BMC Women's Health

RESEARCH

Open Access

Validation of the menopause representation questionnaire (MenoSentations-Q) among Iranian women and cross-cultural comparison with Portuguese women

Zahra Arab Borzu[1], Mahmood Karimy[2], Mafalda Leitão[3], Filipa Pimenta[3], Rita Albergaria[3], Zahedeh Khoshnazar[4] and Parisa Hosseini Koukamari[2*]

Abstract

Background Menopause represents a critical stage in middle. Examining menopausal symptoms within healthcare system requires reliable and valid instruments. The Menopause Representations Questionnaire (Menosentations-Q) is a self-report scale grounded in Leventhal's self-regulation model. This study aimed to explore the psychometric properties of this questionnaire among Iranian women.

Methods This study was conducted with women visiting healthcare centers in Saveh, Markazi province, Iran. A total of 320 eligible Iranian women and 354 Portuguese women (aged 45–65) completed the questionnaire. Structural validity was assessed using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Internal consistency was evaluated through Cronbach's alpha and McDonald's omega. Convergent and divergent validity were determined using average shared variance, maximum shared variance, construct reliability, and Fornell and Larcker's method. Cross-cultural validity was performed by multigroup CFA to assess invariance between two culturally distinct samples (Iranian and Portuguese).

Results The Content Validity Ratio (CVR) and Content Validity Index (CVI) were 0.96 and 0.98, respectively, indicating strong content and face validity. EFA of 22 items revealed four factors-identity, positive and negative consequences, and control/awareness/cause factors, accounting for 61.29% of the total variance. CFA indicated good model fit (CFI = 0.96, TLI = 0.95, $\chi 2/df = 1.74$, GFI = 0.91, AGFI = 0.89, RMSEA = 0.04). Cronbach's alpha (0.90) and McDonald's omega (0.92) indicated good internal consistency. Convergent and discriminant validity values of MenoSentations-Q were also acceptable. Also, the instrument showed invariance between the two cultural groups.

Conclusions The Persian adaptation of MenoSentations-Q demonstrated strong validity and reliability. Furthermore, the comparable responses between Portuguese and Iranian participants suggest shared representations of menopause across these cultures. Given the significance of menopause, tailored educational programs and interventions are essential to address potential challenges during this life stage. Employing standardized tools such as the Menopsentations-Q can support the development of effective strategies, including educational initiatives, support programs, and targeted interventions, to empower women and enhance their well-being during this transitional phase.

Keywords Menopause, Questionnaires, Psychometrics, Reliability and Validity, Women

*Correspondence:
Parisa Hosseini Koukamari
P.hosseinik@gmail.com
Full list of author information is available at the end of the article

Introduction

The World Health Organization (WHO) defines menopause as the permanent cessation of menstruation resulting from the loss of ovarian follicular function and a decline in endogenous oestrogen level [1]. Studies indicate a rapid increase in the global population of middle-aged women, with projections suggesting that the number of menopausal and postmenopausal women will reach 1.2 billion by 2030 [2, 3]. In Iran, the population of women aged 40 to 60 years is expected to increase to approximately 17 million by 2026 [4]. Most women experience menopause between the ages of 40 and 58 [2], with the average age of menopause estimated at 48 years in Iran [5], 50 years in Portugal [6], and 51 years globally [2].

Menopause represents a natural phase in the reproductive life cycle, during which women spend approximately one-third of their lives in the postmenopausal phase, impacts their health and quality of life [2]. Menopausal women experience a variety of sexual, psychosocial [7], and physiological changes, such as hot flashes, insomnia, weight gain, bloating, mood swings, menstrual irregularity, breast discomfort, depression, and headaches [3]. These changes can disrupt daily life and make women vulnerable to physical and psychological clinical conditions [8]. According to a systematic review, vasomotor symptoms are among the most prevalent menopausal symptoms in many societies [9].

Interest in menopause has traditionally centered on medical and biological perspectives, often overlooking the psychological and individual factors that play crucial roles. This narrow focus has resulted in the development of tools that assess menopausal symptoms without adequately addressing the diverse experiences and perceptions of women during this life stage. A more holistic approach is necessary to understand the complex changes associated with menopause and how women perceive and manage this transition. Based on Leventhal's self-regulation model (1984), this approach considers individual differences in coping with menopausal symptoms. This model divides menopausal representations into five cognitive components: Identity—labels and symptoms associated with menopause; Timeline – perceptions of symptom duration (acute, chronic, or cyclical); Cause—beliefs about the causes of menopause and its symptoms; Control/treatment – self-management of menopausal symptoms (preventable, treatable, or controllable); and, Consequences- beliefs about the impact and severity of menopause.

