERS) was entered as the moderator for the relationship between severity of SCDs and quality of life. Age, education, perceived financial situation, and stage of menopause (i.e., perimenopause or post-menopause) were used as covariates across all analyses. Criterion for statistical significance was set at $p < .05$.

An additional identical set of analyses was conducted to examine whether potentially overlapping item content of the MRS and CFSS impacted results of the moderated mediation analysis. In this sensitivity analysis, all models were re-estimated after removing the item with potentially overlapping content from the total score calculation of the MRS (i.e., Item 7: "*Physical and mental exhaustion [general decrease in performance, impaired memory, decrease in concentration, forgetfulness]")*. These re-estimated models did not yield any notable differences in the patterns of significance, or direction of associations (please see Appendix B for detailed results of this analysis).

3. Results

The model evaluating whether menopause-related symptom severity was associated with SCDs, while controlling for age, level of education, perceived financial situation, and stage of menopause, was significant ($F(5, 566) = 63.56$, $p < .001$, $R^2 = .36$). In this model, menopause-related symptom severity demonstrated a positive association with SCDs, such that higher menopause-related symptom severity was associated with a greater severity of SCDs ($b = .46$, $SE = .03$, $p < .001$, 95% CI [0.4016, 0.5169]). Participant age ($b = -.01$, $SE < .01$, $p = .035$, 95% CI [-0.0198, -0.0007]) was negatively associated with SCDs, as was perceived financial situation ($b = -.08$, $SE = .02$, $p < .001$, 95% CI [-0.1267, -0.0405]). Level of education ($b = .02$, $SE = .02$, $p = .273$, 95% CI [-0.0141, 0.0497]) and stage of menopause ($b < .01$, $SE = .04$, $p = .965$, 95% CI [-0.0850, 0.0889]) were not associated with the severity of SCDs.

The model predicting quality of life, while controlling for age, level of education, perceived financial situation, and stage of menopause, was also significant ($F(8, 563) = 50.39$, $p < .001$, $R^2 = .42$). In this model, menopause-related symptom severity ($b = -.25$, $SE = .06$, $p < .001$, 95% CI [-0.3625, -0.1337]), SCDs ($b = -.32$, SE = .06, p < .001, 95% CI [-0.4420, -0.1916]), and emotional difficulties ($b = -.15$, SE = .04, $p < .001$, 95% CI [-0.2297, -0.0638]) were negatively associated with quality of life. While perceived financial situation was positively associated with quality of life ($b = .36$, $SE = .03$, $p < .001$, 95% CI [0.2938, 0.4243]), age ($b <$ [.01] , $SE = .01$, $p = .650$, 95% CI [-0.0176, 0.0110]), level of education ($b = -.01$, $SE = .02$, $p = .604$, 95% CI [-0.0608, 0.0354]), and stage of menopause ($b = .06$, $SE = .07$, $p = .363$, 95% CI [-0.0706, 0.1924]) were not.

Importantly, a significant interaction was also observed between SCDs and emotional difficulties ($b = -.14$, SE = .05, p = .008, 95% CI [-0.2435, -0.0371]), such that the negative

relationship between SCDs and quality of life was stronger at greater levels of emotional difficulties (Figure 2). Specifically, the effect of SCDs on quality of life was significant at low (-1 SD) levels of emotional difficulties (b = -.19, SE = .08, p = .013, 95% CI [-0.3446, -0.0404]), mean levels of emotional difficulties (b = -.32, SE = .06, p < .001, 95% CI [-0.4420, -0.1916]), and high (+1 SD) levels of emotional difficulties (b = -.44, SE = .08, p < .001, 95% CI [-0.5989, -0.2832]). Johnson-Neyman analysis revealed that this effect was statistically significant for 86.2% of participants in the study sample.

The direct effect of menopause-related symptom severity on quality of life remained significant after accounting for SCD, ERS, their interaction, and the covariates (b = -.25, SE = .06, p < .001, 95% CI [-0.3625, -0.1337]). A significant moderated mediation index was also found (b = -.0644, SE = .03, 95% CI [-0.1116, -0.0132]), where the strength of the indirect effect of menopause-related symptom severity on quality of life through SCDs reciprocally increased with severity of emotional difficulties. Specifically, this indirect effect was found to be significant across low (-1 SD; b = -.04, SE =.04, 95% CI [-0.1670, -0.0149]), mean (b = -.15, SE =.03, 95% CI [-0.2142, -0.0813]), and high (+1 SD; b = -.20, SE =.04, 95% CI [-0.2866, -0.1204]) levels of emotional difficulties.

4. Discussion

The present study aimed to explore the nuanced relationship between menopause-related symptom severity and quality of life, particularly delineating how SCDs and emotional difficulties may shape this relationship. Results provided support for the moderated mediation model. In statistically controlling for age, level of education, and perceived financial situation, a negative association was found between menopause-related symptom severity and quality of life,

such that the combined burden of somatic (i.e., hot flashes, heart discomfort, musculoskeletal pain), urogenital (i.e., vaginal dryness, sexual difficulties, and bladder symptoms), and psychological (i.e., depression, anxiety, irritability, and mental or physical exhaustion) difficulties predicted poorer quality of life. While the direct effect of menopause-related symptom severity on quality of life remained significant, a significant indirect effect of menopause-related symptoms on quality of life through SCDs (e.g. perceived problems with attention, memory, and wayfinding abilities) was observed, and this was moderated by emotional difficulties (e.g. greater sensitivity, intensity, and persistence of negative affect). In other words, the indirect effect of menopause-related symptom severity on quality of life through SCDs was notably stronger among participants who endorsed higher levels of emotional difficulties. Of note, this indirect effect remained significant at a lower severity of emotional difficulties, and thus, may further implicate SCDs as a partial contributor, independent of emotional distress. Furthermore, a significant interaction between SCDs and emotional difficulties was also found, where the deleterious impact of SCDs on quality of life was stronger for participants who endorsed greater vulnerability to experiencing emotional distress. Taken together, results from the present study suggest that SCDs may represent one route through which menopause-related symptoms may negatively impact quality of life.

4.1 Impact of Menopause on Quality of Life

In line with previous literature (Chang et al., 2019; Hutchings et al., 2023; Ibrahim et al., 2015; Karaçam & Şeker, 2007; Nazarpour et al., 2020; Ngai, 2019; Vallejo et al., 2026), present study findings demonstrate that menopause-related symptom severity is significantly negatively associated with quality of life across individuals navigating perimenopause and post-menopause. Findings were also consistent with those experiencing induced menopause from breast cancer

treatment, as a greater severity of menopause-related symptoms was perceived to have a significant negative effect on physical, social, and occupational functioning, and general quality of life (Gupta et al., 2006). Additionally, findings are also consistent with retrospective studies, as retrospective menopause symptom severity has been related to poorer current quality of life, such that more severe symptoms in the past are associated with limitations due to emotional difficulties, in addition to poorer vitality, emotional well-being, social functioning, and general health in the present (Hooper et al., 2022).

Previous literature has explored the relationship between menopause-related symptom severity and specific areas of quality of life, such as health-related quality of life, menopause-specific quality of life, and work-related quality of life (Chang et al., 2019; Hooper et al., 2022; Hutchings et al., 2023; Karaçam & Şeker, 2007; Khatun et al., 2026; Ngai, 2019; Vallejo et al., 2026). The findings from the study add to the growing body of research exploring quality of life using a broader lens (Ibrahim et al., 2015; Nazarpour et al., 2020). Health-related quality of life, as measured through the Health-Related Quality of Life Scale and the Short Form-36 (Ware & Sherbourne, 1992), captures the intersection of quality of life, health, and day-to-day functioning, operationalizing the impact of health difficulties in daily living (Upton & Upton, 2014). Menopause specific quality of life is similar, though it explores the impact of menopause-related symptoms specifically, operationalizing how bothersome the symptoms are, often captured through the Disease Specific Utian Quality of Life Scale (Utian et al., 2002) and Menopause-Specific Quality of Life Scale (MENQoL; Hilditch et al., 1996). Lastly, work-related quality of life explores an additional territory relating to quality of life within the occupational setting, specifically capturing well-being, work-life balance, satisfaction of career and working conditions, perception of controllability at work, and degree of occupational stress (Easton &

Van Laar, 2018). Collectively, these areas speak to specific domains of quality of life, though fail to paint the picture of general satisfaction. Thus, the findings from the present study add to this literature by demonstrating that menopause-related difficulties have a broader general impact on daily life, as the QoLS explores global satisfaction across wellbeing, relationships, community engagement, personal growth, and recreational involvement (Burckhardt & Anderson, 2003; Dantas & Ciol, 2024; Flanagan, 1978, 1982).

4.2 Subjective Cognitive Difficulties

Results demonstrated a positive relationship between menopause-related symptom severity and SCDs, also coinciding with previously published findings (Crockford et al., 2024; Drogos et al., 2013; Liu et al., 2024; Reuben et al., 2021; Schaafsma et al., 2010). Thus, a greater severity, frequency, or overall burden of menopause-related symptoms appear to be associated with the perception of more troublesome cognitive challenges with attention, memory, and spatial navigation. The relationship between the severity of menopause-related symptoms and subjective memory difficulties is well-established (Drogos et al., 2013; Liu et al., 2024; Schaafsma et al., 2010), with previous literature denoting hot flashes as specifically associating with memory complaints, but not difficulties in other domains (Mitchell & Woods, 2011). Findings from the present study extend these associations, illustrating a significant relationship between menopause-related symptom severity and perceived global cognitive functioning. These perceived cognitive difficulties may occur due to the fluctuations in endocrine functioning amidst the perimenopause and post-menopause experience (Conde et al., 2021). Alternatively, cognitive failures may be an additional consequence of menopause-related symptoms directly (Reuben et al., 2021) as they may significantly impair concentration, sleep, and general functioning. Fatigue may also be an important consideration in this regard (Ali et al., 2020).

Regardless of specific mechanisms that underlie the relationship between menopause-related symptoms and SCDs, struggles with forgetfulness, attention, and spatial navigation exhibited a deleterious effect on quality of life across individuals navigating perimenopause and post-menopause, and thus, may represent a significant and distressing way in which the menopause transition impacts daily living (Harper et al., 2022; He et al., 2025; Maki & Jaff, 2022). This is supported in the finding that SCDs are amongst the top three symptom priorities for individuals seeking treatment for menopause-related difficulties (Carpenter et al., 2015). Previous literature has established challenges with subjective cognition as being significantly associated with poorer quality of life in mid-to-late adulthood (Hill et al., 2017; M. Mol et al., 2007; M. E. M. Mol et al., 2009; Pan et al., 2015), with SCDs negatively impacting social and occupational functioning in menopause, specifically (Griffiths et al., 2013; He et al., 2025; M. T. O'Neill et al., 2023; Woods & Mitchell, 2011). Additionally, the worry regarding neurodegenerative illness evoked from perceived cognitive difficulties are suggested to negatively impact well-being in the aging population (Kessler et al., 2012), addressing an added factor potentially underlying the significant negative correlation observed within the present study. In this context, findings from the current sample underscore the importance of addressing SCDs as a way to improve quality of life of individuals navigating menopause. In this vein, SCDs represent a promising treatment target for cognitive remediation and psychosocial interventions that can significantly improve quality of life (Ballantyne et al., 2021; Spector et al., 2024).

