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Mental health and quality of life in post-menopausal women as a function of retrospective menopause symptom severity

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Abstract

Objectives: Perimenopause is commonly viewed as a window of vulnerability for developing psychiatric and eating disorders, especially for women who experience severe symptoms. However, menopausal symptoms may have a lasting effect on older women's mental health and quality of life (QOL) into post-menopause. The current study examined older (60+) postmenopausal women's mental health and QOL as a function of retrospective menopausal symptom severity.

Methods: Participants were recruited via public online postings and included 227 postmenopausal women, ages 60–94 years old (M = 68.84, SD = 6.53). Participants completed an online questionnaire to assess past menopausal symptoms as well as current depression, anxiety, sleep difficulties, binge eating, QOL, and demographics. The relation between the retrospective severity of menopausal symptoms and mental health/QOL was evaluated using linear regressions, while controlling for demographic covariates.

Results: Retrospective menopause symptom severity was significantly associated with depression, sleep difficulties, binge eating severity, and most QOL measures. Regarding covariates, having a psychiatric history was significantly associated with all outcome variables, except for anxiety. Time since menopause and BMI were significantly associated with binge eating severity. Regarding specific symptom subgroups, psychological and somato-vegetative symptoms were most associated with mental health and QOL.

Conclusion: The menopausal transition is a significant change in a woman's life and the challenges of menopausal symptoms can have lasting impacts on women's health. It is imperative

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that future research seeks to further understand the lasting impacts of this transition on the lives of older women to ensure proper interventions are implemented for successful aging.

Keywords

Mental health; health-related quality of life; post-menopause; symptom severity

The menopausal transition involves the permanent cessation of ovarian function and typically occurs between ages 45 and 55, though the age of onset and duration varies person to person.[1,2] It is well established that the menopausal transition influences both women's physical and mental health during the aging process.[3,4] Women may experience menopausal symptoms that can begin several years before menopause and can affect quality of life (QOL). These symptoms differ across women in terms of frequency and severity, and include hot flashes, disrupted sleep, vaginal dryness, and changes in mood.[5]

Of note, research on the psychological effects of the menopausal transition has predominantly focused on perimenopause. Perimenopause is commonly viewed as a primary window of vulnerability for developing psychiatric and eating disorders due to hormone fluctuations, physical changes (e.g., redistribution of adipose tissue, muscle loss, etc.), and life circumstances more common during midlife.[4,6–7] Several longitudinal studies suggest that higher levels of depression, for example, occur during early or late stages of the menopausal transition for those with and without depression history.[8–11] Yet, research suggests that postmenopausal women may experience poorer mental health than pre- or perimenopausal women. It is possible symptoms persist beyond the transition (e.g. hot flashes) or new mental health issues develop after menopause.

For example, postmenopausal women endorsed higher levels of anxiety, as well as lower levels of vitality and overall mental wellbeing compared to perimenopausal women.[12] Further, although sleep disruption is a hallmark symptom of perimenopause, older women also frequently report difficulty sleeping post-menopause. For instance, 46.7% of postmenopausal women met the clinical cutoff for sleep disturbance warranting medical attention.[13] Disrupted sleep confers risk for a variety of mental health issues and negative health behaviors, such as depression and binge eating disorder.[14–15] Past research also suggests that early postmenopausal women were 2–4 times more likely to experience a major depressive episode than premenopausal women,[16] while 41% of postmenopausal women reported mild depression in a separate study.[17] Finally, binge eating (i.e., consuming abnormally large amounts of food in one sitting while simultaneously feeling out of control) is the most common form of disordered eating among older adult women (e.g., 12–20%).[18,19] Overall, research demonstrates the role that the menopausal transition plays in the mental health and QOL of women, which can persist across stage of menopause.

Yet, a limitation in the postmenopausal literature is that relatively little is known regarding postmenopausal women's mental health in direct relation to menopausal symptom severity (in addition to menopause stage). The vast majority of research compares women's health across menopausal stages (e.g., pre- or peri- versus post-menopause), rather than degree of symptoms experienced related to menopause. Furthermore, samples of postmenopausal women in the studies examining the impact of symptom severity were frequently under

60 years. Some menopausal symptoms can persist beyond perimenopause, and severe symptoms may have lasting effects on one's mental health.