Several tools have been used to assess menopausal manifestations, such as the Women´s Health Questionnaire [10], the Greene Climacteric Scale [5], the Menopause-specific Quality of Life Questionnaire [7], the Utian Quality of Life [8], Illness Perception Questionnaire [11], the Climacteric Adjustment Questionnaire [12], Beliefs about menopause [13], Menopause-related quality of life [11, 12], and Menopausal representations [14]. While these tools address specific aspects of menopause, the Menopause Representations Questionnaire-MRQ [14], attends out for its focus on exploring women's thoughts, beliefs, coping strategies, and emotional responses related to menopause. The Menopause Representations Questionnaire measure (MenoSentations-Q) was developed based on several sources: 1) the work of Hunter and O'Dea [14],which emphasized Identity, Consequences, and Control as the most relevant components of Lenventhal´s self-regulation model, and this valuable for explaining individual/cultural differences regarding the menopausal experience), 2)a qualitative study exploring menopause representations in Portuguese women [15], and 3) the cognitive components of the Self-Regulation Model [16–18]. Initially developed and validated in Portugal, the original version of the MRQ (MenoSentations-Q) contained 53 items theoretically distributed across five factors: identity (17 items), cause (3 items), control (7 items), timeline (4 items), and consequences (22 items). The final version has 22 Items.

What distinguishes the MenoSensations-Q from other tools is its emphasis on cognitive manifestations, including positive and negative consequences, and how to control these manifestations, making it valuable for epidemiological studies and health interventions. Given the inevitability of menopause and the wide range of symptoms and complications women may experience, identifying their cognitive representations and preparing them for this life stage can significantly enhance their quality of life and well-being.

This study aimed to translate the English version of the MenoSentations-Q into Persian and evaluate its psychometric properties among Iranian women. Also, the study sought to assess the measurement invariance of the MenoSentations-Q across two culturally distinct samples (Iranian and Portuguese).

Materials and methods

Study design and participants

The cross-sectional study was performed on 320 Persian-speaking women, aged 45 to 65, who attended health centers associated with Saveh University of Medical Sciences (collected from 23 October 2022 to 19 February 2023). The Portuguese sample comprised 354 women aged 45 to65 years (collected from 2019 to 2020 through community settings and online platforms in Portugal).

Sampling procedure

According to Cattell's (1988) guideline, it is recommended to have 3 to 6 individuals per variable for

exploratory factor analysis[19]. Additionally, since the questionnaire averages 5 items per factor, the sample size for confirmatory factor analysis should exceed 100 individuals[20]. Based on these considerations, our sample sizes for confirmatory and exploratory factor analyses were 167 and 153 individuals, respectively. Accordingly, 320 eligible Iranian participants and 354 Portuguese participants were included in this study. A convenience non-probabilistic sampling methods was employed. The Iranian sample was selected using electronic records from Saveh University of Medical Sciences, available on the SIB Database of the Iran Ministry of Health (Integrated Health System). The Portuguese sample was recruited through community settings and online platforms.

The inclusion criteria for both samples were: (1) sex (women only), (2) nationality (Iranian or Portuguese), (3) age (between 45 and 65 years), and (4) literacy skills. The exclusion criteria was the presence of cognitive/mental disabilities. Participants were provided with a detailed explanation of the study´s objectives, and questionnaires were distributed after obtaining written informed consent.

Ethical considerations

This study was approved by the Ethics Board of Saveh University of Medical Science, Saveh, Iran (Ethic Code: IR.SAVEHUMS.REC.1401.016). Written informed consent was obtained from all participants prior to their inclusion in the study. All procedures were conducted in strict compliance with the guidelines and regulations of Saveh University of Medical Sciences. The Portuguese study was approved by the Ethical Committee of Ispa — Instituto Universitário (Ethics Code: D/012/01/2019), and all participants read and agreed to the informed consent form before filling out the research protocol.