In addition to these relationships, the findings suggest that SCDs may be a significant avenue in which menopause-related difficulties negatively impact the quality of daily living. Menopause is often viewed as a significant shift in one's identity (Giggins et al., 2026) and these

perceived changes in cognition may underscore undesirable aspects of this transition, considering the ties between cognition, identity, and the sense of self (Buckley et al., 2015; He et al., 2025; Woods et al., 2023). The menopausal transition has also been linked to concerns about the loss of previous functioning (Hakimi et al., 2014; Refaei et al., 2022), which may be maintained and exacerbated by daily experiences of SCDs. In this context, individuals may be acutely cognizant, and distressed, by the observable shift in their cognition, self-efficacy, and sense of competency, as illustrated by the noted concerns over difficulties in meeting expectations that were once successfully managed prior to menopause (He et al., 2025). Additionally of note is that perceived self-efficacy during the menopausal transition has been found to be an important contributor to quality of life (Kafaei-Atrian et al., 2022; Magistro et al., 2025). Within that context, SCDs may not only represent a clinical target to improve quality of life amidst the menopausal transition but may also underscore an avenue for alleviating the menopause-related symptom burden and associated impairments in daily living.

4.3 Emotional Difficulties

The findings also suggest that a higher propensity to experience negative emotions is detrimental to quality of life of individuals navigating menopause. This aligns with past research suggesting emotional dysregulation may be associated with poorer day-to-day functioning (Garofalo et al., 2017; Schirda et al., 2015; Wilks et al., 2016). More specifically, this finding is also in line with menopause-specific literature suggesting that emotional health difficulties, such as anxiety and depression, have been consistently associated with poorer quality of life (Greenblum et al., 2013; Raczkiewicz et al., 2026; Wariso et al., 2017). As such, the present study adds to this growing body of literature by demonstrating that increased sensitivity to negative emotions, as well as a propensity to experience them more intensely, and for a longer

duration (e.g., mood swings or increased irritability), are likely to result in poorer quality of life during the menopausal transition.

In addition to its direct impact on quality of life, emotional difficulties also modulated the indirect impact of menopause-related symptom severity on quality of life through SCDs in the study sample. As such, the interaction between SCDs and emotional difficulties in this context highlights another potentially important mechanism through which menopause-related symptoms may negatively impact daily functioning. Cognitive challenges may often result in negative emotions such as increased anxiety or embarrassment (He et al., 2025; Maki & Jaff, 2022). As such, it is possible that greater emotional reactivity may translate into an exacerbated reaction to SCDs, and their consequences, thereby worsening the impact of SCDs on perceived quality of life. Alternatively, given that SCDs prompt anxieties and fear surrounding objective functioning (Hakimi et al., 2014; He et al., 2025; Maki & Jaff, 2022; Proctor et al., 2026), a greater reactivity to these concerns within this context may similarly exacerbate downstream effects on quality of life. Stress, and anxiety, may also be provoked by the uncertainty of whether these difficulties would persist long-term (Hakimi et al., 2014; Refaei et al., 2022), and whether they represent underlying neurodegenerative conditions (Hakimi et al., 2014; He et al., 2025; Maki & Jaff, 2022; Santoro et al., 2015). These negative emotional reactions may be provoked more frequently, more intensely, and for a longer duration, in individuals with a greater propensity for negative affect, underscoring the observed results. Evidence suggests that difficulties across emotional factors and stress may contribute to increased forgetfulness and struggles with concentration (Mitchell & Woods, 2001, 2011; Woods et al., 2000). As such, results from the present study not only align with literature establishing a significant association between SCDs and emotional factors (Drogos et al., 2013; Mitchell & Woods, 2011; Naysmith et al., 2026;

Opdebeeck et al., 2019; M. Weber & Mapstone, 2009), but they also expand the understanding of the detrimental impact of this interaction on quality of life in the context of menopause-related symptom burden. Taken together, these findings underscore the likely importance of addressing emotion regulation difficulties during the menopausal transition, given that, not only may it have a direct impact on quality of life, but it may also improve quality of life by mitigating the impact of SCDs.

4.4 Other Considerations

Several additional findings are of note. Menopausal stage was not significantly associated with quality of life, where individuals in perimenopause and post-menopause in the study sample did not significantly differ regarding their quality of life ratings. This finding suggests that quality of life may not improve after the menopausal transition, or in other words, as individuals navigate post-menopause. Although supported by literature suggesting an enduring negative impact on quality of life across perimenopause and post-menopause (Hess et al., 2012), this contrasts findings that suggests a movement towards improved quality of life in those navigating post-menopause, specifically (Hutchings et al., 2023). It should be noted, however, that tools for measuring quality of life vary widely across studies (for example, health-related quality of life, menopause-specific quality of life, and work-related quality of life). The measure used in the present study, the QoLS Scale (Burckhardt & Anderson, 2003; Flanagan, 1978, 1982), provides a more general rating of quality of life, capturing several functional domains.

Demographic factors that were considered as covariates demonstrated differential associations with outcome variables across analyses. Perceived financial situation was associated with SCDs and quality of life, where participants who reported better financial security also reported less severe SCDs and better quality of life. This finding aligns with previous research

that links socioeconomic factors with wellbeing (Salem & Robenson, 2025; Xu et al., 2024), suggesting that financial stability may represent an important protective factor for individuals navigating menopause. While the age and level of education reported by participants did not demonstrate any associations with quality of life, age (but not level of education) was negatively associated with SCDs. Although the finding of older participants in the sample reporting less severe SCDs may be at odds with literature suggesting older participants, in some contexts, as experiencing more SCDs (Menon et al., 2025; Röhr et al., 2020; L. Zhang et al., 2021), it may be consistent with past menopause-specific findings indicating that individuals may report fewer emotional and cognitive difficulties later in the transition (Badawy et al., 2024; Gurvich et al., 2026; Kuck & Hogervorst, 2024; Piauilino et al., 2010).

4.5 Limitations

Several limitations should be noted. As this was a cross-sectional study with a correlational design, causal relationships cannot be ascertained, and presented results must be interpreted through the lens of a statistical model. To address this limitation, future studies should use longitudinal designs to evaluate causal relationship between menopause-related symptom severity, subjective cognitive difficulties, and quality of life. Findings from such research may improve healthcare across individuals and delineate the primary symptom impacting the model.

Confounding factors impacting measured variables, such as perceived sleep quality and current mental health diagnoses, were not recorded and should be considered for future studies. As previously delineated in research, poor quality of sleep is associated with greater emotional difficulties (Goldstein & Walker, 2014), subjective cognitive difficulties (Joo et al., 2021), and poorer quality of life (Lee et al., 2021), independently. In menopause, sleep difficulties are also

frequent and severe (Berg et al., 2008); thus, poor sleep marks a potential confounding factor underscoring present results. Regarding current mental health diagnoses, depression in menopause is common (Jia et al., 2024), and this diagnosis involves emotional difficulties, that occur alongside greater SCDs (American Psychiatric Association, 2022; van den Bosch et al., 1993), and poorer quality of life (IsHak et al., 2015), marking an additional confounding factor.

Additionally, several variables were not considered for this investigation that would have potentially facilitated a broader understanding of the research area. For instance, the present study did not inquire regarding the age at which individuals entered menopause, resulting in a failure to delineate the impact of early or premature menopause on the relationships in the model. Early and premature menopause have been associated with worse outcomes (Faubion et al., 2015; Mishra et al., 2024; Shuster et al., 2010) and clarifying how findings from the present study may differ across different types of menopause will allow for a clearer perspective into how symptoms shape functioning. Furthermore, although perceived financial situation demonstrated a negative association with SCDs and quality of life, survey items did not inquire regarding socioeconomic status. Exploring this in a more formal manner using a standard measure of socioeconomic status would allow for a better understanding of how financial status may shape experiences of the menopausal transition.

Lastly, due to the use of convenience sampling and social media to acquire the study sample, generalizability of the results may be limited. The current sample of participants was skewed towards individuals who were from North America and did not identify as a person of colour. A majority of the sample also reported to be highly educated, with a bachelor's degree or higher, and perceived their financial situation as *"good"* or *"very good"*. Overall, this impairs generalizability of results. Furthermore, the sample was acquired through social media

convenience sampling, indicating that the study sample may be primarily made up of individuals who frequent social media platforms and are willing to navigate to an unknown link. Overall, although social media may endorse benefits for survey research (Whitaker et al., 2017), it also imposes several limitations on interpretation, and generalizability. To overcome, a large study advertised across multiple platforms and settings will likely prove to be beneficial to strengthen interpretation and result generalizability.

4.6 Future Directions

The findings from this study indicate a necessity for individuals navigating menopause to have access to avenues to target and improve their cognition and emotional functioning. Currently, interventions are available for physiological or affective difficulties, through menopause hormone therapy, or psychological based approaches (Faubion et al., 2022; Hamoda et al., 2022; Shea et al., 2021; Shufelt et al., 2023); however, recommendations for SCDs remain limited to lifestyle modifications (Panay et al., 2025; Shea et al., 2021; Simon et al., 2025) and/or normalization of the experience (Greendale et al., 2020). Thus, the present study's results demonstrate a significant unmet clinical need where avenues to improve SCDs should be explored. Furthermore, given the significant moderation of emotional difficulties in this model, individuals navigating menopause may benefit from an intervention simultaneously addressing sensitivity, intensity, and persistence of negative reactions. Thus, findings from the present study delineate that interventions aiming to improve quality of life in menopause should prioritize targeting both neurocognitive and emotional domains.

Protocols exploring the adaptation of cognitive remediation strategies to specific populations have previously improved SCDs and emotional functioning (Barlati et al., 2025; Goldberg et al., 2023; Protopopescu et al., 2022); though, literature integrating cognitive

remediation and emotional regulation strategies, in the context of menopause, is lacking (Ballantyne et al., 2021). Thus, to improve quality of life, individuals navigating menopause would benefit from an integration of expertise of clinical psychologists and neuropsychologists to collectively target the constellation of cognitive and emotion symptoms experienced.

5. Conclusion

In conclusion, the menopausal transition involves significant cognitive and emotional difficulties that contribute to the detrimental impact of menopause-related symptoms on quality of life. Findings from the present study provide preliminary evidence suggesting that subjective cognitive difficulties may represent an experience through which the impact of menopause-related symptoms may manifest in daily life. Furthermore, this indirect relationship may be more pronounced in individuals who are more vulnerable to experiencing negative emotions. As such, findings from this study suggest that subjective cognitive difficulties and emotional difficulties represent two important therapeutic targets that have the potential to effectively improve functional outcomes and quality of life in individuals navigating menopause.