Indeed, recent evidence points to the importance of examining symptom severity in the context of mental health. For instance, one research study found experiencing more vasomotor symptoms is associated with risk of developing major depressive disorder in perimenopausal women.[20] Additionally, among women aged 40–60, a recent study found that menopause symptom severity was strongly associated with more disordered eating symptoms and lower body satisfaction, while menopausal stage had no significant relation.[21] Another study found that menopause symptom severity predicted QOL in women aged 40–65 years old, but menopausal status did not.[22] Therefore, recent evidence suggests that menopausal symptom severity may be a better way to examine the impact of this transition on mental health.

In summary, the longevity of mental health impact from severe menopausal symptoms remains understudied. Thus, it is important to examine retrospective menopausal symptom severity in relation to older adult women's current mental health and QOL. In the limited data examining effects of menopausal symptoms in postmenopausal women, most studies limit samples to women under 60–65 years, missing older adult women beyond midlife. Therefore, the primary aim of the current study is to examine current mental health and QOL as a function of retrospective menopausal symptom severity in a cross-sectional study of postmenopausal women ages 60+. We hypothesized that retrospective menopausal symptom severity would be associated with current mental health indicators and QOL in postmenopausal women. As a secondary aim, we explored the degree to which the subtypes of menopause symptom severity were affiliated with current mental health indices and QOL. We predicted that retrospective psychological and somato-vegetative menopause symptoms would associate with current mental health and QOL to a greater degree than would urogenital symptoms.

Methods

Participants

Participants included 227 postmenopausal women, aged 60–94 years old (M = 68.84, SD = 6.53). The majority endorsed White race (91.6%); 14.1% endorsed Hispanic/Latino ethnicity. Regarding education, 68.7% of participants reported having a Bachelor's degree or higher. Time since menopause in our sample ranged from one year to 48 years (M = 49.17). See Table 1 for details.

Procedures

Adult women aged 60 years and older were recruited via public online postings. We used social networking sites (e.g., Facebook), Amazon MTurk and word of mouth (e.g., announcements at local Community Advisory Board meetings). We also utilized internet snowball sampling (i.e., we asked participants to forward the survey link to their own social networks). After informed consent, participants completed online self-report measures. Upon completion, participants had the option to provide their email address and be included

in a raffle for a US$50 Amazon e-gift card. We initially launched the survey such that all participants would receive a US$10 Amazon e-gift voucher. Upon survey launch with this pay structure, we received an influx of artificial responses, known as “bots.” We discarded these responses and relaunched the survey using bot detection filtration (i.e., CAPTCHA verification to detect non-human attempts) and a raffle structure to reduce the likelihood of “bot” entries. All responses were closely monitored by study personnel for suspicious response patterns (e.g., unreasonably short response times, response biases indicating inattention or not reading, repeated entries, invalid or nonsensical text entries). Only responses that passed validity checks were included in analyses.

Measures

We used the Menopause Rating Scale[5] (MRS; current sample Cronbach’s α = .852) to assess retrospective menopause symptoms. This scale defines this transition as going through 12 months – or one whole year – without one’s menstrual period and includes three symptom subscales: psychological, somato-vegetative, and urogenital symptoms. Psychological symptoms include feeling depressed, irritable, anxious, and exhausted.[5] Somato-vegetative symptoms include sweating/hot flashes, cardiac complaints, sleeping disorders, and joint and muscle complaints.[5] Urogenital symptoms included are sexual problems, urinary complaints, and vaginal dryness.[5] Scores are summed to obtain a total score, with higher scores indicating more severe symptoms.