Questionnaire

The data collection instrument consisted of two parts. The first part included a demographic questions on age, education level, marital status, employment categories, and menopausal status. The second part comprised the MenoSentations-Q, a 22-item self-report questionnaire divided into four subscales: identity, includes the labels and symptoms attributed to menopause, such as hot flashes and night sweats, menstrual changes, and more general symptoms (e.g., anxiety;9 items), consequences, assess the perceived severity and impact of menopause, divided into Negative Consequences (4 items; effects on a women's sense of self) and Positive Consequences (4 items; e.g. a relief regarding menses cessation and the end of reproductive life), and control/awareness/cause regards perceived self-management of menopause and menopause-related causes (5 items). Responses were rates on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scoring ranges for each subscale are: identity (9 to 45), negative consequences (4 to 20), positive consequences (4 to 20), and control/awareness/cause (5 to 25). The total score for the MenoSensations-Q ranges from 22 to 110 [21].

Validity procedure in Iranian sample

The MenoSentations-Q scale underwent a rigorous validation process to assess its psychometric properties, including translation and back-translation, content validity, face validity, Structural validity, convergent and discriminant validity, and reliability assessments.

Translation/Cultural Adaptation Section

To translate the English version of the MenoSentations-Q into Persian, Beaton's guidelines [22] were followed. First, written permission was obtained from Filipa Pimenta, one of the principal authors of the original scale. Two bilingual experts, fluent in both Persian and English, independently translated the questionnaire. Afterward, the translators and the lead researcher compared and reconciled the translated versions. Any discrepancies or differences in translation were discussed and resolved to create a unified Persian version of the questionnaire.

In the next stage, the Persian version was back-translated into English by two native English speakers who were fluent in Persian. An expert committee, including all the translators, the lead researcher, two health education and promotion experts, and a biostatistician, reviewed and resolved any discrepancies before approving the final version of the questionnaire.

Face and Content Validity

After completing the translation process, the study evaluated the face and content validity of the Persian version of the MenoSentations-Q. To evaluate face validity, 20 participants from the target population, recruited from comprehensive health centers, were interviewed. The descriptive characteristics of the participants involved in the face validity assessment are presented in Table 1. The interviews were conducted by PH,an assistant professor. Participants were provided with copies of the MenoSentations-Q questionnaire, and throughout the interviews, they examined the suitability, clarity, relevance, and comprehensiveness of the questionnaire's items in relation to their experiences. Participants were asked the following questions: 1. What are their initial impressions of this questionnaire? 2. Are the questions and response choices worded? 3. Is this questionnaire relevant to menopausal women? 4. Is it sufficiently comprehensive? 5. is it easy

Table 1 Descriptive characteristics of Iranian participants in face validity

Variable	Frequency
45–50 years	10
51–60 years	10
>60 years	0
Marital status	
Married	18
Separated/divorced/widow	2
Single	0
Employment categories	
Housewife/Retired	18
Employee	2
Other	0
Education level	
Primary school	7
Middle school	3
High school	2
University degree	8
Menopausal status	
Premenopausal	6
Perimenopausal	4
Postmenopausal	10

to fill out? Participants were provided with an information sheet before the interviews. Written consent was obtained during the interview before any data collection. Face validity was assessed through both qualitative and quantitative analyses, which incorporated feedback from the target group and experts. The expert panel critically reviewed the findings, emphasizing difficulties encountered and suggestions from subjects. Based on this feedback, a final version of the questionnaire was developed and later subjected to further validity and reliability testing.

Content validity assesses how well the selected items represent the construct being measured. Both qualitative (expert committee review) and quantitative measures (content validity ratio [CVR] and content validity index [CVI]) were performed to determine the validity of the scale's items. The items were organized in a content validity assessment form for evaluation. Also, to qualitatively assess the content validity, the questionnaire was initially sent via email to specialists (a panel of 10 experts specializing in reproductive health, with an average experience of 12 years in university and healthcare systems, as well as health education & promotion three professors in university with an average of 10 years experiences, and three psychologists in the healthcare system, with an average of 7 years of experience). These experts provided feedback on the wording, appropriateness of terms, the importance of the questions, and the placement of the items within their proper context. Adjustments were made to the questionnaire based on their feedback. Subsequently, CVR and CVI were employed to confirm the significance of each item and select the most appropriate content [23].

To achieve this, experts were provided with the questionnaire divided into two main sections. The first section evaluated CVI based on the method proposed by Waltz and Basel [24]. Experts rated each item´s relevance, clarity, and simplicity on a 4-point Likert scale: 'not relevant,' 'somewhat relevant,' 'relevant,' or 'relevant.' The CVI was determined by dividing the number of experts rating an item as 3 or 4, by the total number of experts. Items with a CVI greater than 0.79 were considered acceptable [25].

