

Original article

Quality of life at peri- and postmenopause: analysis of the results from app “Mi Menopausia”



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ABSTRACT

Objective: To assess the health-related quality of life (HRQOL) of Spanish peri- and postmenopausal women using the Cervantes Short Form (SF) scale, and the factors associated with its variations.

Study design: A total of 7103 peri- and postmenopausal women were registered with the app “Mi Menopausia” from June 2021 to June 2024. This app is designed specifically for peri- and postmenopausal women. It measures HRQOL using the Cervantes SF scale (higher scores indicate lower HRQOL). Data collected included demographic information, lifestyle details, menopause symptoms, treatments for symptom relief, and personal medical history.

Results: Of the 6833 women included in the final analysis, 47.9 % were peri- and 52.1 % postmenopausal. The overall Cervantes SF score was 40.1 ± 16.8 and was associated in multivariate analysis with age (B: -0.29 , 95 % confidence interval (CI): -0.36 to -0.21), obesity (B: 1.68; 95CI: 0.44 to 2.93), postmenopausal status (B: 1.11; 95CI: 0.22 to 2.0), education level (B: -1.05 ; 95CI: -1.91 to -0.19), having a partner (B: -2.76 ; 95CI: -4.03 to -1.49), sexual intercourse (B: -8.25 ; 95CI: -9.81 to -6.69), no sexual activity (B: 5.86; 95CI: 3.91 to 7.81), diagnosis of depression (B: 8.34; 95CI: 7.34 to 9.35), having undergone hysterectomy (B: 0.51; 95CI: 0.10 to 3.64) and oophorectomy (B: 0.90; 95CI: 0.10 to 3.64) and having experienced bone fractures (B: 0.71; 95CI: 0.12 to 2.90).

Conclusion: The HRQOL of peri- and postmenopausal Spanish women is complex but improvable and is associated with various factors, particularly related to sexual activity and a diagnosis of depression or anxiety.

1. Introduction

Menopause marks a pivotal phase in a woman’s life that lasts over a third of her lifetime and extends beyond the purely physiological. The decline in sexual hormones during this period triggers various changes

and symptoms that affect both physical and mental health, significantly influencing health-related quality of life (HRQOL) [[1]]. Menopausal syndrome accompanies women through this transition, with variations in the type, severity, and duration of symptoms. Among the most common complaints are vasomotor symptoms (VMS), which affect up to 80

Abbreviations: ANOVA, Analysis of variance; B, Beta coefficient; Cervantes SF, Cervantes Short Form scale; COVID, Coronavirus disease; GSM, Genitourinary syndrome of menopause; HRQOL, Health-related quality of life; SD, Standard deviations; SWAN, Study of Women’s Health Across the Nation; VMS, Vasomotor symptoms.

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% of women. Other frequent symptoms include insomnia, mood swings with a tendency toward sadness and irritability, joint pain, reduced libido, and vaginal dryness [2]. These menopausal symptoms clearly impact women's overall well-being, work life, interpersonal relationships, and self-esteem. These effects are closely linked to personal and sociocultural factors, which shape how women perceive and experience these changes [3].

Multiple factors, including cultural norms, ethnicity, education, employment, health status, socioeconomic status, and personal knowledge about menopause, are likely to influence the variability in the severity, duration, and perception of menopausal symptoms, as well as their impact on HRQOL [4].

On the other hand, the lack of knowledge about menopause increases its negative impact. A recent study has shown that many women have limited understanding of menopause and its implications [5]. This gap in knowledge can lead to misinformation, fear, and the stigmatization of this natural stage of life. In this context, research on menopause is essential to improve the care and well-being of women globally. In this line, HRQOL assessment has become an essential component when studying the effects of menopause on well-being as well as when evaluating the benefits of the treatments used at this stage of a woman's life [6].

There is a need to deepen our understanding of the factors that influence the menopausal experience. Enhancing HRQOL during menopause not only benefits women individually but also positively impacts on overall public health. The Cervantes short-form (Cervantes SF) scale, a validated tool, is widely used to assess HRQOL in relation to menopausal symptoms, covering several domains of women's experiences during menopause [7]. Using this scale, the app "Mi Menopausia" was developed to assess HRQOL in peri- and postmenopausal women across Spain. Created by the Spanish Menopause Society, the app aims to increase awareness among women and healthcare professionals about HRQOL, enabling the personalization of therapies if needed.

This study aimed to assess the HRQOL of peri- and postmenopausal Spanish women using the Cervantes SF scale and to examine the factors associated with variations in HRQOL, both globally and within Cervantes SF domains.

2. Material and methods

A total of 7103 women were registered in the app "Mi Menopausia" from June 2021 to June 2024. This app was created by the Spanish Menopause Society with the aim of assessing HRQOL associated with menopause symptoms in Spain. The study was approved on January 13th, 2021, by the Ethics Committee of the Hospital Clínico San Carlos in Madrid, with approval number 20.391-E.

This app is intended exclusively for peri- and postmenopausal women. All content within the app is anonymous, and no personal identification data, such as address, identification card numbers or medical record numbers, were collected. Each user is assigned a unique random number upon registration, with no reference to personal information. After downloading and registering, users complete the questionnaire. During registration, users create a username and password of their choice, which remain entirely inaccessible to the researchers.

A signed informed consent form is required to complete the questionnaire, and consent is given online by clicking on a specific tab that appears after displaying the information and consent form within the app. Once registered, users can access the questionnaire at their convenience. To minimize bias, the app is recommended only for women experiencing climacteric symptoms, those attending medical centers for climacteric-related issues, women seeking preventive care during menopause, or those interested in assessing their quality of life during menopause.