6. References

Ahmadi, K., Dashti, S., & Bahri, N. (2026). Relationship between the severity of menopausal symptoms and quality of life during the menopause transition: a systematic review. *Archives of Women's Mental Health*, *29*(3), 76. https://doi.org/10.1007/s00737-026-01716-z

AlDughaither, A., AlMutairy, H., & AlAteeq, M. (2015). Menopausal symptoms and quality of life among Saudi women visiting primary care clinics in Riyadh, Saudi Arabia. *International Journal of Women's Health*, *7*(0), 645–653. https://doi.org/10.2147/ijwh.s84709

Ali, A. M., Ahmed, A. H., & Smail, L. (2020). Psychological Climacteric Symptoms and Attitudes toward Menopause among Emirati Women. *International Journal of Environmental Research and Public Health*, *17*(14), 5028. https://doi.org/10.3390/ijerph17145028

AlSwayied, G., Frost, R., & Hamilton, F. L. (2024). Menopause knowledge, attitudes and experiences of women in Saudi Arabia: a qualitative study. *BMC Women's Health*, *24*(1), 624. https://doi.org/10.1186/s12905-024-03456-7

Annunziata, M. A., Muzzatti, B., Flaiban, C., Giovannini, L., & Lucchini, G. (2018). Cognitive Functioning Self-Assessment Scale (CFSS): Further psychometric data. *Applied Neuropsychology: Adult*, *25*(1), 1–4. https://doi.org/10.1080/23279095.2016.1225575

Annunziata, M. A., Muzzatti, B., Giovannini, L., & Lucchini, G. (2012). Cognitive functioning self-assessment scale (CFSS): Preliminary psychometric data. *Psychology, Health & Medicine*, *17*(2), 207–212. https://doi.org/10.1080/13548506.2011.596552

Arar, M. A., & Erbil, N. (2023). The effect of menopausal symptoms on women's daily life activities. *Przegląd Menopauzalny = Menopause Review*, *22*(1), 6–15. https://doi.org/10.5114/pm.2023.126436

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders* (5th ed., text rev.). https://doi.org/10.1176/appi.books.9780890425787

Badawy, Y., Spector, A., Li, Z., & Desai, R. (2024). The risk of depression in the menopausal stages: A systematic review and meta-analysis. *Journal of Affective Disorders*, *357*, 126–133. https://doi.org/10.1016/j.jad.2024.04.041

Ballantyne, E. C., King, J. P., & Green, S. M. (2021). Preliminary Support for a Cognitive Remediation Intervention for Women During the Menopausal Transition: A Pilot Study. *Frontiers in Global Women's Health*, *2*, 741539. https://doi.org/10.3389/fgwh.2021.741539

Barlati, S., Nibbio, G., Bellomo, A., Carpiniello, B., Colombo, C., Giorgi, S. D., Deste, G., Maina, G., Martinotti, G., Tortorella, A., Salvo, G. D., Luciano, M., Pinna, F., Ventriglio, A., Fiorillo, A., Vita, A., & Group, the C. S. (2025). Effectiveness of cognitive remediation in subjects with major depressive disorder: A multicenter randomized controlled study in a real-world setting. *European Psychiatry*, *68*(1), e106. https://doi.org/10.1192/j.eurpsy.2025.10073

Berecki-Gisolf, J., Begum, N., & Dobson, A. J. (2009). Symptoms reported by women in midlife. *Menopause*, *16*(5), 1021–1029. https://doi.org/10.1097/gme.0b013e3181a8c49f

Berg, J. A., Larson, C. A., & Pasvogel, A. E. (2008). Menopausal symptom perception and severity: results from a screening questionnaire. *Journal of Clinical Nursing*, *17*(7), 940–948. https://doi.org/10.1111/j.1365-2702.2007.02112.x

Blumel, J. E., Castelo-Branco, C., Binfa, L., Gramegna, G., Tacla, X., Aracena, B., Cumsille, M. A., & Sanjuan, A. (2000). Quality of life after the menopause: a population study. *Maturitas*, *34*(1), 17–23. https://doi.org/10.1016/s0378-5122(99)00081-x

Blümel, J. E., Chedraui, P., Baron, G., Belzares, E., Bencosme, A., Calle, A., Danckers, L., Espinoza, M. T., Flores, D., Gomez, G., Hernandez-Bueno, J. A., Izaguirre, H., Leon-Leon, P., Lima, S., Mezones-Holguin, E., Monterrosa, A., Mostajo, D., Navarro, D., Ojeda, E., … (REDLINC), for the C. G. for R. of the C. in L. A. (2012). Menopausal symptoms appear before the menopause and persist 5 years beyond: a detailed analysis of a multinational study. *Climacteric*, *15*(6), 542–551. https://doi.org/10.3109/13697137.2012.658462

Bosch, R. J. van den, Rombouts, RenéP., & Asma, M. J. O. van. (1993). Subjective cognitive dysfunction in schizophrenic and depressed patients. *Comprehensive Psychiatry*, *34*(2), 130–136. https://doi.org/10.1016/0010-440x(93)90058-c

Bromberger, J. T., Assmann, S. F., Avis, N. E., Schocken, M., Kravitz, H. M., & Cordal, A. (2003). Persistent Mood Symptoms in a Multiethnic Community Cohort of Pre- and Perimenopausal Women. *American Journal of Epidemiology*, *158*(4), 347–356. https://doi.org/10.1093/aje/kwg155

Bromberger, J. T., & Kravitz, H. M. (2011). Mood and Menopause: Findings from the Study of Women's Health Across the Nation (SWAN) over 10 Years. *Obstetrics and Gynecology Clinics of North America*, *38*(3), 609–625. https://doi.org/10.1016/j.ogc.2011.05.011

Bromberger, J. T., Meyer, P. M., Kravitz, H. M., Sommer, B., Cordal, A., Powell, L., Ganz, P. A., & Sutton-Tyrrell, K. (2001). Psychologic Distress and Natural Menopause: A Multiethnic Community Study. *American Journal of Public Health*, *91*(9), 1435–1442. https://doi.org/10.2105/ajph.91.9.1435

Brotto, L. A., Dobrer, S., Adshade, M., Booth, A., Dewar, K., Gustafson, K., Hsieh, C. L., Prestley, N., Parrilla, J. S., Smith, L., Weir, S., Yong, P. J., & Ogilvie, G. (2026). A cross-sectional cohort study of menopause-related symptoms in British Columbia. *Maturitas*, *207*, 108874. https://doi.org/10.1016/j.maturitas.2026.108874

Bruce, D., & Rymer, J. (2009). Symptoms of the menopause. *Best Practice & Research Clinical Obstetrics & Gynaecology*, *23*(1), 25–32. https://doi.org/10.1016/j.bpobgyn.2008.10.002

Buckley, R. F., Saling, M. M., Frommann, I., Wolfsgruber, S., & Wagner, M. (2015). Subjective Cognitive Decline from a Phenomenological Perspective: A Review of the Qualitative Literature. *Journal of Alzheimer's Disease*, *48*(s1), S125–S140. https://doi.org/10.3233/jad-150095

Burckhardt, C. S., & Anderson, K. L. (2003). The Quality of Life Scale (QOLS): Reliability, Validity, and Utilization. *Health and Quality of Life Outcomes*, *1*(1), 60. https://doi.org/10.1186/1477-7525-1-60

Calleja-Agius, J., & Brincat, M. P. (2015). The urogenital system and the menopause. *Climacteric*, *18*(sup1), 18–22. https://doi.org/10.3109/13697137.2015.1078206

Canada, M. F. of. (2022, October 6). *The Silence and the Stigma: Menopause in Canada*. https://menopausefoundationcanada.ca/menopause-in-canada-report/

Carpenter, J. S., Woods, N. F., Otte, J. L., Guthrie, K. A., Hohensee, C., Newton, K. M., Joffe, H., Cohen, L., Sternfeld, B., Lau, R. J., Reed, S. D., & LaCroix, A. Z. (2015). MsFLASH participants' priorities for alleviating menopausal symptoms. *Climacteric*, *18*(6), 859–866. https://doi.org/10.3109/13697137.2015.1083003

Chang, S.-R., Yang, C. F., & Chen, K.-H. (2019). Relationships between body image, sexual dysfunction, and health-related quality of life among middle-aged women: A cross-sectional study. *Maturitas*, *126*, 45–50. https://doi.org/10.1016/j.maturitas.2019.04.218

Charkoudian, N., & Stachenfeld, N. (2016). Sex hormone effects on autonomic mechanisms of thermoregulation in humans. *Autonomic Neuroscience*, *196*, 75–80. https://doi.org/10.1016/j.autneu.2015.11.004

Chedraui, P., Blümel, J. E., Baron, G., Belzares, E., Bencosme, A., Calle, A., Danckers, L., Espinoza, M. T., Flores, D., Gomez, G., Hernandez-Bueno, J. A., Izaguirre, H., Leon-Leon, P., Lima, S., Mezones-Holguin, E., Monterrosa, A., Mostajo, D., Navarro, D., Ojeda, E., … Tserotas, K. (2008). Impaired quality of life among middle aged women: A multicentre Latin American study. *Maturitas*, *61*(4), 323–329. https://doi.org/10.1016/j.maturitas.2008.09.026

Cho, J. M., Lee, J., Ahn, E.-M., & Bae, J. (2025). Beyond Hot Flashes: The Role of Estrogen Receptors in Menopausal Mental Health and Cognitive Decline. *Brain Sciences*, *15*(9), 1003. https://doi.org/10.3390/brainsci15091003

Chung, H.-F., Hayashi, K., Dobson, A. J., Sandin, S., Ideno, Y., Hardy, R., Weiderpass, E., & Mishra, G. D. (2025). Association between endometriosis and type and age of menopause: a pooled analysis of 279 948 women from five cohort studies. *Human Reproduction*, *40*(6), 1210–1219. https://doi.org/10.1093/humrep/deaf068

Cohen, L. S., Soares, C. N., Vitonis, A. F., Otto, M. W., & Harlow, B. L. (2006). Risk for New Onset of Depression During the Menopausal Transition: The Harvard Study of Moods and Cycles. *Archives of General Psychiatry*, *63*(4), 385–390. https://doi.org/10.1001/archpsyc.63.4.385

Conde, D. M., Verdade, R. C., Valadares, A. L. R., Mella, L. F. B., Pedro, A. O., & Costa-Paiva, L. (2021). Menopause and cognitive impairment: A narrative review of current knowledge. *World Journal of Psychiatry*, *11*(8), 412–428. https://doi.org/10.5498/wjp.v11.i8.412

Coronado, P. J., Fasero, M., Mendoza, N., González, S. P., Sánchez-Méndez, S., Presa, J., Jurado, A. R., Viuda, E. de la, Quereda, F., & Menopausia"), on behalf of R. ("Red E. de I. en. (2025). Quality of life at peri- and postmenopause: analysis of the results from app "Mi Menopausia." *Maturitas*, *197*, 108267. https://doi.org/10.1016/j.maturitas.2025.108267

Cox, L., & Liu, J. H. (2014). Primary ovarian insufficiency: an update. *International Journal of Women's Health*, *6*(0), 235–243. https://doi.org/10.2147/ijwh.s37636

Crockford, J. F. E., Guan, D. X., Einstein, G., Ballard, C., Creese, B., Corbett, A., Pickering, E., Bloomfield, A., Roach, P., Smith, E. E., & Ismail, Z. (2024). Menopausal symptom burden as a predictor of mid- to late-life cognitive function and mild behavioral impairment symptoms: A CAN-PROTECT study. *medRxiv*, 2024.03.13.24304247. https://doi.org/10.1101/2024.03.13.24304247

Currie, H., & Moger, S. J. (2019). Menopause – Understanding the impact on women and their partners. *Post Reproductive Health*, *25*(4), 183–190. https://doi.org/10.1177/2053369119895413

Cutts, B. A., & Fennessy, K. (2025). Addressing the perimenopause: what's blood got to do with it? *Research and Practice in Thrombosis and Haemostasis*, *9*(2), 102698. https://doi.org/10.1016/j.rpth.2025.102698

Dantas, R. A. S., & Ciol, M. A. (2024). Flanagan Quality of Life Scale. In *Encyclopedia of Quality of Life and Well-Being Research (2nd ed)* (pp. 2515–2518). https://doi.org/10.1007/978-3-031-17299-1_1057

Davis, S. R., Pinkerton, J., Santoro, N., & Simoncini, T. (2023). Menopause—Biology, consequences, supportive care, and therapeutic options. *Cell*, *186*(19), 4038–4058. https://doi.org/10.1016/j.cell.2023.08.016

Deshpande, N., & Rao, T. S. S. (2025). Psychological Changes at Menopause: Anxiety, Mood Swings, and Sexual Health in the Biopsychosocial Context. *Journal of Psychosexual Health*, *7*(1), 11–14. https://doi.org/10.1177/26318318251324577

Dobson, A. J., XU, Z., Wilson, L. F., Chung, H.-F., Sandin, S., Schouw, Y. T. V. der, Demakakos, P., Weiderpass, E., & Mishra, G. D. (2024). Menopause age and type and dementia risk: a pooled analysis of 233 802 women. *Age and Ageing*, *53*(11), afae254. https://doi.org/10.1093/ageing/afae254