The second section involved the CVR, where experts assessed each item´s necessity on a 3-point Likert scale: 'necessary,' 'useful but not necessary,' or 'not necessary.' According to the Lawshe table for a panel of 10 experts, a CVR greater than 0.62 indicated the item´s necessity [26].

Structural validity assessment through exploratory and confirmatory factor analysis

In this study, structural validity was assessed through a two-step process involving exploratory factor analysis (EFA) followed by confirmatory factor analysis (CFA) to validate the proposed factor structure [27]. The total sample was randomly split into sub-samples: EFA was conducted on the first sub-sample, and CFA was performed on the second sub-sample. The characteristics and scales ranges of the split sample are shown in Tables 2 and 3.

The appropriateness of the data for EFA was assessed using the Kaiser-Meyer Olkin (KMO) criterion and Bartlett's sphericity test [28]. The KMO test evaluates the degree of variance among variables attributable to underlying factors, with values ranging from 0.8 to 1 indicating sufficient sampling for factor analysis. Values below 0.7 suggest inadequate sampling, requiring corrective measures [29]. Bartlett's sphericity test assesses the suitability of data for factor analysis, where statistical significance indicates that the data is appropriate for this type of analysis [30]. EFA was conducted using the Maximum likelihood method with Promax rotation to extract factors from the 22-item questionnaire. The number of factors was determined based on existing literature supporting four factors and criteria such as Eigenvalue > 1 and screen plot. A minimum factor loading threshold of 0.3 was set for factor extraction.

CFA was performed using maximum likelihood estimation to evaluate the structural factors [31]. Fit

Table 2 Split sample characteristics in Persian version

Characteristics	Frequency (%) for the Iranian sample	CFA (*N*)	EFA (*N*)
45–50 years	147(45.1)	78	69
51–60 years	131(40.9)	68	63
> 60 years	42(13.1)	21	21
Marital status			
Married	293(91.6)	154	139
Separated/divorced/widow	9(2.8)	2	7
Single	18(5.6)	11	7
Employment categories			
Housewife/Retired	269(84.3)	137	132
Employee	34(10.7)	19	15
Other	16(5)	10	6
Education level			
Primary school	189(59.1)	102	87
Middle school	44(13.8)	17	27
High school	31(9.7)	16	15
University degree	56(17.5)	31	25
Menopausal status			
Premenopausal	72(22.5)	41	31
Perimenopausal	141(44.1)	72	69
Postmenopausal	107(33.4)	54	53

indices were evaluated based on recommendations by Jaccard and Wan (1996) and Meyers et al. (2016)[32]. These included root mean square error of approximation (RMSEA), normed fit index (NFI), comparative fit index (CFI), goodness of fit index (GFI), incremental fit index (IFI), Tucker-Lewis index (TLI), and CMIN/df index. Values greater than 0.90 for CFI, GFI, NFI, TLI, and IFI, along with RMSEA ≤ 0.08 and CMIN/DF ≤ 3, were considered indicative of a good model fit.

Convergent & Discriminant validity

Discriminant validity was rigorously evaluated using the Fornell and Larcker criterion [33]. Additionally, the Maximum Shared Squared Variance (MSV) and Average Shared Square Variance (ASV) were employed to ensure the distinctiveness of the latent factors. Convergent validity was established by comparing the Composite Reliability (CR) with the Average Variance Extracted (AVE) for each latent factor.

Reliability

The reliability of the measurement model was assessed using Cronbach's alpha and Macdonald's omega coefficients [34]. A value higher than 0.7 was considered acceptable.

Cross-cultural measurement invariance in Iranian and Portuguese women

The Cross-cultural invariance analysis of the MenoSentations-Q between two culturally distinct samples (Iranian and Portuguese) was conducted through multigroup analysis, following the recommendations for ordinal variables [35]. Given the high sensitivity of the Chi-square (X^2) statistic to sample size, the ΔCFI differences criterion was used instead. Specifically, values of $|\Delta CFI| < 0.01$ (specifically CFI_{metric}-$CFI_{configural}$ and CFI_{scalar}-CFI_{metric}) indicate measurement invariance[36]. Additionally, the mean scores of bothe samples were compared using a t-student test for independent groups. Levene´s test was applied to determine the homoscedasticity.