The app contains a questionnaire related to demographic data, lifestyle, menopause symptoms, treatments used to relieve the menopausal symptoms and personal history of diseases. After this questionnaire the

women must fill the Cervantes SF scale to measure the HRQOL [7]. The result indicates the impact of menopausal symptoms on HRQOL, overall and in each domain (menopause and health, psychology, sexuality and partner relationships). This result is supported by the population-based norms published to the Spanish population, which facilitate the interpretation of these scores in clinical practice, research, and health management [8]. The Cervantes SF scale is a validated scale designed to measure HRQOL in peri- and postmenopausal Spanish women (Available online at <https://aeem.es/calculadora-escala-cervantes-de-calidad-de-vida/>). It consists of 16 items, rated on a Likert-type scale from 0 to 5, across various domains related to menopausal symptoms and concerns (Table 1S, supplemental material). The total score ranges from 0 to 100, where 0 indicates the best possible HRQOL (no impact of menopausal symptoms), and 100 indicates the worst HRQOL (greatest impact of menopausal symptoms) [8,9].

To minimize bias in completing the questionnaire, data control was implemented using mandatory fields required to finalize the questionnaire, such as the menopausal status. Additionally, filters were used to prevent errors in quantitative variables such as age, weight, and height. Once the questionnaire was submitted, it was locked to prevent further editing to avoid data repetition and participants were only allowed to resubmit the questionnaire after a 3-month period. Postmenopausal women were defined as those whose last menstruation occurred >12 months ago or have undergone to bilateral oophorectomy. In cases of prior hysterectomy without bilateral oophorectomy, we classified as postmenopausal those women presenting menopausal symptoms and a medical history clearly indicative of postmenopausal status (e.g., cancer treatments, age over 55, or a diagnosis confirmed by a healthcare professional). Perimenopausal women were considered those whose last menstruation occurred <12 months ago, who experienced menstrual irregularities with amenorrhea lasting 60 or more days, and who exhibited menopausal symptoms.

2.1. Statistical analysis

Discrete variables are expressed in frequencies and percentages, and quantitative variables were presented as means and standard deviations (SD). The Cervantes-SF score was calculated as described previously [7]. Student *t*-tests and ANOVA were used to analyze the relationship between Cervantes-SF scores and the other measured variables. Post-hoc Bonferroni test was used to analyze the association between each of the categories in variables with 3 or more categories. Man-Whitney and Kruskal Wallis tests were used for quantitative non-parametric variables. Spearman or Pearson's correlation coefficients were calculated to determine the correlation between Cervantes-SF scores and the continuous variables. A backward stepwise multiple linear regression analysis was carried out to identify the independent variables related to Cervantes-SF, where global or domain scores were included as the dependent variables. Variables with *p*-value <0.05 in the univariate analysis were used to construct the final linear regression model. All statistical tests were two-tailed, and the significance level was set at *p* < 0.05. IBM SPSS statistic v29 software for windows was used.

3. Results

A total of 6833 women were included in the final analysis, while 270 were excluded due to incorrect, incomplete, confusing or repetitive data. Table 1 presents the baseline characteristics of the series, as well as the global and domain-specific scores of the Cervantes SF scale. This population was representative of middle-aged Spanish women (Table 2S, supplemental material).

Of the participants, 47.9 % were perimenopausal women, while the remaining 52.1 % were postmenopausal. The average age of menopause in postmenopausal women was 49.6 years (SD: 6.1), with 2.3 % experiencing early menopause. Obesity was present in 13.1 % of the women, the majority were Caucasian (86.4 %), 59.2 % had a university

Table 1
Baseline of the series and global and domains values of the Cervantes sort-form scale.