Drogos, L. L., Rubin, L. H., Geller, S. E., Banuvar, S., Shulman, L. P., & Maki, P. M. (2013). Objective cognitive performance is related to subjective memory complaints in midlife women with moderate to severe vasomotor symptoms. *Menopause*, *20*(12), 1236–1242. https://doi.org/10.1097/gme.0b013e318291f5a6

Easton, S., & Laar, D. V. (2018). *User Manual for the Work-Related Quality of Life (WRQoL) Scale A Measure of Quality of Working Life* (2nd ed). University of Portsmouth. https://researchportal.port.ac.uk/en/publications/user-manual-for-the-work-related-quality-of-life-wrqol-scale-a-me/

Eysenbach, G. (2004). Improving the Quality of Web Surveys: The Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *Journal of Medical Internet Research*, *6*(3), e34. https://doi.org/10.2196/jmir.6.3.e34

Eysenbach, G. (2012). Correction: Improving the Quality of Web Surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). *Journal of Medical Internet Research*, *14*(1), e8. https://doi.org/10.2196/jmir.2042

Faubion, S. S., Crandall, C. J., Davis, L., Khoudary, S. R. E., Hodis, H. N., Lobo, R. A., Maki, P. M., Manson, J. E., Pinkerton, J. V., Santoro, N. F., Shifren, J. L., Shufelt, C. L., Thurston, R. C., & Wolfman, W. (2022). The 2022 hormone therapy position statement of The North

American Menopause Society. *Menopause*, *29*(7), 767–794. https://doi.org/10.1097/gme.0000000000002028

Faubion, S. S., Kuhle, C. L., Shuster, L. T., & Rocca, W. A. (2015). Long-term health consequences of premature or early menopause and considerations for management. *Climacteric*, *18*(4), 483–491. https://doi.org/10.3109/13697137.2015.1020484

Fidecicchi, T., Giannini, A., Chedraui, P., Luisi, S., Battipaglia, C., Genazzani, A. R., Genazzani, A. D., & Simoncini, T. (2024). Neuroendocrine mechanisms of mood disorders during menopause transition: A narrative review and future perspectives. *Maturitas*, *188*, 108087. https://doi.org/10.1016/j.maturitas.2024.108087

Flanagan, J. C. (1978). A research approach to improving our quality of life. *American Psychologist*, *33*(2), 138–147. https://doi.org/10.1037/0003-066x.33.2.138

Flanagan, J. C. (1982). Measurement of quality of life: current state of the art. *Archives of Physical Medicine and Rehabilitation*, *63*(2), 56–59.

Furey, R. T., Thomas, E. H. X., Kulkarni, J., & Gurvich, C. (2025). Subjective versus objective cognition during menopause: A systematic review and meta-analysis. *Journal of the International Neuropsychological Society*, *31*(5–6), 459–477. https://doi.org/10.1017/s1355617725101306

Gandhi, J., Chen, A., Dagur, G., Suh, Y., Smith, N., Cali, B., & Khan, S. A. (2016). Genitourinary syndrome of menopause: an overview of clinical manifestations,

pathophysiology, etiology, evaluation, and management. *American Journal of Obstetrics and Gynecology*, *215*(6), 704–711. https://doi.org/10.1016/j.ajog.2016.07.045

Garg, R., & Munshi, A. (2025). Menopause and Mental Health. *Journal of Mid-Life Health*, *16*(2), 119–123. https://doi.org/10.4103/jmh.jmh_61_25

Garofalo, C., Velotti, P., Zavattini, G. C., & Kosson, D. S. (2017). Emotion dysregulation and interpersonal problems: The role of defensiveness. *Personality and Individual Differences*, *119*, 96–105. https://doi.org/10.1016/j.paid.2017.07.007

Giggins, O. M., Smith, S. C., McLysaght, A., & Doyle, J. (2026). A robber of joy or a natural transition? a qualitative exploration of women's menopause experiences in Ireland. *BMC Women's Health*, *26*(1), 121. https://doi.org/10.1186/s12905-025-04204-1

Goldberg, Z., Kuslak, B., & Kurtz, M. M. (2023). A meta-analytic investigation of cognitive remediation for mood disorders: Efficacy and the role of study quality, sample and treatment factors. *Journal of Affective Disorders*, *330*, 74–82. https://doi.org/10.1016/j.jad.2023.02.137

Goldstein, A. N., & Walker, M. P. (2014). The Role of Sleep in Emotional Brain Function. *Annual Review of Clinical Psychology*, *10*(1), 679–708. https://doi.org/10.1146/annurev-clinpsy-032813-153716

Golezar, S., Tehrani, F. R., Khazaei, S., Ebadi, A., & Keshavarz, Z. (2019). The global prevalence of primary ovarian insufficiency and early menopause: a meta-analysis. *Climacteric*, *22*(4), 403–411. https://doi.org/10.1080/13697137.2019.1574738

Goonaratna, C., Fonseka, P., & Wijeywardene, K. (1999). Perimenopausal symptoms in Sri Lankan women. *The Ceylon Medical Journal*, *44*(2), 63–69.

Greenblum, C. A., Rowe, M. A., Neff, D. F., & Greenblum, J. S. (2013). Midlife women. *Menopause: The Journal of The North American Menopause Society*, *20*(1), 22–27. https://doi.org/10.1097/gme.0b013e31825a2a91

Greendale, G. A., Huang, M.-H., Wight, R. G., Seeman, T., Luetters, C., Avis, N. E., Johnston, J., & Karlamangla, A. S. (2009). Effects of the menopause transition and hormone use on cognitive performance in midlife women. *Neurology*, *72*(21), 1850–1857. https://doi.org/10.1212/wnl.0b013e3181a71193

Greendale, G. A., Karlamangla, A. S., & Maki, P. M. (2020). The Menopause Transition and Cognition. *JAMA*, *323*(15), 1495–1496. https://doi.org/10.1001/jama.2020.1757

Greendale, G. A., Wight, R. G., Huang, M.-H., Avis, N., Gold, E. B., Joffe, H., Seeman, T., Vuge, M., & Karlamangla, A. S. (2010). Menopause-associated Symptoms and Cognitive Performance: Results From the Study of Women's Health Across the Nation. *American Journal of Epidemiology*, *171*(11), 1214–1224. https://doi.org/10.1093/aje/kwq067

Griffiths, A., MacLennan, S. J., & Hassard, J. (2013). Menopause and work: An electronic survey of employees' attitudes in the UK. *Maturitas*, *76*(2), 155–159. https://doi.org/10.1016/j.maturitas.2013.07.005

Grub, J., Süss, H., Willi, J., & Ehlert, U. (2021). Steroid Hormone Secretion Over the Course of the Perimenopause: Findings From the Swiss Perimenopause Study. *Frontiers in Global Women's Health*, *2*, 774308. https://doi.org/10.3389/fgwh.2021.774308

Gupta, P., Sturdee, D. W., Palin, S. L., Majumder, K., Fear, R., Marshall, T., & Paterson, I. (2006). Menopausal symptoms in women treated for breast cancer: the prevalence and severity of symptoms and their perceived effects on quality of life. *Climacteric*, *9*(1), 49–58. https://doi.org/10.1080/13697130500487224

Gurvich, C., Spector, A., & Hickey, M. (2026). Advances in understanding of cognitive symptoms during menopause. *The Lancet Obstetrics, Gynaecology, & Women's Health*, *2*(4), e335–e345. https://doi.org/10.1016/s3050-5038(26)00043-9

Hakimi, S., Simbar, M., & Tehrani, F. R. (2014). Perceived Concerns of Azeri Menopausal Women in Iran. *Iranian Red Crescent Medical Journal*, *16*(5), e11771. https://doi.org/10.5812/ircmj.11771

Hamoda, H., Mukherjee, A., Morris, E., Baldeweg, S. E., Jayasena, C. N., Briggs, P., & Moger, S. (2022). Joint position statement by the British Menopause Society, Royal College of Obstetricians and Gynaecologists and Society for Endocrinology on best practice recommendations for the care of women experiencing the menopause. *Post Reproductive Health*, *28*(3), 123–125. https://doi.org/10.1177/20533691221104879

Harlow, S. D., Gass, M., Hall, J. E., Lobo, R., Maki, P., Rebar, R. W., Sherman, S., Sluss, P. M., Villiers, T. J. de, & Group, for the S. + 10 C. (2012). Executive Summary of the Stages of Reproductive Aging Workshop + 10: Addressing the Unfinished Agenda of Staging

Reproductive Aging. *The Journal of Clinical Endocrinology & Metabolism*, *97*(4), 1159–1168. https://doi.org/10.1210/jc.2011-3362

Harper, J. C., Phillips, S., Biswakarma, R., Yasmin, E., Saridogan, E., Radhakrishnan, S., Davies, M. C., & Talaulikar, V. (2022). An online survey of perimenopausal women to determine their attitudes and knowledge of the menopause. *Women's Health*, *18*, 17455057221106890. https://doi.org/10.1177/17455057221106890

Hauser, G. A., Huber, I. C., Keller, P. J., Lauritzen, C., & Schneider, H. P. (1994). [Evaluation of climacteric symptoms (Menopause Rating Scale)]. *Zentralblatt Fur Gynakologie*, *116*(1), 16–23.

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: a regression-based approach* (3rd ed.). Guilford Press.

He, L., Jaff, N. G., Bahhar, N., Proctor, D., & Spector, A. (2025). Women's experience and management of cognition during menopause transition: a qualitative study. *Climacteric*, *ahead-of-print*(ahead-of-print), 1–7. https://doi.org/10.1080/13697137.2025.2530449

Heinemann, L. A., Potthoff, P., & Schneider, H. P. (2003). International versions of the Menopause Rating Scale (MRS). *Health and Quality of Life Outcomes*, *1*(1), 28. https://doi.org/10.1186/1477-7525-1-28

Hess, R., Thurston, R. C., Hays, R. D., Chang, C.-C. H., Dillon, S. N., Ness, R. B., Bryce, C. L., Kapoor, W. N., & Matthews, K. A. (2012). The impact of menopause on health-related

quality of life: results from the STRIDE longitudinal study. *Quality of Life Research*, *21*(3), 535–544. https://doi.org/10.1007/s11136-011-9959-7

Hilditch, J. R., Lewis, J., Peter, A., Maris, B. van, Ross, A., Franssen, E., Guyatt, G. H., Norton, P. G., & Dunn, E. (1996). A menopause-specific quality of life questionnaire: development and psychometric properties. *Maturitas*, *24*(3), 161–175. https://doi.org/10.1016/s0378-5122(96)82006-8

Hill, N. L., McDermott, C., Mogle, J., Munoz, E., DePasquale, N., Wion, R., & Whitaker, E. (2017). Subjective cognitive impairment and quality of life: a systematic review. *International Psychogeriatrics*, *29*(12), 1965–1977. https://doi.org/10.1017/s1041610217001636

Hooper, S. C., Marshall, V. B., Becker, C. B., LaCroix, A. Z., Keel, P. K., & Kilpela, L. S. (2022). Mental health and quality of life in postmenopausal women as a function of retrospective menopause symptom severity. *Menopause*, *29*(6), 707–713. https://doi.org/10.1097/gme.0000000000001961

Hutchings, H. A., Taylor, N., Remesh, A., & Rafferty, J. (2023). A study evaluating quality of life and factors affecting it before, during and after menopause. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, *289*, 100–107. https://doi.org/10.1016/j.ejogrb.2023.08.373

Ibrahim, Z. M., Ahmed, W. A. S., & El-Hamid, S. A. (2015). Prevalence of menopausal related symptoms and their impact on quality of life among Egyptian women. *Clinical and Experimental Obstetrics & Gynecology*, *42*(2), 161–167.