The 10-item Center for Epidemiologic Studies – Depression Scale[23] (CES-D; α = .866) measured current depressive symptoms. Scores are summed, with a cutoff of ≥10 signifying probable clinical depression. The Binge Eating Scale[24] (BES; α = .904) assessed current binge eating severity. Scores are summed, and higher scores indicate more severe symptoms. A cutoff of ≥17 indicates moderate-to-severe binge eating. We used the Geriatric Anxiety Inventory Short Form[25] (GAI; α = .926) to assess anxiety. Higher scores indicate greater anxiety, with scores of ≥2 indicating an anxiety disorder. The Pittsburgh Sleep Quality Index[26] (PSQI; α = .726) assessed sleep quality. Scores are summed; higher scores indicate worse sleep quality and a cutoff score of >5 indicates severe sleep difficulties. We used the 3-item version of Alcohol Use Disorders Identification Test (AUDIT)[27] to screen for possible alcohol misuse. Higher scores suggest greater use of alcohol, and a score of 3 or more is considered a positive screen for alcohol misuse among women. Internal consistency in this sample was low (α = .49). Thus, we did not proceed with inferential statistics using this measure.

We used the RAND 36-Item Short Form Health Survey[28] (SF-36; domain α range =.79–.91) to measure health-related QOL. Higher scores indicate better/healthier QOL. All eight subscales of the SF-36 were used: physical functioning, role limitations due to physical health, role limitations due to emotional health, vitality, emotional wellbeing, social functioning, pain, and general health.

Statistical Analyses

Primary Analyses—Before proceeding with inferential statistics, we examined the clinical characteristics of our sample (Table 1). Our primary aim was to investigate the

relation between retrospective menopause symptom severity and current mental health/QOL status. We used linear regression models with MRS total score as the independent variable for each outcome variable, including models for each subscale of the QOL measure. In all 12 models, we controlled for demographic covariates including self-reported psychiatric history (current or past psychiatric disorder), education, partner status, body mass index (BMI), and past or current hormone therapy (HT). We covaried for these demographics to be consistent with previous research that has looked at mental health variables in relation to menopause.[16] We also controlled for years since menopause instead of age. Because we ask for symptom recall, time since menopause is likely more influential on symptom reporting and has a broader range than age. Additionally, controlling for time since menopause and age would be redundant as they are strongly correlated ($r = .72$) and there were minimal differences between the models when controlling for time since menopause and for age separately. To account for multiple tests, we used the Bonferroni correction to determine statistical significance (.05/12 = .004). We also tested for collinearity among predictor variables using variance inflation factors (VIFs; VIFs greater than 10 suggest collinearity) and calculated Cohen's f^2 to estimate effect size (0.02 = small, 0.15 = medium, 0.35 = large).

Secondary Analyses—For significant models with MRS total score, we used linear regression models with each symptom group of the MRS to compare the individual influence of menopause symptom type on outcomes. As noted above, the MRS subscales are psychological, somato-vegetative, and urogenital symptoms. In each model, we continued to control for the demographic covariates described above. To account for multiple tests (i.e., one MRS total model and three symptom subscale models for nine outcome variables), we used a Bonferroni correction to determine statistical significance (.05/36 = .001) and calculated Cohen's f^2 to estimate effect size.

Results

Primary Analyses (Table 2)

The VIF for all models were less than 1.15, indicating that collinearity was not a concern in this study. For depression, the model was significant, with MRS total score accounting for 14.1% of the variance ($p < .001$, $f^2 = .16$) and psychiatric history accounting for 6.5% of the variance ($p < .001$). MRS total score was not significantly associated with anxiety. Total MRS score was associated with poorer sleep quality, accounting for 15% of the variance ($p < .001$, $f^2 = .18$). Psychiatric history was significantly associated with sleep quality as well, accounting for 7.3% of the variance ($p < .001$). Regarding binge eating severity, total MRS score accounted for 4.6% of the variance ($p < .001$, $f^2 = .05$) and time since menopause accounted for 5.4% of the variance ($p = .001$), with less time since menopause being associated with more severe binge eating. Additionally, BMI accounted for 13.1% ($p < .001$) of the variance of this model. For each outcome variable significantly related to MRS scores, higher MRS scores were associated with poorer current mental health. Effect sizes ranged from small to medium-to-large in magnitude for MRS total score in the models.