Variables (n = 6833)	Frequency (%) / Mean ± Standard deviation	Cervantes sort form score (Mean ± Standard deviation)				
		Domains				
		Global	Menopause/Health	Psychology	Sexuality	Partner
All series	6833	40.1 ± 16.8	40.6 ± 20.1	42.2 ± 27.9	48.6 ± 24.6	25.6 ± 25.6
Age (years)	51.8 ± 6.1	Rho -0.065	Rho -0.092	Rho -0.139	Rho -0.069	Rho 0.008
		p < 0.001	p < 0.001	p < 0.001	p < 0.001	p = 0.558
Age range (years)		p < 0.001	p < 0.001	p < 0.001	p < 0.001	p = 0.546
• < 45	535 (7.8)	43.2 ± 16.3	45.3 ± 20.7	51.4 ± 28.2	46.1 ± 24.9	26.2 ± 24.4
• 45-55	4962 (72.6)	40.2 ± 16.8	41.1 ± 19.8	43.0 ± 27.7	47.8 ± 24.5	25.4 ± 24.1
• > 55	1336 (19.6)	38.5 ± 16.6	36.9 ± 20.3	35.5 ± 27.3	52.3 ± 24.3	26.2 ± 23.9
BMI (Kg/m ²)	25.0 ± 5.3	Rho 0.088	Rho 0.120	Rho 0.095	Rho 0.006	Rho 0.017
		p < 0.001	p < 0.001	p < 0.001	p = 0.625	p = 0.197
		p < 0.001	p < 0.001	p < 0.001	p = 0.956	p = 0.867
Obesity (BMI > 30 Kg/m ²)		43.2 ± 17.0	46.3 ± 21.5	48.1 ± 28.3	48.5 ± 25.6	25.7 ± 23.7
• ≥ 30 Kg/m ²	894 (13.1)	39.6 ± 16.7	39.7 ± 19.7	41.3 ± 27.8	48.6 ± 24.4	25.5 ± 24.7
• < 30 Kg/m ²	5861(85.8)	-	-	-	-	-
• Missing	78 (1.1)	p = 0.046	p = 0.497	p < 0.001	p < 0.001	p < 0.001
Menopause status		39.7 ± 16.3	40.8 ± 19.6	44.9 ± 27.7	45.5 ± 24.6	24.4 ± 23.3
• Perimenopause	3275 (47.9)	40.5 ± 16.8	40.5 ± 20.6	39.8 ± 28.0	51.4 ± 24.3	26.6 ± 24.1
• Postmenopause	3558 (52.1)	Rho -0.067	Rho -0.067	Rho -0.092	Rho 0.012	Rho -0.026
Age at last menstruation (years)	49.5 ± 5.7	p < 0.001	p < 0.001	p < 0.001	p = 0.312	p = 0.054
		p < 0.001	p < 0.001	p < 0.001	p = 0.303	p = 0.159
Early menopause		45.4 ± 18.6	47.0 ± 21.2	49.6 ± 28.4	50.6 ± 26.5	28.6 ± 27.0
• Yes	160 (2.3)	40.0 ± 16.7	40.5 ± 20.1	42.0 ± 27.9	48.5 ± 24.6	25.6 ± 24.0
• No	6673 (97.7)	p = 0.263	p < 0.001	p < 0.001	p < 0.001	p = 0.420
Ethnicity		39.9 ± 16.6	40.1 ± 20.0	41.6 ± 27.8	49.0 ± 24.4	25.7 ± 23.8
• White	5907 (86.4)	39.0 ± 19.9	32.9 ± 18.2	31.6 ± 28.8	57.0 ± 24.4	35.8 ± 36.4
• Asiatic	23 (0.3)	42.7 ± 21.0	45.8 ± 20.6	42.9 ± 31.8	50.0 ± 32.2	26.9 ± 22.5
• African	16 (0.2)	41.4 ± 17.8	44.3 ± 21.0	46.7 ± 28.6	45.1 ± 25.7	25.1 ± 25.0
• Latin-American	717 (10.5)	42.7 ± 27.2	47.5 ± 19.2	23.3 ± 23.0	80.0 ± 28.3	20.0 ± 20.0
• Afro-American	2 (0.001)	-	-	-	-	-
• Missing	168 (2.5)	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p = 0.353
Education level		45.6 ± 22.1	47.2 ± 25.0	46.0 ± 32.2	55.8 ± 29.2	26.8 ± 33.0
• No studies	50 (0.7)	42.1 ± 17.8	46.8 ± 20.9	47.2 ± 29.7	45.3 ± 25.2	25.4 ± 25.9
• Basic	755 (11.0)	40.7 ± 17.1	42.8 ± 20.6	43.7 ± 28.1	47.6 ± 25.3	24.7 ± 24.1
• High school	1890 (27.7)	39.3 ± 16.3	38.3 ± 19.2	40.5 ± 27.3	49.5 ± 23.3	26.0 ± 23.6
• University	4047 (59.2)	-	-	-	-	-
• Missing	91 (1.3)	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p < 0.001
Partner		48.0 ± 17.6	41.8 ± 20.7	45.2 ± 28.9	57.1 ± 24.0	-
• No	857 (12.5)	44.1 ± 17.9	45.1 ± 20.2	47.3 ± 27.6	39.5 ± 24.2	46.3 ± 28.7
• Occasional	207 (3.0)	38.7 ± 16.3	40.2 ± 20.0	41.4 ± 27.8	47.6 ± 24.4	24.5 ± 23.1
• Stable	5626 (82.3)	-	-	-	-	-
• Missing	143 (2.1)	p < 0.001	p < 0.001	p < 0.001	p = 0.013	p = 0.009
Laboral status		40.0 ± 17.0	42.3 ± 20.8	44.5 ± 28.5	47.9 ± 25.1	22.2 ± 24.2
• Housewife	577 (8.4)	39.7 ± 16.6	40.1 ± 19.8	41.5 ± 27.6	48.5 ± 24.3	25.8 ± 23.8
• Active	5474 (80.1)	42.5 ± 16.6	43.7 ± 19.8	47.3 ± 28.6	48.6 ± 26.2	26.8 ± 26.3
• Unemployed	359 (5.3)	45.7 ± 19.1	47.1 ± 22.8	48.1 ± 31.8	53.9 ± 26.9	27.1 ± 24.7
• Retired	217 (3.2)	-	-	-	-	-
• Missing	206 (3.0)	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p < 0.001
Sexual activity		54.0 ± 17.2	46.2 ± 21.5	51.8 ± 28.9	69.2 ± 22.9	45.4 ± 30.7
• No	606 (8.9)	34.3 ± 14.8	38.6 ± 19.6	38.7 ± 27.0	38.7 ± 22.1	20.0 ± 20.3
• Regular intercourse	3733 (54.6)	44.9 ± 15.1	42.6 ± 19.8	44.9 ± 28.1	59.0 ± 20.1	31.0 ± 23.8
• Sporadic intercourse	1665 (24.4)	47.4 ± 16.4	40.4 ± 19.7	45.4 ± 28.2	58.7 ± 21.8	44.7 ± 29.4
• Only Masturbation	570 (8.3)	49.9 ± 17.2	43.4 ± 20.8	50.8 ± 28.1	69.3 ± 22.3	33.0 ± 30.1
• Only Caresses	54 (0.8)	-	-	-	-	-
• Missing	205 (3.0)	p < 0.001	p < 0.001	p < 0.001	p = 0.552	p < 0.001
Smoking		39.3 ± 16.6	39.7 ± 20.0	40.9 ± 27.7	48.7 ± 24.4	24.6 ± 23.6
• No	4619 (67.6)	41.0 ± 16.5	40.6 ± 20.2	42.5 ± 27.8	48.0 ± 25.5	30.8 ± 26.6
• Occasional	308 (4.5)	43.1 ± 17.9	44.6 ± 21.0	48.1 ± 29.0	47.5 ± 25.7	27.4 ± 25.2
• Diary	929 (13.6)	40.5 ± 16.4	41.0 ± 19.1	42.4 ± 27.1	48.7 ± 23.8	26.9 ± 23.9
• Ex-smoker	899 (13.2)	-	-	-	-	-
• Missing	78 (1.1)	p < 0.001	p < 0.001	p = 0.004	p < 0.001	p = 0.997
Alcohol consumer		40.7 ± 17.0	39.6 ± 20.1	42.3 ± 28.1	51.9 ± 25.5	25.5 ± 24.4
• No	792 (11.6)	40.7 ± 16.9	41.6 ± 20.7	43.1 ± 28.2	48.8 ± 24.4	25.7 ± 24.6
• Occasional (<1Unit/week)	3142 (46.0)	38.6 ± 16.0	38.8 ± 18.8	40.0 ± 26.6	47.2 ± 24.3	25.5 ± 22.5
• Moderate (1-2 Unit/week)	1515 (22.2)	39.2 ± 16.8	39.9 ± 19.2	41.5 ± 28.4	47.2 ± 24.1	25.6 ± 23.4
• Frequent (> 3 1Unit/week)	1003 (14.7)	-	-	-	-	-
• Missing	381 (5.6)	p < 0.001	p < 0.001	p < 0.001	p < 0.001	p < 0.001
Depression / anxiety		47.9 ± 17.1	47.8 ± 20.2	56.8 ± 27.5	52.7 ± 25.1	29.2 ± 26.1
• Yes	1525 (22.3)	40.2 ± 16.7	38.4 ± 19.4	37.7 ± 26.4	47.5 ± 24.2	24.6 ± 23.3
• No	4681 (68.5)	-	-	-	-	-
• Missing	627 (9.2)	p < 0.001	p < 0.001	p = 0.024	p = 0.100	p = 0.084
Hysterectomized		43.6 ± 18.3	45.7 ± 22.0	45.2 ± 28.7	50.6 ± 25.6	27.9 ± 27.7
• Yes	377 (5.5)	39.7 ± 16.6	40.1 ± 19.8	41.8 ± 27.7	48.5 ± 24.5	25.5 ± 23.9
• No	5727 (83.8)					