IsHak, W. W., Mirocha, J., James, D., Tobia, G., Vilhauer, J., Fakhry, H., Pi, S., Hanson, E., Nashawati, R., Peselow, E. D., & Cohen, R. M. (2015). Quality of life in major depressive disorder before/after multiple steps of treatment and one-year follow-up. *Acta Psychiatrica Scandinavica*, *131*(1), 51–60. https://doi.org/10.1111/acps.12301

Jacobs, E. G., Weiss, B., Makris, N., Whitfield-Gabrieli, S., Buka, S. L., Klibanski, A., & Goldstein, J. M. (2016). Reorganization of Functional Networks in Verbal Working Memory Circuitry in Early Midlife: The Impact of Sex and Menopausal Status. *Cerebral Cortex*, *27*(5), 2857–2870. https://doi.org/10.1093/cercor/bhw127

Jafari, F., Hadizadeh, M. H., Zabihi, R., & Ganji, K. (2014). Comparison of depression, anxiety, quality of life, vitality and mental health between premenopausal and postmenopausal women. *Climacteric*, *17*(6), 660–665. https://doi.org/10.3109/13697137.2014.905528

Jagtap, B. L., Prasad, B. S. V., & Chaudhury, S. (2016). Psychiatric morbidity in perimenopausal women. *Industrial Psychiatry Journal*, *25*(1), 86–92. https://doi.org/10.4103/0972-6748.196056

Jia, Y., Zhou, Z., Xiang, F., Hu, W., & Cao, X. (2024). Global prevalence of depression in menopausal women: A systematic review and meta-analysis. *Journal of Affective Disorders*, *358*, 474–482. https://doi.org/10.1016/j.jad.2024.05.051

Johnson, H., & Ogden, J. (2025). Much more than a biological phenomenon: A qualitative study of women's experiences of brain fog across their reproductive journey. *Journal of Health Psychology*, *30*(8), 1963–1976. https://doi.org/10.1177/13591053241290656

Joo, H. J., Joo, J. H., Kwon, J., Jang, B. N., & Park, E.-C. (2021). Association between quality and duration of sleep and subjective cognitive decline: a cross-sectional study in South Korea. *Scientific Reports*, *11*(1), 16989. https://doi.org/10.1038/s41598-021-96453-x

Kafaei-Atrian, M., Sadat, Z., Nasiri, S., & Avanji, F. S. I.-. (2022). The Effect of Self-care Education Based on Self-efficacy Theory, Individual Empowerment Model, and Their Integration on Quality of Life among Menopausal Women. *International Journal of Community Based Nursing & Midwifery*, *10*(1), 54–63. https://doi.org/10.30476/ijcbnm.2021.86814.1370

Karaçam, Z., & Şeker, S. E. (2007). Factors associated with menopausal symptoms and their relationship with the quality of life among Turkish women. *Maturitas*, *58*(1), 75–82. https://doi.org/10.1016/j.maturitas.2007.06.004

Kessler, E.-M., Bowen, C. E., Baer, M., Froelich, L., & Wahl, H.-W. (2012). Dementia worry: a psychological examination of an unexplored phenomenon. *European Journal of Ageing*, *9*(4), 275–284. https://doi.org/10.1007/s10433-012-0242-8

Khan, S. J., Kapoor, E., Faubion, S. S., & Kling, J. M. (2023). Vasomotor Symptoms During Menopause: A Practical Guide on Current Treatments and Future Perspectives. *International Journal of Women's Health*, *15*(0), 273–287. https://doi.org/10.2147/ijwh.s365808

Khatun, K., Sultana, N., Kulsum, S. U., Noor-E-Ferdous, Islam, S., Ferdous, M. S., & Meem, T. E. (2026). Severity of Postmenopausal Syndrome and Its Association with Physical Activity. *The Planet*, *9*, 101–106. https://doi.org/10.5281/zenodo.19486032

Khoudary, S. R. E., Greendale, G., Crawford, S. L., Avis, N. E., Brooks, M. M., Thurston, R. C., Karvonen-Gutierrez, C., Waetjen, L. E., & Matthews, K. (2019). The menopause transition and women's health at midlife: a progress report from the Study of Women's Health Across the Nation (SWAN). *Menopause (New York, N.y.)*, *26*(10), 1213–1227. https://doi.org/10.1097/gme.0000000000001424

Kuck, M. J., & Hogervorst, E. (2024). Stress, depression, and anxiety: psychological complaints across menopausal stages. *Frontiers in Psychiatry*, *15*, 1323743. https://doi.org/10.3389/fpsyt.2024.1323743

Lee, S., Kin, J. H., & Chung, J. H. (2021). The association between sleep quality and quality of life: a population-based study. *Sleep Medicine*, *84*, 121–126. https://doi.org/10.1016/j.sleep.2021.05.022

Lega, I. C., Fine, A., Antoniades, M. L., & Jacobson, M. (2023). A pragmatic approach to the management of menopause. *CMAJ*, *195*(19), E677–E672. https://doi.org/10.1503/cmaj.221438

Liu, K., Lei, X., Zhao, L., Yu, H., Wang, D., & Yang, L. (2024). Cognitive shadows in perimenopause: linking subjective cognitive decline (SCD) to menopausal symptom severity. *Gynecological Endocrinology*, *40*(1), 2352134. https://doi.org/10.1080/09513590.2024.2352134

Magistro, D., Vagnetti, R., Ansdell, P., & Piasecki, J. (2025). Self-efficacy, quality of life, physical activity and educational interventions in menopausal women: A cross-sectional and

pre–post study using Bayesian structural equation modelling. *Maturitas*, *203*, 108774. https://doi.org/10.1016/j.maturitas.2025.108774

Maki, P. M., & Jaff, N. G. (2022). Brain fog in menopause: a health-care professional's guide for decision-making and counseling on cognition. *Climacteric*, *25*(6), 570–578. https://doi.org/10.1080/13697137.2022.2122792

McCarthy, M., & Raval, A. P. (2020). The peri-menopause in a woman's life: a systemic inflammatory phase that enables later neurodegenerative disease. *Journal of Neuroinflammation*, *17*(1), 317. https://doi.org/10.1186/s12974-020-01998-9

McKinlay, S. M., Brambilla, D. J., & Posner, J. G. (1992). The normal menopause transition. *Maturitas*, *14*(2), 103–115. https://doi.org/10.1016/0378-5122(92)90003-m

Menon, J., Kantipudi, S. J., Vinoth, S., & Kuchipudi, J. D. (2025). Prevalence of subjective cognitive decline and its association with physical health problems among urban community dwelling elderly population in South India. *Alzheimer's & Dementia*, *21*(2), e14505. https://doi.org/10.1002/alz.14505

Menopause Foundation of Canada. (2022, October 6). *The Silence and the Stigma: Menopause in Canada*. https://menopausefoundationcanada.ca/menopause-in-canada-report/

Mishra, G. D., Davies, M. C., Hillman, S., Chung, H.-F., Roy, S., Maclaran, K., & Hickey, M. (2024). Optimising health after early menopause. *The Lancet*, *403*(10430), 958–968. https://doi.org/10.1016/s0140-6736(23)02800-3

Mitchell, E. S., & Woods, N. F. (2001). Midlife Women's Attributions about Perceived Memory Changes: Observations from the Seattle Midlife Women's Health Study. *Journal of Women's Health & Gender-Based Medicine*, *10*(4), 351–362. https://doi.org/10.1089/152460901750269670

Mitchell, E. S., & Woods, N. F. (2011). Cognitive symptoms during the menopausal transition and early postmenopause. *Climacteric*, *14*(2), 252–261. https://doi.org/10.3109/13697137.2010.516848

Mol, M., Carpay, M., Ramakers, I., Rozendaal, N., Verhey, F., & Jolles, J. (2007). The effect of perceived forgetfulness on quality of life in older adults; a qualitative review. *International Journal of Geriatric Psychiatry*, *22*(5), 393–400. https://doi.org/10.1002/gps.1686

Mol, M. E. M., Boxtel, M. P. J. van, Willems, D., Verhey, F. R. J., & Jolles, J. (2009). Subjective forgetfulness is associated with lower quality of life in middle-aged and young-old individuals: A 9-year follow-up in older participants from the Maastricht Aging Study. *Aging & Mental Health*, *13*(5), 699–705. https://doi.org/10.1080/13607860902845541

Montejo, P., Montenegro, M., Fernández, M. A., & Maestú, F. (2012). Memory complaints in the elderly: Quality of life and daily living activities. A population based study. *Archives of Gerontology and Geriatrics*, *54*(2), 298–304. https://doi.org/10.1016/j.archger.2011.05.021

Motlani, V., Motlani, G., Pamnani, S., Sahu, A., & Acharya, N. (2023). Endocrine Changes in Postmenopausal Women: A Comprehensive View. *Cureus*, *15*(12), e51287. https://doi.org/10.7759/cureus.51287

Mühlen, D. G. von, Kritz-Silverstein, D., & Barrett-Connor, E. (1995). A community-based study of menopause symptoms and estrogen replacement in older women. *Maturitas*, *22*(2), 71–78. https://doi.org/10.1016/0378-5122(95)00917-a

Naysmith, L. F., Ward, H., Elliott, P., Atchison, C., Hellyer, P., Denno, P., Williams, S. C. R., & Hampshire, A. (2026). Cognition and the menopause transition: cross-sectional evidence from a large community cohort. *Npj Women's Health*, *4*(1), 14. https://doi.org/10.1038/s44294-026-00132-z

Nazarpour, S., Simbar, M., Tehrani, F. R., & Majd, H. A. (2020). Factors associated with quality of life of postmenopausal women living in Iran. *BMC Women's Health*, *20*(1), 104. https://doi.org/10.1186/s12905-020-00960-4

Ngai, F. W. (2019). Relationships between menopausal symptoms, sense of coherence, coping strategies, and quality of life. *Menopause*, *Publish Ahead of Print*(NA;), NA; https://doi.org/10.1097/gme.0000000000001299

Nock, M. K., Wedig, M. M., Holmberg, E. B., & Hooley, J. M. (2008). The Emotion Reactivity Scale: Development, Evaluation, and Relation to Self-Injurious Thoughts and Behaviors. *Behavior Therapy*, *39*(2), 107–116. https://doi.org/10.1016/j.beth.2007.05.005

O'Neill, M. T., Jones, V., & Reid, A. (2023). Impact of menopausal symptoms on work and careers: a cross-sectional study. *Occupational Medicine*, *73*(6), 332–338. https://doi.org/10.1093/occmed/kqad078

O'Neill, S., & Eden, J. (2012). The pathophysiology of menopausal symptoms. *Obstetrics, Gynaecology & Reproductive Medicine*, *22*(3), 63–69. https://doi.org/10.1016/j.ogrm.2011.12.006

Opdebeeck, C., Yates, J. A., Kudlicka, A., & Martyr, A. (2019). What are subjective cognitive difficulties and do they matter? *Age and Ageing*, *48*(1), 122–127. https://doi.org/10.1093/ageing/afy148

Pan, C.-W., Wang, X., Ma, Q., Sun, H.-P., Xu, Y., & Wang, P. (2015). Cognitive dysfunction and health-related quality of life among older Chinese. *Scientific Reports*, *5*(1), 17301. https://doi.org/10.1038/srep17301

Panay, N., Fenton, A., Hamoda, H., Hillard, T., Islam, R., Pedder, H., Romero, L., Vincent, A. J., & Group, T. I. R. W. (2025). International Menopause Society (IMS) recommendations and key messages on women's midlife health and menopause. *Climacteric*, *28*(6), 634–656. https://doi.org/10.1080/13697137.2025.2585487