We also conducted linear regressions to investigate the relationship between total MRS score and each subscale of the SF-36, while controlling for psychiatric history, education, marital status, years since menopause, BMI, and HT. MRS total score significantly related to six domains of the SF-36, for most of which psychiatric history (PsyHx) was also significant: limitations due to emotional health (MRS = 4.2%, f^2 = .04; PsyHx = 9.0%), vitality (MRS = 6.9%, f^2 = .07; PsyHx = 16.0%), emotional wellbeing (MRS = 13.8%, f^2 = .16; PsyHx = 7.6%), social function (MRS = 5.9%, f^2 = .06; PsyHx = 8.3%), pain (MRS = 12.1%, f^2 = .14; PsyHx = 5.4%), and general health (MRS = 10%, f^2 = .11) (all MRS p's < .001 - .003; all PsyHx p's < .001). More severe menopause symptoms and history of psychiatric illness were associated with poorer health. MRS total score was not significantly associated with physical function or limitations due to physical health. Effect sizes were small-to-medium in magnitude for MRS total score in the models, except for pain and emotional wellbeing which had medium effect sizes.

Secondary Analyses (Table 2)

For all outcome variables significantly associated with MRS total, we conducted linear regressions with each MRS symptom subscale to examine which symptom types were driving these models. For depression, the models for MRS Psychological (variance accounted for = 17.1%, p < .00, f^2 = .21) and MRS Somato-vegetative (10.6%, p < .001, f^2 = .12) were significant, but the MRS Urogenital model was not. Psychiatric history was significant in all three models (6.5 – 6.9%; all p < .001). For sleep quality, MRS Psychological (15.5%, p < .001, f^2 = .18), MRS Somato-vegetative (12.2%, p < .001, f^2 = .14), and MRS Urogenital (5.6%, p < .001, f^2 = .06) scores were all significant. Psychiatric history was significant (7.3%, p < .001) for all three models. MRS Urogenital (6.9%, p < .001, f^2 = .07) was significantly associated with binge eating severity. BMI accounted for a significant amount of variance in all three models (11.2 – 13.1%; all p's <.001). Time since menopause was also significant (5.4%, p = .001) for all three models. Effect sizes for significant MRS Psychological models were medium-to-large in magnitude. Significant MRS Somato-vegetative and MRS Urogenital models had effect sizes ranging from small to medium in magnitude.

Regarding QOL, limitations due to emotional problems was significantly associated with MRS Psychological (5.4%, p < .001, f^2 = .06) and MRS Somato-vegetative (4.7%, p = .001, f^2 = .05), but not MRS Urogenital. Psychiatric history was significant in all three models (9.0 – 9.5%; p < .001). For vitality, MRS Psychological and MRS Somato-vegetative accounted for 8.2% (f^2 = .09) and 4.9% (f^2 = .05) of the variance, respectively (all p's < .001). Psychiatric history was significant in all three models (16 – 16.9%, p < .001). For emotional wellbeing, the models for MRS Psychological (16.3%, p < .001, f^2 = .19) and MRS Somato-vegetative (9.7%, p < .001, f^2 = .11) were significant. Psychiatric history was significant in all three models (7.6 – 8.1%, p < .001). For social function, MRS Psychological (12.5%, p < .001, f^2 = .14) was significant; psychiatric history was significant in all three models (8.3 – 8.7%, p < .001). Pain was associated with MRS Psychological (9.8%, f^2 = .11) and MRS Somato-vegetative (13.5%, f^2 = .16), while psychiatric history (5.4–5.8%) was significant in all models (all p's ≤ .001). For general health, the MRS Psychological and MRS Somato-vegetative models were significant, accounting for 8.5%

(f^2 = .09) and 10% (f^2 = .11) of the variance, respectively (p < .001). Effect sizes were mostly small to medium in magnitude, except for a medium-to-large effect size for MRS Psychological model for emotional wellbeing.

Discussion

The primary aim of this study was to examine mental health and QOL as a function of retrospective menopausal symptom severity in a sample of postmenopausal women aged 60 years and older. Retrospective menopause symptom severity was significantly associated with depression, sleep difficulties, binge eating severity, and six domains of quality of life measured by the SF-36. Additionally, less time since menopause and higher BMI were related to binge eating severity. Though we controlled for psychiatric history, which has a strong relationship with mental health and was significant in most models, higher MRS scores still suggested poorer mental health/QOL except for anxiety. This points to the strength of the relation between menopausal symptom severity to women's mental health and QOL, even in an older postmenopausal sample. In our secondary analyses, psychological and somato-vegetative menopause symptoms more consistently and significantly contributed to the relation between MRS scores and mental health/QOL. Urogenital symptoms played less of a role across mental health variables, with the exception of binge eating severity.