(continued on next page)

Table 1 (continued)

Variables (n = 6833)	Frequency (%) / Mean ± Standard deviation	Cervantes sort form score (Mean ± Standard deviation)				
		Domains				
		Global	Menopause/Health	Psychology	Sexuality	Partner
• Missing	729 (10.7)	–	–	–	–	–
Bilateral oophorectomy		p < 0.001	p = 0.057	p < 0.001	p < 0.001	p = 0.944
• Yes	229 (3.4)	44.1 ± 19.0	45.2 ± 20.4	45.4 ± 29.5	54.1 ± 25.5	26.6 ± 23.9
• No	5836 (85.4)	39.8 ± 16.6	40.3 ± 20.0	41.8 ± 27.5	48.6 ± 24.6	25.5 ± 23.8
• Missing	768 (11.2)	–	–	–	–	–
Any bone fracture		p = 0.003	p = 0.003	p = 0.110	p = 0.391	p = 0.033
• Yes	668 (9.8)	41.9 ± 16.9	42.8 ± 20.1	43.9 ± 28.0	49.4 ± 24.2	27.7 ± 24.3
• No	5954 (87.1)	39.9 ± 16.7	40.4 ± 20.0	42.1 ± 27.9	48.5 ± 24.6	25.4 ± 24.1
• Missing	211 (3.1)	–	–	–	–	–

BMI (body mass index).

education, 82.3 % had a stable partner, 80.1 % were employed, and 91.1 % reported being sexually active. Additionally, 18.1 % were smokers, and 36.9 % were moderate to frequent alcohol consumers. A diagnosis of depression or anxiety was reported by 22.3 % of the women. Furthermore, 5.5 % had undergone a hysterectomy, 3.4 % had a bilateral oophorectomy, and 9.8 % had experienced a bone fracture (wrist 2.2 %, vertebral 0.4 %, hip 0.2 %, others 6.7 % and unknown 0.3 %).

Fig. 1 shows the prevalence of menopausal symptoms in the study series. Hot flashes, joint pain, and insomnia were the three most reported symptoms among the women.

The overall Cervantes SF score was 40.1 (SD: 16.8), with lower HRQOL associated with younger age, obesity, postmenopausal status, early menopause, lower education level, not having a partner, not being employed, lack of sexual activity, smoking, no or occasional alcohol consumption, diagnosis of depression, having undergone hysterectomy and oophorectomy, and having experienced bone fractures (Table 1). In the multivariate analysis, all these factors remained independently associated with HRQOL during menopause (Table 2). Based on population norms for the Spanish population, 1816 women (26.6 %) were above the 75th percentile. The distribution by Spanish autonomous communities was shown in Fig. 1S (supplemental material).

The menopause and health domain, which measures vasomotor symptoms, health status, and aging, had a score of 40.6 (SD: 20.1). Lower HRQOL in this domain was linked to younger age, obesity, early menopause, non-White or non-Asian ethnicity, lower education level, not having a partner, not being employed, lack of sexual activity, smoking, occasional alcohol consumption, diagnosis of depression, having undergone hysterectomy, and experiencing bone fractures (Table 1). In the multivariate analysis, all the aforementioned factors,

except smoking (p = 0.090), were considered independent variables associated with HRQOL in the menopause and health domain (Table 3).