Paramsothy, P., Harlow, S. D., Nan, B., Greendale, G. A., Santoro, N., Crawford, S. L., Gold, E. B., Tepper, P. G., & Randolph, J. F. (2017). Duration of the menopausal transition is longer in women with young age at onset. *Menopause*, *24*(2), 142–149. https://doi.org/10.1097/gme.0000000000000736

Pavel, A., Romania, D. of P., University of Medicine and Pharmacy "Carol Davila," Bucharest, Paun, R., Matei, V., Rosca, A., & Tudose, C. (2023). Quality of Life in People With Subjective Cognitive Decline. *ALPHA PSYCHIATRY*, *24*(2), 60–64. https://doi.org/10.5152/alphapsychiatry.2023.221007

Piauilino, D. C., Bueno, O. F. A., Tufik, S., Bittencourt, L. R., Santos-Silva, R., Hachul, H., Gorenstein, C., & Pompéia, S. (2010). The Prospective and Retrospective Memory Questionnaire: A population-based random sampling study. *Memory*, *18*(4), 413–426. https://doi.org/10.1080/09658211003742672

Pillay, O. C., & Manyonda, I. (2022). The surgical menopause. *Best Practice & Research Clinical Obstetrics & Gynaecology*, *81*, 111–118. https://doi.org/10.1016/j.bpobgyn.2022.03.001

Proctor, D., Hunter, M. S., He, L., & Spector, A. (2026). Mixed methods research to support the development of an evidence-based intervention for cognitive symptoms in menopause transition. *Menopause*. https://doi.org/10.1097/gme.0000000000002796

Protopopescu, A., O'Connor, C., Cameron, D., Boyd, J. E., Lanius, R. A., & McKinnon, M. C. (2022). A Pilot Randomized Controlled Trial of Goal Management Training in Canadian Military Members, Veterans, and Public Safety Personnel Experiencing Post-Traumatic Stress Symptoms. *Brain Sciences*, *12*(3), 377. https://doi.org/10.3390/brainsci12030377

Raczkiewicz, D., Sarecka-Hujar, B., Gujska, J. H., Wdowiak, A., Wróbel, A., Patyra, W., & Bojar, I. (2026). Quality of Life, Menopausal Symptoms, Insomnia and Depression in Peri- and Post-Menopausal Women: A Cross-Sectional Study. *Medical Science Monitor*, *32*, e951812. https://doi.org/10.12659/msm.951812

Ramli, N. Z., Yahaya, M. F., Fahami, N. A. M., Manan, H. A., Singh, M., & Damanhuri, H. A. (2023). Brain volumetric changes in menopausal women and its association with cognitive

function: a structured review. *Frontiers in Aging Neuroscience*, *15*, 1158001. https://doi.org/10.3389/fnagi.2023.1158001

Ramyashree, S., Veigas, J., & Kanagal, D. (2024). Severity of menopausal symptoms on quality of life among working women. *Journal of Education and Health Promotion*, *13*(1), 35. https://doi.org/10.4103/jehp.jehp_802_23

Rasul, S., Mashayekhi, Y., Javaid, M., Merie, S., Khalaf, M. A., Ahmed, T., Haris, M., & Mustafa, I. (2025). Hormonal Changes During Menopause and Their Impact on Bone Health: Insights from Orthopedic and Reproductive Medicine. *Cureus*, *17*(9), e93224. https://doi.org/10.7759/cureus.93224

Rathnayake, N., Lenora, J., Alwis, G., & Lekamwasam, S. (2019). Prevalence and Severity of Menopausal Symptoms and the Quality of Life in Middle-aged Women: A Study from Sri Lanka. *Nursing Research and Practice*, *2019*(1), 2081507. https://doi.org/10.1155/2019/2081507

Refaei, M., Mardanpour, S., Masoumi, S. Z., & Parsa, P. (2022). Women's experiences in the transition to menopause: a qualitative research. *BMC Women's Health*, *22*(1), 53. https://doi.org/10.1186/s12905-022-01633-0

Reuben, R., Karkaby, L., McNamee, C., Phillips, N. A., & Einstein, G. (2021). Menopause and cognitive complaints: are ovarian hormones linked with subjective cognitive decline? *Climacteric*, *24*(4), 321–332. https://doi.org/10.1080/13697137.2021.1892627

Roehr, S., Luck, T., Pabst, A., Bickel, H., König, H.-H., Lühmann, D., Fuchs, A., Wolfsgruber, S., Wiese, B., Weyerer, S., Mösch, E., Brettschneider, C., Mallon, T., Pentzek, M., Wagner, M., Mamone, S., Werle, J., Scherer, M., Maier, W., … group, for the A. study. (2017). Subjective cognitive decline is longitudinally associated with lower health-related quality of life. *International Psychogeriatrics*, *29*(12), 1939–1950. https://doi.org/10.1017/s1041610217001399

Röhr, S., Pabst, A., Riedel-Heller, S. G., Jessen, F., Turana, Y., Handajani, Y. S., Brayne, C., Matthews, F. E., Stephan, B. C. M., Lipton, R. B., Katz, M. J., Wang, C., Guerchet, M., Preux, P.-M., Mbelesso, P., Ritchie, K., Ancelin, M.-L., Carrière, I., Guaita, A., … (COSMIC), for C. S. of M. in an I. C. (2020). Estimating prevalence of subjective cognitive decline in and across international cohort studies of aging: a COSMIC study. *Alzheimer's Research & Therapy*, *12*(1), 167. https://doi.org/10.1186/s13195-020-00734-y

Russell, J. K., Jones, C. K., & Newhouse, P. A. (2019). The Role of Estrogen in Brain and Cognitive Aging. *Neurotherapeutics*, *16*(3), 649–665. https://doi.org/10.1007/s13311-019-00766-9

Ryan, J., Scali, J., Carrière, I., Amieva, H., Rouaud, O., Berr, C., Ritchie, K., & Ancelin, M. (2014). Impact of a premature menopause on cognitive function in later life. *BJOG: An International Journal of Obstetrics & Gynaecology*, *121*(13), 1729–1739. https://doi.org/10.1111/1471-0528.12828

Salem, M., & Robenson, J. (2025). The Impact of Socioeconomic Factors on Mental Health: A Conceptual Framework. *Cureus*, *17*(7), e88244. https://doi.org/10.7759/cureus.88244

Samuelson, K. W., Abadjian, L., Jordan, J. T., Bartel, A., Vasterling, J., & Seal, K. (2017). The Association Between PTSD and Functional Outcome Is Mediated by Perception of Cognitive Problems Rather Than Objective Neuropsychological Test Performance. *Journal of Traumatic Stress*, *30*(5), 521–530. https://doi.org/10.1002/jts.22223

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

Santoro, N., Roeca, C., Peters, B. A., & Neal-Perry, G. (2020). The Menopause Transition: Signs, Symptoms, and Management Options. *The Journal of Clinical Endocrinology & Metabolism*, *106*(1), 1–15. https://doi.org/10.1210/clinem/dgaa764

Schaafsma, M., Homewood, J., & Taylor, A. (2010). Subjective cognitive complaints at menopause associated with declines in performance of verbal memory and attentional processes. *Climacteric*, *13*(1), 84–98. https://doi.org/10.3109/13697130903009187

Schirda, B., Nicholas, J. A., & Prakash, R. S. (2015). Examining Trait Mindfulness, Emotion Dysregulation, and Quality of Life in Multiple Sclerosis. *Health Psychology*, *34*(11), 1107–1115. https://doi.org/10.1037/hea0000215

Shea, A. K., Wolfman, W., Fortier, M., & Soares, C. N. (2021). Guideline No. 422c: Menopause: Mood, Sleep, and Cognition. *Journal of Obstetrics and Gynaecology Canada*, *43*(11), 1316-1323.e1. https://doi.org/10.1016/j.jogc.2021.08.009

Shields, G. S., Moons, W. G., Tewell, C. A., & Yonelinas, A. P. (2016). The Effect of Negative Affect on Cognition: Anxiety, Not Anger, Impairs Executive Function. *Emotion*, *16*(6), 792–797. https://doi.org/10.1037/emo0000151

Shields, G. S., Sazma, M. A., & Yonelinas, A. P. (2016). The effects of acute stress on core executive functions: A meta-analysis and comparison with cortisol. *Neuroscience & Biobehavioral Reviews*, *68*, 651–668. https://doi.org/10.1016/j.neubiorev.2016.06.038

Shufelt, C. L., Brown, V., Carpenter, J. S., Chism, L. A., Faubion, S. S., Joffe, H., Kling, J. M., Soares, C. N., & Thurston, R. C. (2023). The 2023 nonhormone therapy position statement of The North American Menopause Society. *Menopause*, *30*(6), 573–590. https://doi.org/10.1097/gme.0000000000002200

Shuster, L. T., Rhodes, D. J., Gostout, B. S., Grossardt, B. R., & Rocca, W. A. (2010). Premature menopause or early menopause: Long-term health consequences. *Maturitas*, *65*(2), 161–166. https://doi.org/10.1016/j.maturitas.2009.08.003

Simon, J. A., Davis, S. R., Hirschberg, A. L., Kiesel, L., Pompei, L. de M., Reginster, J.-Y., Simoncini, T., & Hillard, T. (2025). State of the art in menopause: current best practice approaches from the IMS World Congress 2024, Melbourne. *Climacteric*, *28*(2), 98–103. https://doi.org/10.1080/13697137.2025.2457993

Spector, A., Li, Z., He, L., Badawy, Y., & Desai, R. (2024). The effectiveness of psychosocial interventions on non-physiological symptoms of menopause: A systematic review and meta-analysis. *Journal of Affective Disorders*, *352*, 460–472. https://doi.org/10.1016/j.jad.2024.02.048

Spyropoulou, A. C., Zervas, I. M., Christodoulakos, G., Lambrinoudaki, I., Rizos, D., Koundi, K., Sanida, E., Creatsas, G., & Soldatos, C. R. (2009). Irritability in Menopause: An Investigation of Its Relation to Menopausal, Hormonal and Physical Factors. *Psychotherapy and Psychosomatics*, *78*(2), 128–130. https://doi.org/10.1159/000203120

Statistics Canada. (2025, March). *Key findings from the Health of Canadians report, 2024*. Government of Canada. https://www150.statcan.gc.ca/n1/daily-quotidien/250305/dq250305a-eng.htm

Statistics Canada. (2025, September). *Population estimates on July 1, by age and gender*. Government of Canada. https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1710000501

Stites, S. D., Harkins, K., Rubright, J. D., & Karlawish, J. (2018). Relationships Between Cognitive Complaints and Quality of Life in Older Adults With Mild Cognitive Impairment, Mild Alzheimer Disease Dementia, and Normal Cognition. *Alzheimer Disease & Associated Disorders*, *32*(4), 276–283. https://doi.org/10.1097/wad.0000000000000262

Sun, G., Kirk, A., Karunanayake, C. P., O'Connell, M. E., & Morgan, D. G. (2023). Quality of life in patients with subjective cognitive impairment compared with those diagnosed with mild cognitive impairment or dementia referred to a rural and remote memory clinic. *Alzheimer's & Dementia*, *19*(S19). https://doi.org/10.1002/alz.072795

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

Than, S., Moran, C., Beare, R., Vincent, A., Lane, E., Collyer, T. A., Callisaya, M. L., & Srikanth, V. (2023). Cognitive trajectories during the menopausal transition. *Frontiers in Dementia*, *2*, 1098693. https://doi.org/10.3389/frdem.2023.1098693

Thurston, R. C., Thomas, H. N., Castle, A. J., & Gibson, C. J. (2025). Menopause as a biological and psychological transition. *Nature Reviews Psychology*, *4*(8), 530–543. https://doi.org/10.1038/s44159-025-00463-9