Normal distribution of data, outliers, and missing data

Various statistical methods were employed to evaluate normal distribution, outliers, and missing data. Skewness and kurtosis were used to assess univariate and multivariate data distributions, recommended by Maroco (2021).

Statistical Data Analyses

Data analyses were performed using the R program (R Core Team, 2016), with the *lavaan* (Rosseel, 2012) and *semTools* [37] Packages: Amos (v.18) and IBM SPSS Statistics 22 (IBM Corp., Armonk, NY, USA). A significance level of $p \leq 0.05$ was adopted. Descriptive and analytical indices were used to determine reliability, including the Mean (M) ± (SD: standard deviation (SD) for quantitative variables, CVR and CVI for content validity, CFA and EFA for structural validity; ASV, MSV, ASV, and Fornell and Larcker for convergent and discriminant validity. Cronbach's alpha and Mcdonald's omega coefficients were used to assess reliability.

Results

Demographic characteristics

The Iranian sample consisted of 320 women aged 45 to 65, with a mean (SD) age of 52.11 ± 6.19 years. Among the participants, 17% had a university degree, and 91.6% were married. Regarding menopausal status, 22.5% were premenopausal, 44.1% perimenopausal, and 33.4% postmenopausal. Table 4 presents a detailed description of the participants' characteristics.

The mean age of the Portuguese sample was 53.14 ± 5.60 years. Regarding menopausal status, 27.7% were in premenopause, 15.3% in perimenopause, and 57.1% in postmenopause, with 65% experiencing natural menopause. Also, 68% were married, and 41% held a university degree.

Table 3 Descriptive statistics of the items in persian version

	Mean (SD) (total)	Skewness (Kurtosis)	Domain	Total		CFA		Mean (SD)	Factor Loading	95% Confidence Interval for Mean	EFA		Mean (SD)	Factor loading	95% Confidence Interval for Mean	% of Variance
				max	min	max	min				max	min				
Q1	3.95 (1.2)	-0.99 (-0.22)	Identity M = 32.89 SD = 9.05	45	12	45	18	4.04 (1.21)	0.61	31.80,34.51 M = 33.16 SD = (8.88)	45	19	3.86 (1.27)	0.68	31.21,34.03 M = 32.62 SD = 9.19	35.13
Q2	3.60 (1.30)	-0.48 (-1.19)						3.70 (1.29)	0.67				3.50 (1.35)	0.64		
Q3	3.71 (1.25)	-0.68 (-0.86)						3.80 (1.20)	0.72				3.62 (1.28)	0.85		
Q4	3.57 (1.36)	-0.41 (-1.31)						3.69 (1.33)	0.77				3.46 (1.40)	0.76		
Q5	3.52 (1.39)	-0.46 (-1.26)						3.60 (1.35)	0.72				3.45 (1.43)	0.74		
Q6	3.42 (1.33)	-0.16 (-1.45)						3.56 (1.31)	0.76				3.29 (1.36)	0.74		
Q7	3.59 (1.31)	-0.61 (-0.94)						3.68 (1.30)	080				3.51 (1.33)	0.65		
Q8	3.44 (1.35)	-0.29 (-1.35)						3.55 (1.32)	0.81				3.34 (1.39)	0.73		
Q9	3.46 (1.38)	-0.31 (-1.36)						3.54 (1.37)	0.68				3.38 (1.40)	0.64		
Q10	3.46 (1.13)	-0.08 (-1/05)	Positive Consequences M = 13.49 SD = 3.96	20	4	20	6	3.53 (1.14)	0.82	12.97,14.14 M = 13.56 SD = 3.82	20	5	3.39 (1.11)		12.80,14.07 M = 13.43 SD = 4.13	4.06
Q11	3.27 (1.20)	-0.17 (-0.99)						3.28 (1.19)	0.70				3.26 (1.21)	0.55		
Q12	3.25 (1.27)	-0.23 (-0.82)						3.25 (1.18)	0.71				3.25 (1.16)	0.99		
Q13	3.42 (1.17)	-0.30 (-0.90)						3.50 (1.14)	0.65				3.35 (1.21)	0.81		
Q14	3.17 (1.28)	0.14 (-1.19)	Negative Consequences M = 13.05 SD = 4.84	20	4	20	5	3.19 (1.30)	0.89	11.99,13.41 M = 12.70 SD = 4.66	20	4	3.15 (1.27)	0.46	12.39,13.89 M = 13.43 SD = 4.13	15.75
Q15	3.13 (1.27)	0.11 (-1.13)						3.12 (1.27)	0.94				3.14 (1.28)	0.80		
Q16	3.17 (1.22)	0.23 (-1.14)						3.19 (1.21)	0.92				3.16 (1.24)	0.86		
Q17	3.16 (1.26)	0.18 (-1.08)						3.21 (1.29	0.85				3.12 (1.24)	0.89		