The psychological domain had a score of 42.2 (SD: 27.9) and its lower HRQOL was associated with younger age, obesity, perimenopausal status, not being of Latin American ethnicity, lower education level, not having a partner, not being employed, lack of sexual activity, smoking, being a non-drinker or occasional drinker, diagnosis of depression, having undergone hysterectomy and oophorectomy (Table 1). In the multivariate analysis, all these factors except early menopause, ethnicity, having undergone hysterectomy and oophorectomy, education level (p = 0.054) and smoking (p = 0.081), were considered independent variables associated with HRQOL in the psychological domain (Table 4).

The domain related to the sexuality had a score of 48.6 (SD: 24.6), being the more affected domain, and the lower HRQOL was associated with younger age, perimenopausal status, being of Latin American or White ethnicity, lower education level, not having a partner, being retired, not having regular sexual intercourse, being a non-drinker, being diagnosed of depression, and having undergone oophorectomy (Table 1). In the multivariate analysis, all these factors were considered independent variables associated with HRQOL in the sexual domain (Table 5).

The partner domain had a score of 25.6 (SD: 25.6). This domain was the best one and the lower HRQOL was associated with postmenopausal status, not having a partner, being unemployed or retired, no sexual activity or only masturbation, smoking, having a diagnosis of depression, and experiencing bone fractures (Table 1). In the multivariate analysis, all these factors except smoking (p = 0.091) were considered independent variables associated with HRQOL in the partner domain

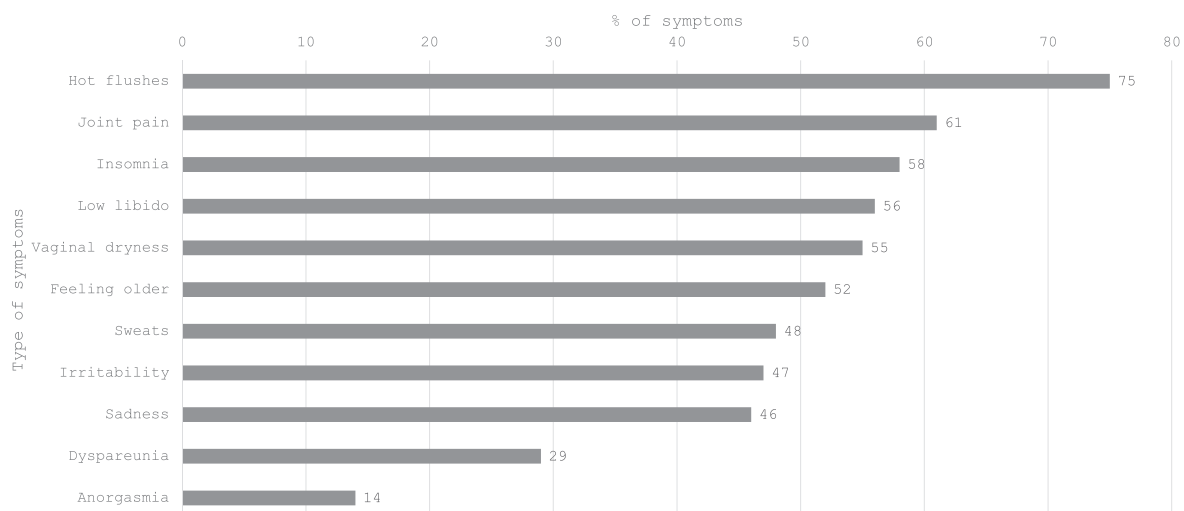


Fig. 1. Percentage of menopausal symptoms reported by the Spanish women in the app “Mi Menopause”.

Table 2
Multivariate analysis of the variables associated with the quality of life measured by Global Cervantes sort-form.

Global	B	Error	Beta	t	signification	95%CI for B Inferior	95%CI for B superior
(Constant)	60.91	2.09		29.12	<0.001	56.81	65.01
Age (linear Increment per year)	-0.29	0.04	-0.10	-7.51	<0.001	-0.36	-0.21
BMI ≥ 30 vs <30 kg/m ²	1.68	0.64	0.03	2.65	0.008	0.44	2.93
Peri vs postmenopause	1.11	0.45	0.03	2.44	0.015	0.22	2.00
University studies vs no	-1.05	0.44	-0.03	-2.39	0.017	-1.91	-0.19
Stable partner vs no	-2.76	0.65	-0.06	-4.25	<0.001	-4.03	-1.49
Sexual intercourse vs no	-8.25	0.80	-0.19	-10.37	<0.001	-9.81	-6.69
No sexual relationship vs any	5.86	1.00	0.10	5.89	<0.001	3.91	7.81
Diagnosis of depression / anxiety vs no	8.34	0.51	0.21	16.31	<0.001	7.34	9.35
hysterectomized vs no	1.87	0.90	0.03	2.07	0.038	0.10	3.64
Any bone fracture vs no	1.51	0.71	0.03	2.13	0.033	0.12	2.90

R [2]: 0.163. BMI: body mass index.

Table 3
Multivariate analysis of the variables associated with the quality of life measured by Menopause-Health domain of the Cervantes sort-form scale.

Menopause-Health	B	Error	Beta	t	signification	95%CI for B Inferior	95%CI for B superior
(Constant)	59.01	2.57		23.00	<0.001	53.98	64.04
Age (linear Increment per year)	-0.32	0.05	-0.10	-7.01	<0.001	-0.41	-0.23
BMI ≥ 30 vs <30 kg/m ²	4.20	0.80	0.07	5.23	<0.001	2.63	5.78
Caucasic vs others	-2.03	0.87	-0.03	-2.32	0.020	-3.74	-0.31
University studies vs no	-4.10	0.57	-0.10	-7.26	<0.001	-5.21	-2.99
Laboral active vs no	-1.52	0.74	-0.03	-2.07	0.039	-2.97	-0.08
No sexual relationship vs any	5.47	0.94	0.08	5.79	<0.001	3.62	7.32
Smoker vs no	1.20	0.71	0.02	1.70	0.090	-0.19	2.58
Diagnosis of depression / anxiety vs no	7.84	0.65	0.16	12.12	<0.001	6.57	9.11
hysterectomized vs no	3.71	1.13	0.04	3.27	0.001	1.49	5.94
Any bone fracture vs no	2.32	0.90	0.03	2.59	0.010	0.56	4.08

R [2]: 0.077. BMI: body mass index.