Unkenstein, A. E., Bryant, C. A., Judd, F. K., Ong, B., & Kinsella, G. J. (2016). Understanding women's experience of memory over the menopausal transition. *Menopause*, *23*(12), 1319–1329. https://doi.org/10.1097/gme.0000000000000705

Upton, D., & Upton, P. (2014). *Psychology of Wounds and Wound Care in Clinical Practice*. 85–111. https://doi.org/10.1007/978-3-319-09653-7_4

Utian, W. H., Janata, J. W., Kingsberg, S. A., Schluchter, M., & Hamilton, J. C. (2002). The Utian Quality of Life (UQOL) Scale: development and validation of an instrument to quantify quality of life through and beyond menopause. *Menopause*, *9*(6), 402–410. https://doi.org/10.1097/00042192-200211000-00005

Vallejo, M. S., Blümel, J. E., Chedraui, P., Matsumura-Kasano, J., Meza, P., Monterrosa-Castro, Á., Ñañez, M., López, M., Ojeda, E., Rey, C., Valadares, A. L. R., Rodríguez-Vidal, D., Rodrigues, M. A. H., Saavedra, J., Salinas, C., Sosa, L., Tserotas, K., Martín, M. A.-S., Aguirre, M. S., … Gutiérrez-Crespo, H. (2026). Severity of menopausal symptoms is associated with lower work-related quality of life and job satisfaction in midlife Latin

American women: REDLINC XIII. *Maturitas*, *208*, 108918. https://doi.org/10.1016/j.maturitas.2026.108918

Vega, J. N., Zurkovsky, L., Albert, K., Melo, A., Boyd, B., Dumas, J., Woodward, N., McDonald, B. C., Saykin, A. J., Park, J. H., Naylor, M., & Newhouse, P. A. (2016). Altered Brain Connectivity in Early Postmenopausal Women with Subjective Cognitive Impairment. *Frontiers in Neuroscience*, *10*, 433. https://doi.org/10.3389/fnins.2016.00433

Verrilli, L., & Berga, S. L. (2020). What Every Gynecologist Should Know About Perimenopause. *Clinical Obstetrics and Gynecology*, *63*(4), 720–734. https://doi.org/10.1097/grf.0000000000000578

Ware, J. E., & Sherbourne, C. D. (1992). The MOS 36-ltem Short-Form Health Survey (SF-36). *Medical Care*, *30*(6), 473–483. https://doi.org/10.1097/00005650-199206000-00002

Wariso, B. A., Guerrieri, G. M., Thompson, K., Koziol, D. E., Haq, N., Martinez, P. E., Rubinow, D. R., & Schmidt, P. J. (2017). Depression during the menopause transition: impact on quality of life, social adjustment, and disability. *Archives of Women's Mental Health*, *20*(2), 273–282. https://doi.org/10.1007/s00737-016-0701-x

Weber, M., & Mapstone, M. (2009). Memory complaints and memory performance in the menopausal transition. *Menopause*, *16*(4), 694–700. https://doi.org/10.1097/gme.0b013e318196a0c9

Weber, M. T., Mapstone, M., Staskiewicz, J., & Maki, P. M. (2012). Reconciling subjective memory complaints with objective memory performance in the menopausal transition.

Menopause: The Journal of The North American Menopause Society, *19*(7), 735–741. https://doi.org/10.1097/gme.0b013e318241fd22

Weber, M. T., Rubin, L. H., & Maki, P. M. (2013). Cognition in perimenopause. *Menopause*, *20*(5), 511–517. https://doi.org/10.1097/gme.0b013e31827655e5

Whitaker, C., Stevelink, S., & Fear, N. (2017). The Use of Facebook in Recruiting Participants for Health Research Purposes: A Systematic Review. *Journal of Medical Internet Research*, *19*(8), e290. https://doi.org/10.2196/jmir.7071

Whiteley, J., DiBonaventura, M. daCosta, Wagner, J.-S., Alvir, J., & Shah, S. (2013). The Impact of Menopausal Symptoms on Quality of Life, Productivity, and Economic Outcomes. *Journal of Women's Health*, *22*(11), 983–990. https://doi.org/10.1089/jwh.2012.3719

Wilks, C. R., Korslund, K. E., Harned, M. S., & Linehan, M. M. (2016). Dialectical behavior therapy and domains of functioning over two years. *Behaviour Research and Therapy*, *77*, 162–169. https://doi.org/10.1016/j.brat.2015.12.013

Woods, N. F., Coslov, N., & Richardson, M. K. (2023). Effects of bothersome symptoms during the late reproductive stage and menopausal transition: observations from the Women Living Better Survey. *Menopause*, *30*(1), 45–55. https://doi.org/10.1097/gme.0000000000002090

Woods, N. F., & Mitchell, E. S. (2011). Symptom interference with work and relationships during the menopausal transition and early postmenopause. *Menopause*, *18*(6), 654–661. https://doi.org/10.1097/gme.0b013e318205bd76

Woods, N. F., Mitchell, E. S., & Adams, C. (2000). Memory Functioning Among Midlife Women. *Menopause*, *7*(4), 257–265.

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

Xu, Q., Li, H., & Zhu, D. (2024). Socioeconomic status, personality, and major mental disorders: a bidirectional Mendelian randomization study. *Schizophrenia*, *10*(1), 49. https://doi.org/10.1038/s41537-024-00471-3

Yang, K., Zeng, Y., Tong, L., Hu, Y., Zhang, R., Li, Z., & Yan, B. (2023). Extremely negative emotion interferes with cognition: Evidence from ERPs and time-varying brain network. *Journal of Neuroscience Methods*, *396*, 109922. https://doi.org/10.1016/j.jneumeth.2023.109922

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

Zhang, Z., DiVittorio, J. R., Joseph, A. M., & Correa, S. M. (2021). The Effects of Estrogens on Neural Circuits That Control Temperature. *Endocrinology*, *162*(8), bqab087. https://doi.org/10.1210/endocr/bqab087

Zhu, C., Thomas, N., Arunogiri, S., & Gurvich, C. (2022). Systematic review and narrative synthesis of cognition in perimenopause: The role of risk factors and menopausal symptoms. *Maturitas*, *164*, 76–86. https://doi.org/10.1016/j.maturitas.2022.06.010

Tables

Table 1

Global Statistics Pertaining to Premature, Early, and Induced Menopause

TYPE OF MENOPAUSE	DEFINITION	ESTIMATED GLOBAL PREVALENCE
PREMATURE MENOPAUSE	Menopause occurring prior to the age of 40. This is also referred to as primary ovarian insufficiency, which can be spontaneously caused by genetic mutations (e.g. X-chromosome disorders), autoimmune diagnoses (e.g. autoimmune polyendocrine syndromes, rheumatoid arthritis), and/or infections (e.g., mumps). [1,2]	3.7%[1]
EARLY MENOPAUSE	Menopause occurring between ages 40-45.[1]	12.2%[1]
INDUCED MENOPAUSE	Menopause occurring as a result of medical interventions. This includes, but is not limited to, bilateral oophorectomy, bilateral salpingo-oophorectomy, and chemotherapy/radiation treatment. [2,3]	Estimated to range from 7.9%[4]-11%[5] *

[1.] Golezar et al. (2019). [2.] Cox & Liu (2014). [3.] Pillay & Manyonda (2022). [4.] Chung et al. (2025). [5.] Dobson et al. (2024). *Global prevalence has yet to be ascertained.

Table 2

Demographic Characteristics of Participants Across Self-Reported Stages of Menopause

CHARACTERISTIC	CATEGORY	PERIMENOPAUSE (N = 297)	POSTMENOPAUSE (N = 275)
AGE		49.0 ± 4.0	53.0 ± 5.0
COUNTRY	North America	242	206
	Europe	43	51
	Oceania	11	15
	Africa	1	2
	South America	0	1
PERSON OF COLOUR	Percent Yes	8.8%	12.4%
BILINGUAL OR MULTILINGUAL	Percent Yes	32.7%	25.5%
EDUCATION	Did not complete High School	3	0
	High School	11	21
	Some college	16	22
	College Diploma/Associate's Degree	56	59
	Bachelor's Degree	119	101
	Master's degree	64	59
	Doctoral Degree	25	12
	Prefer not to answer	3	1
PERCEIVED FINANCIAL SITUATION	Very Bad	4	10
	Bad	29	22
	Neither good nor bad	78	76
	Good	142	115
	Very good	44	52
CURRENT USE OF MENOPAUSE HORMONE THERAPY (MHT)	Percent Yes	97.0 (23.6%)	120.0 (43.6%)
	Duration in months	13.0 ± 14.8	25.4 ± 26.1

Table 3

Descriptive Statistics of Measures Included in the Study Across Stages of Menopause

MEASURE	PERIMENOPAUSE (N = 297)	POSTMENOPAUSE (N = 275)	COMPARISON STATISTIC
MENOPAUSE RATING SCALE (MRS)	1.95 (.63)	2.06 (.77)	$t(530.98) = 1.84$, $p = .07$
QUALITY OF LIFE SCALE (QOLS)	4.46 (.84)	4.35 (.99)	$t(539.06) = -1.38$, $p = .17$
COGNITIVE FUNCTIONING SELF-ASSESSMENT SCALE	2.03 (.54)	2.03 (.63)	$t(541.66) = .06$, $p = .96$
EMOTION REACTIVITY SCALE	2.39 (.81)	2.28 (.96)	$t(538.13) = -1.37$, $p = .17$

Figures

Figure 1

The Proposed Moderated Mediation Model

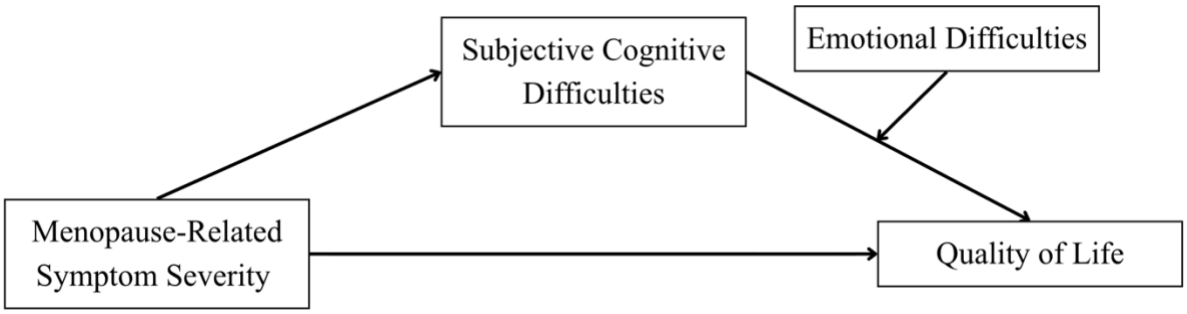
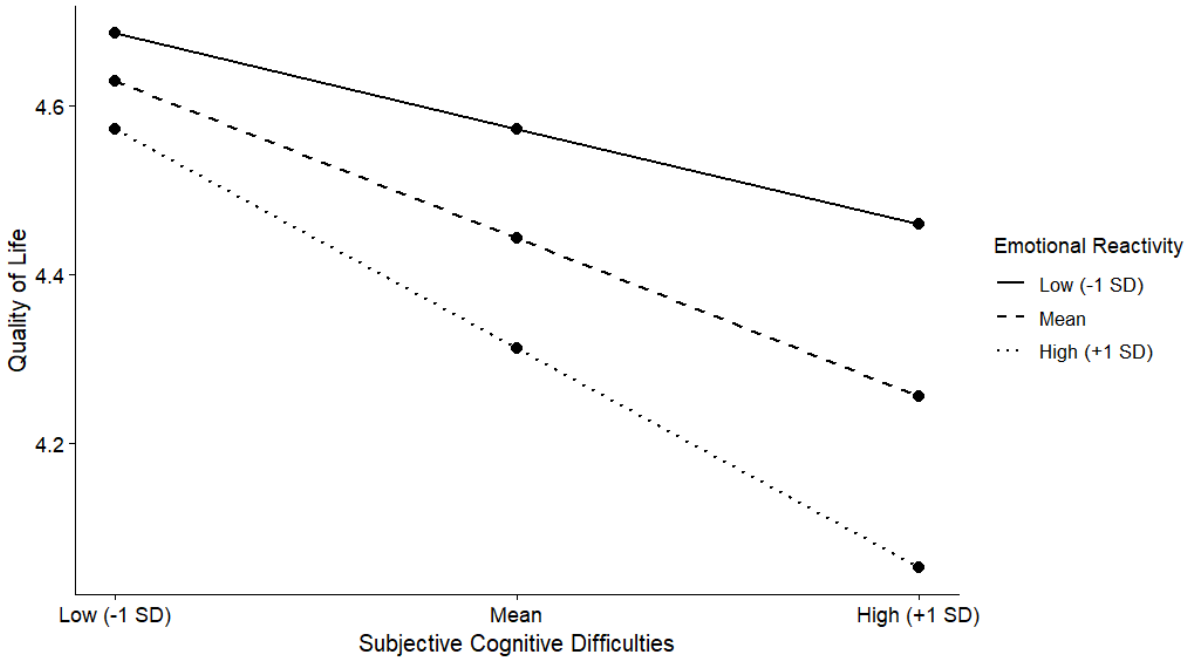