Table 3 (continued)

	Mean (SD) (total)	Skewness (Kurtosis)	Domain	Total		CFA		Mean (SD)	Factor Loading	95% Confidence Interval for Mean	EFA		Mean (SD)	Factor loading	95% Confidence Interval for Mean	% of Variance
				max	min	max	min				max	min				
Q18	4.27 (0.81)	-1.38 (2.46)	Control/ awareness/cause M = 21.39 SD = 3.34	25	9	25	10	4.32 (0.76)	0.58	20.86,21.85 M = 21.35 SD = 3.22	25	9	4.23 (0.86)	0.76	20.93,21.93 M = 21.43 SD = 3.28	6.34
Q19	4.43 (0.74)	-1.28 (1.39)						4.43 (0.75)	0.66				4.44 (0.73)	0.50		
Q20	4.19 (0.81)	-0.81 (0.52)						4.21 (0.82)	0.82				4.18 (0.81)	0.57		
Q21	4.07 (0.95)	-0.92 (0.52)						4.08 (0.94)	0.89				4.07 (0.96)	0.83		
Q22	4.29 (0.75)	-1.04 (1.42)						4.32 (0.75)	0.74				4.26 (0.77)			

Table 4 Descriptive characteristics of the Iranian and Portuguese participants

Characteristics	Frequency (%) for the Iranian sample	Frequency (%) for the Portuguese sample
45–50 years	147(45.1)	130(36.6)
51–60 years	131(40.9)	182(51.2)
> 60 years	42(13.1)	42(11.8)
Marital status		
Married	293(91.6)	241(68.1)
Separated/divorced/widow	9(2.8)	73(20.6)
Single	18(5.6)	35(9.9)
Employment categories		
Housewife/Retired	269(84.3)	24(6.8)
Employee	34(10.7)	297(83.9)
Other	16(5)	24(6.8)
Education level		
Primary school	189(59.1)	41(11.6)
Middle school	44(13.8)	49(13.8)
High school	31(9.7)	116(32.8)
University degree	56(17.5)	145(41)
Menopausal status		
Premenopausal	72(22.5)	97(27.4)
Perimenopausal	141(44.1)	54(15.3)
Postmenopausal	107(33.4)	202(57.1)

Content and Face Validity in Iranian Women

Following the qualitative validity assessment, item 13 was revised to better align with cultural context. The item was modified from "to have more sexual freedom" to "to have more freedom to have sexual intercourse with spouse". In the subsequent quantitative validity assessment, all items had impact scores greater than 1.5 (ranging from 2.3 to 4.7) and were retained. Feedback from professors and experts was implemented after the qualitative content validity assessment stage. The content validity of the tool was evaluated using the Lawshe method. The results indicated good content validity, with a content validity ratio (CVR) ranging from 0.6 to 1.00, and a content validity index (CVI) ranging from 0.7 and 1.00.

Structural-Related Validity in Iranian Women

Sampling adequacy was confirmed by the Kaiser–Meyer–Olkin (KMO) test, wich yielded a value of 0.91 ($p = 0.001$). Based on eigenvalues and scree plots (Fig. 1), four factors were extracted during EFA. Descriptive statistics, including skewness and kurtosis for univariate normality, are shown in Table 4. Item mean scores ranged from 3.20 to 4.47, with standard deviations between0.72 and 1.40. All skewness and kurtosis values fell within acceptable ranges for normality. The EFA yielded a four-factor solution, with 22 items explaining 61.29% of the total variance. Specifically, Identity (9 items) accounted for 5.87% of the variance; Positive Consequences (4 items) for 5.37%; Negative Consequences (4 items) for 6.33%; and Control/Awareness/Cause (5 items) for 5.19%. Table 3 provides detailed descriptive statistics and factor loadings for the items.