Table 4
Multivariate analysis of the variables associated with the quality of life measured by psychological domain of the Cervantes sort-form scale.

Psychological	B	Error	Beta	t	signification	95%CI for B Inferior	95%CI for B superior
(Constant)	76.68	3.73		20.55	<0.001	69.37	84.00
Age (linear Increment per year)	-0.59	0.07	-0.13	-9.10	<0.001	-0.72	-0.47
BMI ≥ 30 vs <30 kg/m ²	3.54	1.09	0.04	3.25	0.001	1.41	5.67
Peri vs postmenopause	-3.28	0.77	-0.06	-4.27	<0.001	-4.79	-1.78
University studies vs no	-1.48	0.77	-0.03	-1.93	0.054	-2.98	0.03
Laboral active vs no	-2.77	1.00	-0.04	-2.77	0.006	-4.73	-0.81
Sexual intercourse vs no	-5.11	1.26	-0.07	-4.04	<0.001	-7.59	-2.63
No sexual relationship vs any	5.25	1.71	0.05	3.08	0.002	1.90	8.59
Smoker vs no	1.67	0.96	0.02	1.75	0.081	-0.21	3.55
Diagnosis of depression / anxiety vs no	16.70	0.88	0.25	19.01	<0.001	14.97	18.42

R [2]: 0.117. BMI: body mass index.

Table 5
Multivariate analysis of the variables associated with the quality of life measured by sexuality domain of the Cervantes sort-form scale.

Sexuality	B	Error	Beta	t	signification	95%CI for B Inferior	95%CI for B superior
(Constant)	49.57	1.60		30.90	<0.001	46.42	52.71
Peri vs postmenopause	4.24	0.64	0.09	6.63	<0.001	2.99	5.49
Caucasic vs other	3.80	1.04	0.05	3.66	<0.001	1.77	5.83
Asiatic vs other	10.59	5.66	0.02	1.87	0.062	-0.52	21.69
University studies vs no	2.32	0.66	0.05	3.52	<0.001	1.03	3.61
Stable partner vs no	3.66	0.98	0.05	3.75	<0.001	1.75	5.58
Sexual intercourse vs no	-14.81	1.20	-0.23	-12.35	<0.001	-17.16	-12.46
No sexual relationship vs any	9.07	1.50	0.11	6.06	<0.001	6.13	12.00
Occasional / frequent alcohol consumer vs no	-1.93	0.65	-0.04	-2.95	0.003	-3.21	-0.65
Diagnosis of depression / anxiety vs no	3.75	0.77	0.06	4.88	<0.001	2.24	5.25

R [2]: 0.116.

(Table 6).

4. Discussion

This study is the first to evaluate HRQOL and its associated factors in

a large cohort of peri- and postmenopausal Spanish women. The findings revealed a moderate decline in QOL, with 1 in 4 women experiencing significant impairment due to menopausal symptoms.

The mean Cervantes-SF score of 40.1 (SD: 16.8) observed in our study aligns with results from another population-based survey that

Table 6

Multivariate analysis of the variables associated with the quality of life measured by partner domain of the Cervantes sort-form scale.

partner	B	Error	Beta	t	signification	95%CI for B Inferior	95%CI for B superior
(Constant)	63.31	2.08		30.39	<0.001	59.23	67.40
Peri vs postmenopause	1.50	0.66	0.03	2.29	0.022	0.22	2.79
Stable partner vs no	-25.91	1.80	-0.20	-14.40	<0.001	-29.44	-22.38
Laboral active vs no	2.73	0.87	0.04	3.15	0.002	1.03	4.43
Sexual intercourse vs no	-19.31	1.04	-0.26	-18.50	<0.001	-21.35	-17.26
Smoker vs no	1.49	0.88	0.02	1.69	0.091	-0.24	3.22
Diagnosis of depression / anxiety vs no	3.52	0.80	0.06	4.39	<0.001	1.95	5.09
Any bone fracture vs no	2.40	1.11	0.03	2.17	0.030	0.23	4.58

R [2]: 0.116.

utilized the same scale [10]. Additionally, the percentage of women scoring above the 75th percentile (26.6 %) corresponds with the prevalence of more severe menopausal symptoms and their impact on HRQOL, as reported in a Spanish survey conducted by the market research company Sigma Dos, which included 1073 peri- and postmenopausal women aged 40–70 years. [11]. Our study confirms the impact of various sociodemographic factors on HRQOL during peri- and postmenopause, highlighting that these factors may vary depending on the specific domain of the Cervantes-SF scale affected.

Aging has a negative impact on HRQOL, showing a trend toward declining HRQOL as age advances [8], however, a study in Spanish population found no association between the age and Cervantes SF scores [10]. In contrast, our study revealed that younger participants had worse outcomes (higher scores) on the Cervantes-SF scale, indicating lower HRQOL related to menopausal symptoms. These findings align with the observed pattern of worse HRQOL in perimenopausal women and early menopause, as well as the negative correlation with the age of menopause. A survey of 279 women aged 51 to 55 years found a trend of HRQOL deteriorating from pre- to perimenopause, followed by a slight improvement in postmenopause [12]. This pattern can be explained by the fact that the menopausal transition has a more profound impact on HRQOL than postmenopause, during which the most bothersome symptoms, such as VMS, tend to decrease over time, even though genitourinary syndrome of menopause (GSM) may worsen [2,13].