Previous research supports these findings. For example, in a slightly younger sample of postmenopausal women (M age = 57.9), a history of excessive vasomotor symptoms constituted risk for psychological disorders, particularly depression.[17] Among postmenopausal Korean women (aged 41–59), more severe menopausal symptoms were associated with increased severity of depressive symptoms.[29] Regarding sleep, more frequent hot flashes was associated with excessive daytime sleepiness.[13] In addition to symptom severity, past research also indicates that psychological and somato-vegetative symptoms (e.g. vasomotor symptoms, like hot flashes) were most associated with poorer mental health and QOL postmenopausally.[13,17,30]

Though no research to date has directly examined binge eating in relation to menopausal symptom severity in older women, evidence suggests that diets comprised of frequently binged foods are related to menopausal symptoms. In particular, evidence suggests that diets with high saturated fats, processed foods, and desserts are related to psychological, vasomotor, and somatic symptoms in postmenopausal women.[31] If these symptoms are related to less nutritious diets which are often associated with binge eating, this may contribute to our finding that menopausal symptom severity is significantly associated with binge eating severity. Our findings also align with previous studies examining QOL in older women. For instance, postmenopausal women with more severe vasomotor symptoms are more likely to experience a negative impact on their quality of life.[32] Similarly, menopausal symptoms negatively impacted health-related QOL in a sample of midlife women.[22]

In regard to demographics as covariates, Freeman et al. found BMI was not significantly associated with depression which aligns with our findings.[10] Additionally, previous studies reported small to medium effect sizes when examining risk for depression in relation to

menopause stage or menopause symptoms.[9–11] Thus, our effect sizes are comparable in magnitude to previous studies in the literature, though the measure of effect size differed between studies. Overall, our findings suggest that retrospective menopause symptom severity has a small-to-moderate, yet statistically significant, impact on the current mental health and QOL of postmenopausal women when controlling for various demographic variables, including psychiatric history and BMI.

There are several limitations to the current study. While our study includes an older age range of adult women, our sample is homogenous in terms of race/ethnicity, education, and income. Our sample was majority White and of higher annual income, which limits the generalizability of our findings to other populations. It is also important to note the limitations with online psychiatric data collection. As discussed by Quagan et al., there are vulnerabilities to data quality when collecting online reports of behavior and symptomatology due to subjectivity and possibilities of false responses.[33] This study was also cross-sectional, which limits our ability to understand a predictive relationship between menopause symptom severity and mental health in older postmenopausal women.

Additionally, the retrospective design of this study makes it difficult to pinpoint the specific role of menopause in this sample's mental health. Even when controlling for demographic variables and mental health risk factors, additional factors likely play a role. This variance could be attributed to fluctuations in menopause symptoms or other known mental health risk factors, such as an extensive medical history, chronic non-perimenopausal depression, relational distress, or substance/alcohol use, which are known risk factors for future depressive symptoms. Our measure of alcohol misuse demonstrated unacceptably low internal validity, limiting our ability to proceed with inferential statistics evaluating the potential role of alcohol use in current mental health and QOL. Of note, smoking has been linked to depressive symptoms in postmenopausal women as well. However, only 4.8% (n = 11) of our participants reported smoking. Thus, we were unable to covary for the potential impact of various health behaviors in this sample which have contributed substantial variance in depressive symptoms among similar samples. Furthermore, beyond HT use, we do not know if participants received other treatments for menopausal symptoms which could affect outcomes.