Confirmatory factor analysis (CFA), was conducted on the remaining sample ($N = 167$) using maximum likelihood estimation to validate the four-factor structure. The results confirmed the stability of the structure, with several fit indices supporting a good model fit. Specifically, the CFA results showed a P-value ≤ 0.001, CMIN/df = 1.27, RMSEA = 0.04, CFI = 0.96, GFI = 0.91, AGFI = 0.89, IFI = 0.96, TLI = 0.95, NFI = 0.92, suggesting a moderately good fit. A graphical representation of the SEM analysis is presented in Fig. 2. This figure shows that the factors—identified as "iden," "post," "negative," and "Control/Awareness/Cause"—exhibit covariance.

Convergent and Discriminant-Related Validity

Convergent validity was established as the AVE values exceeded 0.5, indicating good convergent validity. Discriminant validity was also supported since the AVE values for the factors were greater than the corresponding values of average shared variance (ASV) and maximum shared variance (MSV). Furthermore, the correlation coefficients among factors were lower than the square root of the AVE, further confirming acceptable discriminant validity (Table 5).

Reliability

Reliability was assessed using Cronbach's alpha and McDonald's Omega coefficients, reported in Table 5. All values were greater than 0.70, indicating good internal consistency and reliability of the items within each construct.

Cross-sectional measurement invariance and comparison of each dimension scores

The Portuguese sample consisted of 354 women. The fit indices for both the Iranian and Portuguese groups indicated a good model fit ($X^2/df = 2.27$, p-value ≤ 0.001, RMSEA = 0.04, CFI = 0.95, TLI = 0.95, SRMR = 0.05). The MenoSentations-Q showed invariance between the culturally distinct samples (Iranian and Portuguese) for the fitted first-order factorial model with three dimensions (ΔCFImetric-configure $_{= -0.001}$ and $\Delta CFI_{scalar\text{-}metric=0.000}$).

Following the confirmation of measurement invariance, a comparative analysis of the MenoSentations-Q dimensions between the two culturally distinct samples was performed (Table 6). Heteroscedasticity was observed across all dimensions: identity ($F = 12.13$, $p < 0.001$),

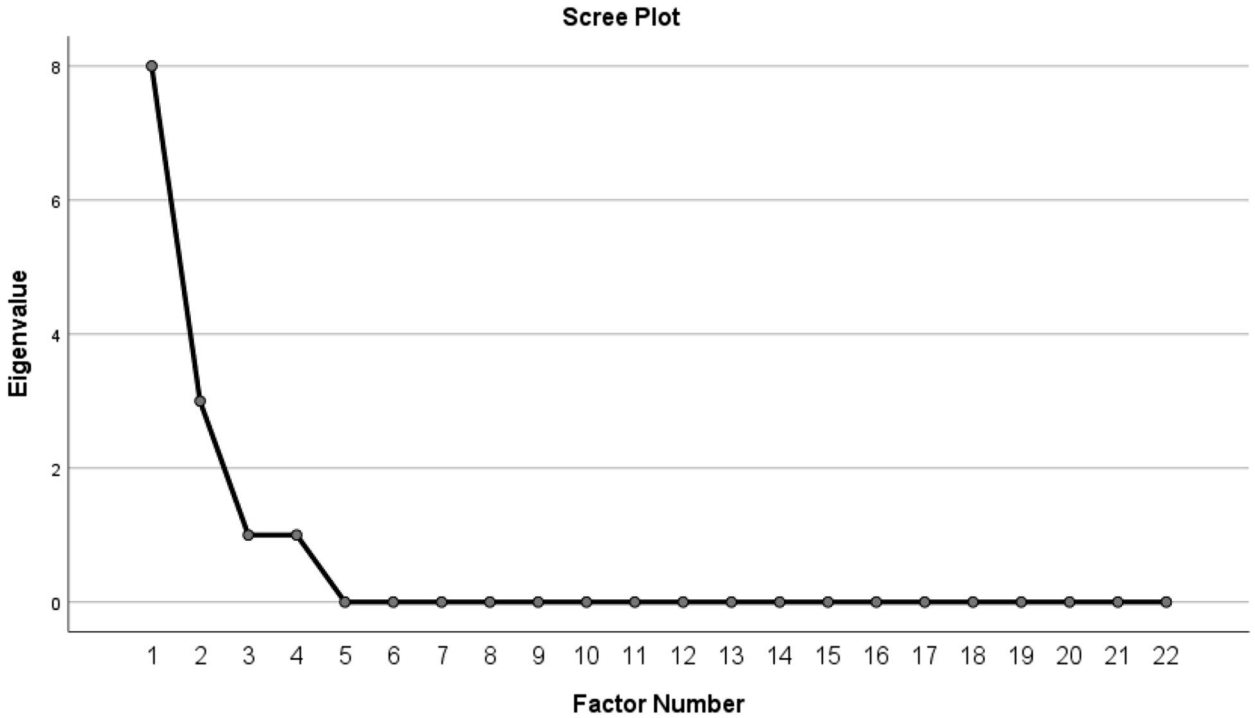

Fig. 1 Factor load scree plot of the items for determining the number of extracted factors of the MenoSentations-Q in Persian Version