Obesity was associated with a decline in HRQOL, particularly in the global score and the menopause/health and sexual domains. It is well-established that overweight and obesity tend to increase during menopause, placing women at greater risk of complications during this phase of life [14]. The impact on the menopause/health domain may be linked to the higher prevalence of VMS in obese individuals. Regarding obesity and sexual desire, a cross-sectional study of 521 Spanish women found no significant differences in sexual desire across BMI categories [15], contrasting with another study that reported an inverse relationship between obesity and sexual functioning [16]. Furthermore, obesity not only increases the risk of low HRQOL but also elevates the risk of mortality from conditions such as heart disease, stroke, certain cancers, respiratory and kidney diseases, and type 2 diabetes, all of which negatively affect HRQOL. These findings highlight the importance of providing personalized, multidisciplinary counseling to monitor and address the effects of obesity and its treatment on women's health [17].

Ethnicity was assessed in this study; however, the results lack sufficient statistical power to draw solid conclusions due to the small sample size of non-Caucasian participants. Nonetheless, Caucasian women demonstrated lower HRQOL in the menopause/health and sexual domains in multivariate analysis. The SWAN study identified African American women, followed by Hispanic and Caucasian women, as having more frequent and persistent VMS, what could be related with the findings in menopause/health domain [13]. In our study, Asian women exhibited lower HRQOL in the sexual domain during peri- and postmenopause. This may be linked to the acculturation of Asian women in our country. A cross-sectional study in Canada found that Euro-

Canadian women had significantly greater sexual knowledge and experience, more liberal attitudes, and higher levels of desire, arousal, sexual receptivity, and sexual pleasure compared to women of Asian origin. Asian women reported significantly higher anxiety about anticipated sexual activity; however, there were no significant differences between the groups in relationship satisfaction or problems with sexual function [18].

A low educational level was associated with reduced HRQOL, both globally and across all domains of the Cervantes-SF scale (indicated by higher scores), except in the partnership domain. In contrast, women with university-level education achieved the highest HRQOL (lowest scores) in global and all scale domains, except in the sexual domain, where, interestingly, it was an independent factor for lower HRQOL. A Spanish multicenter cross-sectional study involving 2355 women revealed poor knowledge about menopause and demonstrated that factors such as age, postmenopausal status, early menopause, educational level, type of healthcare, and sources of information significantly influenced menopause-related knowledge [19]. Lack of awareness about menopause, its symptoms, and available treatments are recognized as a major barrier to seeking help and adhering to healthcare providers' advice. This lack of knowledge could explain the lower HRQOL in women with lower educational level, and vice versa, and may also contribute to the low prevalence (up to 5.3 %) of menopausal hormone therapy (MHT) use in Spain [2].

Having a partner, particularly a permanent one, was associated with higher HRQOL both globally and across all domains. Additionally, sexual activity of any kind, but especially intercourse, has been linked to better HRQOL during menopause and was an independent factor in reducing the impact of menopausal symptoms across all domains in our study. A survey conducted during the Coronavirus 19 (COVID-19) lockdown among 2430 peri- and postmenopausal women highlighted the importance of cohabitation and sexual activity for menopause-related QOL [10]. Sexual distress tends to peak at midlife, decline with age, and is strongly influenced by the presence of a partner. Many postmenopausal women remain sexually active, particularly if they are in a stable relationship [20]. Sexual dysfunction involves an impairment in sexual response and pleasure leading to discomfort, while sexual distress centers on negative emotions related to sexual function. Distress is crucial for diagnosing sexual dysfunctions but can also occur independently and the sexual discomfort may not necessarily result in dysfunction unless accompanied by distress [21]. Two studies have identified a clear relationship between HRQOL, as measured by the Cervantes-SF scale, and sexual dysfunction. In these studies, HRQOL was positively correlated with sexual satisfaction and desire [15,22]. Sexuality appears to be significantly affected by menopause, primarily due to symptoms of GSM and reduced libido [2]. These issues can also affect partner relationships and increase discomfort, contributing to a decline in HRQOL during menopause. We found a similar prevalence of vaginal dryness (55 %) and low libido (56 %) in our sample, suggesting a possible association. However, low libido is often influenced more by emotional factors than by physical discomfort, so this relationship could be coincidental. Dyspareunia had a lower prevalence (29 %) compared to vaginal dryness. This apparent lack of association may be due to the

absence of data on the severity of vaginal dryness and the use of lubricants during intercourse. Moreover, the presence of VMS, GSM, and sexuality-related symptoms has been associated with a higher likelihood of seeking treatment [2], especially MHT because this treatment option is more demanded by those women with lower HRQOL [23].

Being employed or a housewife were both conditions associated with better HRQOL across all domains of the Cervantes-SF scale. However, these conditions were identified as independent factors for better HRQOL only in the menopause/health and psychological domains. In contrast, being employed was linked to worse HRQOL in the partnership domain. Although menopausal symptoms significantly affect women's daily activities and work productivity [24], our findings suggest that feeling useful and keeping the mind engaged, whether through employment or housework, improves HRQOL during menopause compared to being retired. A study involving 308 peri- and postmenopausal women using the Cervantes-SF scale found that a 6.7-point change in the global scale was indicative of a significant increase in disability related to work and daily activities. This included greater economic losses due to decreased work productivity, fewer years of disability-free life expectancy, reduced hours of undisturbed sleep, and more frequent visits to physicians annually due to menopausal symptoms [25].