It is important to acknowledge that, as with all retrospective research, it is entirely possible that women in this study were subject to recall biases. Because menopause symptom severity is retrospective, it is possible that women with poorer current psychological health or QOL have biased recall for their experience of menopause. Specifically, individuals who are depressed selectively attend to more negative information and are more specific in their recall for negative events, which could affect past symptom reporting.[34] However, older adults generally have a positive recall bias for events, which may help mitigate potential depressive negative recall biases.[35]

Potential Clinical Value

The findings of the current study have several clinical implications. If menopause symptom severity has long-lasting impacts on older women's mental health, it could be valuable to screen women during menopause for symptom severity as a risk factor for declining mental

health and QOL; it is also important for clinicians to be mindful of this risk. These results also raise the question of whether improved symptom management during menopause would confer protective of mental health in later life. Perhaps behavioral health preventive interventions (e.g., healthy eating, sleep hygiene, and affect regulation programs) could be beneficial to mitigate negative immediate and long-term effects of menopause symptoms. Though inferences drawn from this data are limited due to its cross-sectional design, these findings suggest symptom severity may constitute a biomarker for mental health and QOL in older postmenopausal women.

Conclusion

As our population gets older, it is important to pay attention to older adults' mental health and QOL. Older adult women, in particular, frequently experience significant mental health challenges and poorer QOL beyond midlife. The menopausal transition is a significant change in a woman's life, which can be especially challenging when experiencing severe symptoms. It is imperative that future research seeks to understand the lasting impacts of this transition on the lives of older women to ensure proper interventions are implemented for successful aging.

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Table 1.

Participant demographics and baseline characteristics *(N = 227)*

Measures	*M* (SD) or *N* (%)
Age	68.84 (6.53)
BMI	29.31 (7.82)
Race	
White	208 (91.6%)
Black or African American	5 (2.2%)
Asian	2 (0.9%)
Native American/Alaskan Native	1 (0.4%)
Other or mixed race[a]	6 (2.6%)
Ethnicity	
Hispanic/Latina	32 (14.1%)
Non-Hispanic/Latina	189 (83.3%)
Relationship Status	
Married/living with partner	124 (54.6%)
Single	25 (11%)
Divorced/Separated	45 (19.8%)
Widowed	33 (14.5%)
Education	
Graduated high school or GED	15 (6.6%)
Some college	32 (14.1%)
Graduated 2-year or 4-year college	74 (32.6%)
Some graduate school	25 (11%)
Graduate school degree	75 (33%)
Menopause	
Hysterectomy	61 (26.9%)
HT (past or present)	93 (40.9%)
Clinical Cutoffs	
Depression	54 (25.2%)
Anxiety	71 (35.9%)
Binge Eating	20 (10.5%)
Sleep	111 (56.9%)

Note: BMI = Body Mass Index; HT = Hormone Therapy

[a]Participants that selected “Other or mixed race” reported Hispanic race, Hispanic white, Mestiza, Mexican, and two participants did not provide specifics

Table 2.

Mental health and quality of life predicted by menopause symptom type.