Figure 2

The Impact of Subjective Cognitive Difficulties on Quality of Life at Low (–1 SD), Mean, and High (+1 SD) Levels of Emotional Difficulties



Appendices

Appendix A: Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

The Checklist for Reporting Results of Internet E-Surveys (CHERRIES), developed by Eysenbach (2004, 2012), represents a standardized way for researchers to report findings from web-based surveys. This ensures transparency regarding methodology, the recruited sample, and subsequent analyses.

CHECKLIST ITEM	***EXPLANATION***	***PAGE NUMBER***
DESCRIBE SURVEY DESIGN	Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	10
IRB APPROVAL	Mention whether the study has been approved by an IRB.	12
INFORMED CONSENT	Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	11
DATA PROTECTION	If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	12

DEVELOPMENT AND TESTING	State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	73
OPEN SURVEY VERSUS CLOSED SURVEY	An "open survey" is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	11
CONTACT MODE	Indicate whether or not the initial contact with the potential participants was made on the Internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	11
ADVERTISING THE SURVEY	How/where was the survey announced or advertised? Some examples are offline media (newspapers), or online (mailing lists – If yes, which ones?) or banner ads (Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to	10, *see page 73,74 for survey announcement*

	participate. Ideally the survey announcement should be published as an appendix.	
WEB/E-MAIL	State the type of e-survey (eg, one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered manually into a database, or was there an automatic method for capturing responses?	10, 11
CONTEXT	Describe the Web site (for mailing list/newsgroup) in which the survey was posted. What is the Web site about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the Web site could pre-select the sample or influence the results. For example, a survey about vaccination on a anti-immunization Web site will have different results from a Web survey conducted on a government Web site	10
MANDATORY/VOLUNTARY	Was it a mandatory survey to be filled in by every visitor who wanted to enter the Web site, or was it a voluntary survey?	11

INCENTIVES	Were any incentives offered (eg, monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?	11
TIME/DATE	In what timeframe were the data collected?	11
RANDOMIZATION OF ITEMS OR QUESTIONNAIRES	To prevent biases items can be randomized or alternated.	11
ADAPTIVE QUESTIONING	Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions.	11
NUMBER OF ITEMS	What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	74
NUMBER OF SCREENS (PAGES)	Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	74
COMPLETENESS CHECK	It is technically possible to do consistency or completeness checks before the questionnaire is submitted. Was this done, and if “yes”, how (usually JAVAScript)?	74

	An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as “not applicable” or “rather not say”, and selection of one response option should be enforced.	
REVIEW STEP	State whether respondents were able to review and change their answers (eg, through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).	11
UNIQUE SITE VISITOR	If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.	12
VIEW RATE (RATIO OF UNIQUE SURVEY VISITORS/UNIQUE SITE VISITORS)	Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view	75

	rates of less than 0.1 % if the survey is voluntary.	
PARTICIPATION RATE (RATIO OF UNIQUE VISITORS WHO AGREED TO PARTICIPATE/UNIQUE FIRST SURVEY PAGE VISITORS)	Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called “recruitment” rate.	10
COMPLETION RATE (RATIO OF USERS WHO FINISHED THE SURVEY/USERS WHO AGREED TO PARTICIPATE)	The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate “informed consent” page or if the survey goes over several pages. This is a measure for attrition. Note that “completion” can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word “completeness rate”.)	10

COOKIES USED	Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate database entries having the same user ID eliminated before analysis? In the latter case, which entries were kept for analysis (eg, the first entry or the most recent)?	12
IP CHECK	Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (eg, 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same IP address within a given period of time	12

	eliminated before analysis? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	
LOG FILE ANALYSIS	Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	N/A
REGISTRATION	In "closed" (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (eg, the first entry or the most recent)?	N/A
HANDLING OF INCOMPLETE QUESTIONNAIRES	Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	10

QUESTIONNAIRES SUBMITTED WITH AN ATYPICAL TIMESTAMP	Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined.	10
STATISTICAL CORRECTION	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	75

Additional Information Pertaining to CHERRIES

State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire. The questionnaire was developed using Question Pro, and usability and technical functionality was tested prior to advertisements on social media platforms. Usability and technical functionality were tested across multiple devices, including laptops, tablets, and cellular devices, as well as across the Microsoft Windows and macOS operating systems.

Survey announcement. "Have you experienced Menopause, or are you going through perimenopause? Researchers at York University are currently seeking participants for a brief online survey that examines cognitive and emotional difficulties that are experienced by women during and after their menopausal transition. The study consists of a brief (10-15 mins) online

survey. To be eligible, you must be: In peri-menopausal transition (experiencing irregular intervals between menstrual cycles) OR In post-menopause (no menstrual cycle in the past 12 months) OR In surgical menopause. You will be asked to complete a few questionnaires about symptoms of menopause, cognitive difficulties, emotional experiences, and your background (e.g., age, ethnicity, etc.). You will have a chance to be entered into a draw to win one of five $100 Amazon e-gift cards."

What was the number of questionnaire items per page? The number of items is an important factor for the completion rate. The number of questionnaire items per page varied from 1 to 21, as a result of adaptive questioning.

Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate. The questionnaire ranged from 8-10 pages, as a result of adaptive questioning.

It is technically possible to do consistency or completeness checks before the questionnaire is submitted. Was this done, and if "yes", how (usually JAVAScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as "not applicable" or "rather not say", and selection of one response option should be enforced. Consistency or completeness was not checked prior to submission, as this was not achievable through the Question Pro software. As a result, participants were able to submit questionnaires with missing data. To maintain data quality, submissions were excluded if 25% of data was missing.

View Rate: Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary. Based on the available information, the study informed consent page was visited by 1034 unique site visitors. Due to limitations of the software used, we were unable to ascertain the number of unique site visitors to calculate the view rate.

Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods. Considering the use of convenience sampling through social media ads for recruitment, no formal statistical procedures were applied to assess, or correct, for non-representativeness. Rather, representativeness is addressed indirectly through transparent reporting of recruitment method and sample characteristics.

Appendix B: Additional Analyses

In operationalizing the psychological domain of the Menopausal Rating Scale, the item "*Physical and mental exhaustion (general decrease in performance, impaired memory, decrease in concentration, forgetfulness)*" may conceptually overlap with the construct of subjective cognitive difficulties as measured through the Cognitive Functioning Self-Assessment Scale. To address this, this item was removed, and the revised total score of the Menopausal Rating Scale was used to re-estimate the moderated mediation model. In this re-estimated model, there were no alternations in patterns of significance, or direction.

The model evaluating whether menopause-related symptom severity was associated with SCDs, while controlling for age, level of education, perceived financial situation, and stage of menopause, was significant ($F(5, 566) = 54.56$, $p < .001$, $R^2 = .33$). In this model, menopause-related symptom severity demonstrated a positive association with SCDs, such that higher menopause-related symptom severity was associated with a greater severity of SCDs ($b = .43$, $SE = .03$, $p < .001$, 95% CI [0.3673, 0.4845]). Participant age ($b = -.01$, $SE = .01$, $p = .022$, 95% CI [-0.0212, -0.0016]) was negatively associated with SCDs, as was perceived financial situation ($b = -.09$, $SE = .02$, $p < .001$, 95% CI [-0.1345, -0.0461]). Level of education ($b = .02$, $SE = .02$, $p = .217$, 95% CI [-0.0121, 0.0534]) and stage of menopause ($b < .01$, $SE = .05$, $p = .943$, 95% CI [-0.0861, 0.0926]) were not associated with the severity of SCDs.

The model predicting quality of life, while controlling for age, level of education, perceived financial situation, and stage of menopause, was also significant ($F(8, 563) = 49.67$, $p < .001$, $R^2 = .41$). In this model, menopause-related symptom severity ($b = -.22$, $SE = .06$, $p < .001$, 95% CI [-0.3255, -0.1047]), SCDs ($b = -.34$, SE = .06, p < .001, 95% CI [-0.4634, -0.2173]), and emotional

difficulties (*b* = -.16, SE = .04, *p* < .001, 95% CI [-0.2384, -0.0724]) were negatively associated with quality of life. While perceived financial situation was positively associated with quality of life (*b* = .36, *SE* = .03, *p* < .001, 95% CI [0.2944, 0.4254]), age (*b* < [.01], *SE* = .01, *p* = .676, 95% CI [-0.0174, 0.0113]), level of education (*b* = -.01, *SE* = .02, *p* = .566, 95% CI [-0.0624, 0.0341]), and stage of menopause (*b* = .06, *SE* = .07, *p* = .356, 95% CI [-0.0700, 0.1941]) were not.

Importantly, a significant interaction was also observed between SCDs and emotional difficulties (*b* = -.14, SE = .05, p = .01, 95% CI [-0.2400, -0.0329]), such that the negative relationship between SCDs and quality of life was stronger at greater levels of emotional difficulties. Specifically, the effect of SCDs on quality of life was significant at low (-1 SD) levels of emotional difficulties (*b* = -.22, *SE* = .08, *p* = .004, 95% CI [-0.3694, -0.0695]), mean levels of emotional difficulties (*b* = -.34, *SE* = .06, *p* < .001, 95% CI [-0.4634, -0.2173]), and high (+1 SD) levels of emotional difficulties (*b* = -.46, *SE* = .08, *p* < .001, 95% CI [-0.6181, -0.3043]). Johnson-Neyman analysis revealed that this effect was statistically significant for 89.0% of participants in the study sample.

The direct effect of menopause-related symptom severity on quality of life remained significant after accounting for SCD, ERS, their interaction, and the covariates (*b* = -.22, *SE* = .06, *p* < .001, 95% CI [-0.3255, -0.1047]). A significant moderated mediation index was also found (*b* = -.0581, *SE* = .02, 95% CI [-0.1039, -0.0091]), where the strength of the indirect effect of menopause-related symptom severity on quality of life through SCDs reciprocally increased with severity of emotional difficulties. Specifically, this indirect effect was found to be significant across low (-1 SD; *b* = -.09, *SE* =.04, 95% CI [-0.1661, -0.0244]), mean (*b* = -.14, *SE* =.03, 95% CI [-0.2070, -0.0849]), and high (+1 SD; *b* = -.20, *SE* =.04, 95% CI [-0.2735, -0.1215]) levels of emotional difficulties.