Smoking significantly impacted HRQOL across all domains of the Cervantes-SF scale, except for the sexual domain, which was borderline significant in multivariate analysis. Smoking has been linked to poor overall QOL, particularly during menopause, and also exacerbates other health factors that impair HRQOL. A cross-sectional study included 513 consecutive midlife women showed that longer duration of smoking, but not number of cigarettes smoked per day, was associated with worse HRQOL using the MENQOL scale. In addition, observed that menopausal symptoms were significantly less bothersome for women who smoked <10 years [26]. Smoking is often correlated with alcohol consumption; however, in our study, drinking alcohol had the opposite effect. Frequent or moderate alcohol consumption was associated with better HRQOL during menopause and was identified as an independent factor for improved HRQOL in the sexual domain. Nevertheless, women are more vulnerable to alcohol's harmful effects and tend to develop alcohol-related diseases earlier than men, a risk that is increased during the menopausal transition [27]. A survey of 3421 women aged 41–54 years found that a lower educational level was associated with poorer QOL, and retired women reported more symptoms than working or unemployed women, while unemployed women reported more symptoms than employed women. Additionally, higher BMI was associated with lower QOL. Women who consumed alcohol occasionally reported fewer symptoms, whereas those who drank weekly reported more symptoms than abstainers. Smokers, regardless of frequency, experienced more symptoms than nonsmokers [28].

We found a high rate of depression among women (22%), and it was independently associated with poor HRQOL across all domains during menopause. This association has also been observed in another national survey using the Cervantes SF scale [10]. A significant number of women experience sadness, mood changes, melancholy, and depression during the menopausal transition. However, there is limited understanding and management of these complex mental health issues, despite their impact, including early departure from the workforce due to menopause-related depression and anxiety [29]. Depression during the menopausal transition is particularly noteworthy. A study involving 90 perimenopausal women with depression and 51 controls found that depressed women reported significantly lower QOL, less social support, poorer adjustment, and increased disability compared to non-depressed perimenopausal women. The authors also noted that the reduction in QOL during menopause is similar to the decline seen in women with depression at other stages of life [30].

Undergoing hysterectomy or oophorectomy was a factor contributing to lower HRQOL, but it was only independently associated with the global score and the menopause/health domain. The abrupt onset of

menopause due to castration is a key factor explaining this finding, particularly impacting the menopause/health domain, where VMS are the primary concern. Surgical menopause tends to result in a more rapid increase in VMS and a more pronounced sense of aging compared to natural menopause. A systematic review found that oophorectomy (often performed for ovarian cancer prevention) significantly impaired menopause-specific QOL and sexual function, especially in the absence of MHT [31].

Suffering a bone fracture was associated with the global score, menopause/health, and partnership domains. This finding could be related to the pain, discomfort, and disability caused by the fracture. Alleviating pain through treatment for osteoporotic fractures has been linked to an improvement in HRQOL [32].

The primary strength of this study is its large sample size (6833 women), making it the largest study on HRQOL in Spanish menopausal women. This enhances the external validity of the findings and increases confidence in the generalizability of the results to the Spanish population. Additionally, this study is novel, as it is the first to evaluate HRQOL and its associated factors in a representative population of middle-aged Spanish women.

The primary limitations of this study include the challenge of defining perimenopausal status. While postmenopausal status is relatively easy to define, perimenopause presents complexities, especially in cases of hysterectomy with at least one ovary retained. The STRAW criteria recommend in those cases quantifying serum FSH levels [33], but this was not feasible as the data were self-reported by participants. We think that the characteristics and utility of the app make unlikely its use by a significant number of women who were not at least perimenopausal. In any case, there were 214 cases of hysterectomy without oophorectomy; of these, 45 had cancer and were postmenopausal due to the treatment, 72 were over age 55, and 22 exhibited menopausal symptoms. The remaining 75 cases were considered perimenopausal, representing 1% of the sample, with minimal impact on overall results, but to avoid bias they were excluded due to confusing data.

Additional limitations include those inherent to self-administered questionnaires or surveys, such as potential inaccuracies in responses or unanswered items due to participants' misunderstandings or lack of medical guidance. Furthermore, given our findings on sexual activity, the absence of questions about sexual orientation limits the study's conclusions regarding sexuality.

This study has relevant implications for clinical practice, because it reinforces the importance of assessing HRQOL in menopausal women using the Cervantes-SF scale. The identification of factors associated with lower HRQOL can help health professionals to implement personalized preventive and treatment strategies. The Cervantes-SF scale can also be used to monitor response to therapeutic interventions and adjust treatment as needed.

5. Conclusions

In summary, these new data complement and enhance the validity of the Cervantes SF scale as a tool for measuring HRQOL in menopausal women. The results of this large study clearly indicate that the HRQOL of peri- and postmenopausal Spanish women can be improved and is associated with various sociodemographic and lifestyle factors, particularly sexual activity and diagnoses of depression or anxiety.

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Contributors

Pluvio J. Coronado participated in conception and design, data collection, coordination, statistical analysis, preparation of manuscript and drafting and editing of the paper.

María Fasero participated in conception and design, statistical analysis and preparation of manuscript and drafting and editing of the

paper.

Nicolás Mendoza, Silvia P. González, Sonia Sánchez-Méndez, Jesús Presa, Ana R. Jurado, Esther de la Viuda, Francisco Quereda contributed to conception and design, preparation of manuscript and drafting and editing of the paper.

All authors saw and approved the final version and no other person made a substantial contribution to the paper.

Ethical approval

This study was approved on January 13th, 2021, by the Ethics Committee of the Hospital Clínico San Carlos in Madrid, with approval number 20.391-E.

Provenance and peer review

This article was not commissioned and was externally peer reviewed.

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Declaration of competing interest

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Data availability

There are no linked research data sets for this paper. Research data are available at the Asociación Española para el Estudio de la Menopausia (AEEM) (aeem@aeem.es).

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