Variables	b	[95%CI]	β	t value	Adj. R^2	f^2 [d]
CES-D						
MRS Total	**b= .29**	**[.19–.39]**	**β = .40**	***t* = 5.79** [b]	**.19**	**.23**
Psychological	b= .71	[.50–.93]	β = .43	*t* =6.55[c]	.22	.28
Somato-	b=.64	[.38–.89]	β = .34	*t* =4.95[c]	.15	.18
Urogenital	b=.38	[.10–.65]	β = .19	*t* =2.70	.08	.09
PSQI						
MRS Total	**b= .21**	**[.14–.27]**	**β = .41**	***t* = 6.00** [b]	**.27**	**.37**
Psychological	b= .48	[.32–.63]	β = .41	*t* = 6.19[c]	.28	.39
Somato-	b= .46	[.29–.64]	β = .36	*t* = 5.36[c]	.24	.32
Urogenital	b= .32	[.14–.51]	β = .25	*t* = 3.46[c]	.17	.20
BES						
MRS Total	**b= .01**	**[.01–.02]**	**β =.23**	***t* =3.38** [b]	**.23**	**.30**
Psychological	b= .02	[.01–.04]	β = .18	*t* =2.60	.19	.23
Somato-	b= .03	[.01–.05]	β =.19	*t* =2.78	.19	.23
Urogenital	b= .04	[.02–.06]	β =.27	*t* =4.20[c]	.25	.33
Limits *E*[a]						
MRS Total	**b= −.91**	**[−1.50 to −.31]**	**β = −.22**	***t* = −3.00** [b]	**.11**	**.12**
Psychological	b= −2.31	[−3.63 to −1.0]	β = −.24	*t* = −3.47[c]	.13	.15
Somato-	b= −2.43	[−3.91 to −.95]	β = −.23	*t* = −3.23[c]	.13	.15
Urogenital	b= −.52	[−2.09 to 1.06]	β = −.05	*t* = −.65	.07	.08
Vitality[a]						
MRS Total	**b= −.74**	**[−1.09 to −.39]**	**β = −.28**	***t* = −4.18** [b]	**.24**	**.32**
Psychological	b= −1.84	[−2.62 to −1.06]	β = −.30	*t* = −4.63[c]	.26	.35
Somato-	b= −1.61	[−2.50 to −.71]	β = −.23	*t* = −3.53[c]	.23	.30
Urogenital	b= −.99	[−1.92 to −.05]	β = −.14	*t* = −2.08	.18	.22
Wellbeing[a]						
MRS Total	**b= −.84**	**[−1.13 to −.56]**	**β = −.39**	***t* = −5.77** [b]	**.20**	**.25**
Psychological	b= −2.07	[−2.70 to −1.44]	β = −.42	*t* = −6.46[c]	.24	.32
Somato-	b= −1.81	[−2.55 to −1.06]	β = −.32	*t* = −4.77[c]	.17	.20
Urogenital	b= −1.11	[−1.91 to −.32]	β = −.20	*t* = −2.76	.09	.10
Social Function[a]						
MRS Total	**b= −.70**	**[−1.08 to −.32]**	**β = −.26**	***t* = −3.60** [b]	**.12**	**.14**

Variables	b	[95%CI]	β	t value	Adj. R^2	f^2 [d]
Psychological	b= −2.29	[−3.11 to −1.47]	β = −.37	$t = -5.50$ [c]	.19	.23
Somato-	b= −1.59	[−2.57 to −.61]	β = −.23	$t = -3.21$	.11	.12
Urogenital	b= −.40	[−1.42 to .62]	β = −.06	$t = -.77$	.06	.06
Pain[a]						
MRS Total	**b= −1.06**	**[−1.44 to −.68]**	**β = −.37**	**$t = -5.50$** [b]	**.23**	**.30**
Psychological	b= −2.11	[−2.96 to −1.26]	β = −.33	$t = -4.88$ [c]	.20	.25
Somato-	b= −2.80	[−3.74 to −1.86]	β = −.38	$t = -5.87$ [c]	.23	.30
Urogenital	b= −1.59	[−2.62 to −.56]	β = −.21	$t = -3.03$	.14	.16
General Health[a]						
MRS Total	**b = −.80**	**[−1.23 to −.38]**	**β = −.34**	**$t = -3.75$** [b]	**.18**	**.22**
Psychological	b = −1.58	[−2.49 to −.67]	β = −.31	$t = -3.44$ [c]	.16	.19
Somato-	b = −1.97	[−3.00 to −.93]	β = −.33	$t = -3.75$ [c]	.18	.22
Urogenital	b = −1.12	[−2.47 to .23]	β = −.16	$t = -1.65$	.10	.11

Note: CES-D = Center for Epidemiologic Studies – Depression Scale; BES = Binge Eating Scale; PSQI = Pittsburgh Sleep Quality Index; Limits *E* = role limitations due to emotional health; Somato- = Somato-vegetative; Bold indicates MRS total results; MRS higher = more severe symptoms; Adj. R^2 accounts for all covariates and the independent variable entered into the model; All models are controlling for: psychiatric history, education, partner status, time since menopause, Body Mass Index, and hormone therapy

[a] = higher indicates better QOL

[b] p < .004; Adjusted for multiple observations on each participant. A Bonferroni correction for multiple variable comparisons would consider p < .004 as statistically significant.

[c] p < .001; Adjusted for multiple observations on each participant. A Bonferroni correction for multiple variable comparisons would consider p < .001 as statistically significant.

[d] Cohen's f^2 as estimate of effect size: 0.02 = small, 0.15 = medium, 0.35 = large