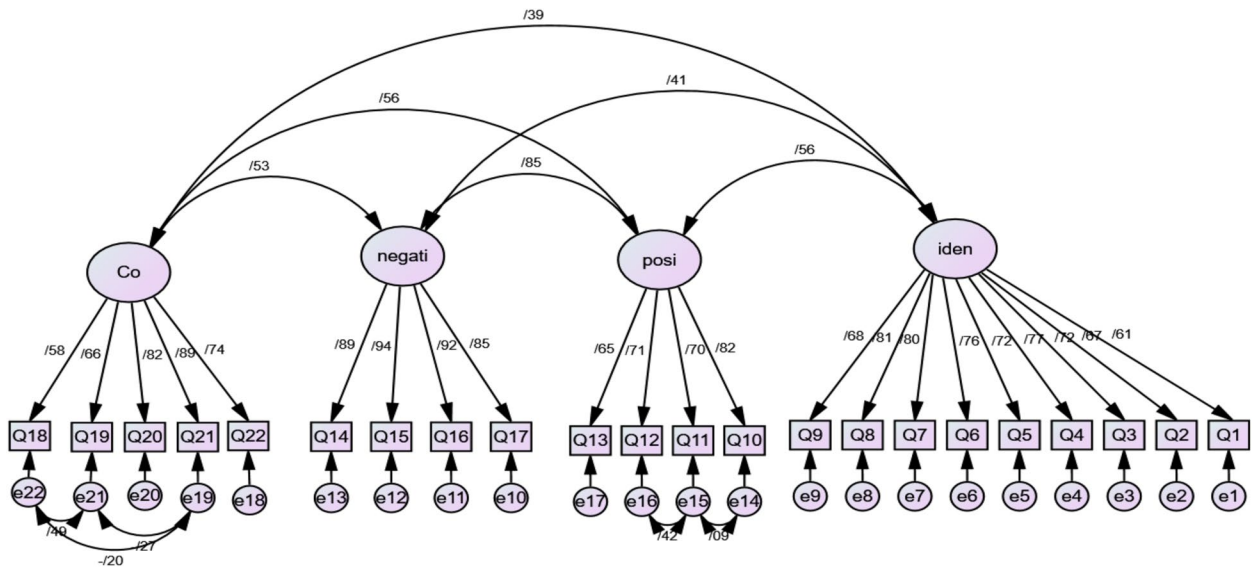

Fig. 2 Factor structure model of the MenoSentations-Q based on CFA. (All factor loadings are significant at $p < 0.001$, iden: Identity, posi: Positive Consequences, negati: Negative Consequences, Co: Control/Awareness/Cause

positive consequences ($F = 49.43$, $p < 0.001$), negative consequences ($F = 58.32$, $p < 0.001$), and control/awareness/cause factors ($F = 5.13$, $p = 0.02$). Statistically significant differences were found in all MenoSentations-Q dimensions between Iranian and Portuguese women. Iranian women showed higher means scores regarding Identity, Positive Consequences, Negative consequences, and Control/awareness/cause.

Table 5 Validity and reliability analysis of MenoSentations-Q in the Persian version

	MSV	CR	AVE	ASV	Cronbach's alpha	Mcdonald's Omega	Identity	Positive Consequences	Negative Consequences	Control Awareness Cause
Identity	0.13	0.90	0.52	0.13	0.90	0.90	0.72			
Positive Consequences	0.54	0.84	0.56	0.31	0.84	0.84	0.38	0.75		
Negative Consequences	0.54	0.94	0.79	0.34	0.94	0.94	0.35	0.73	0.89	
Control Awareness Cause	0.35	0.86	0.56	0.25	0.85	0.86	0.36	0.51	0.59	0.74

Table 6 Comparison between Iranian and Portuguese women's responses to the MenoSentations-Q

MenoSentations-Q dimension	*Iran (n = 320)*		*Portugal (n = 354)*		t-student	*df*	*p*	*Cohen´s d*	*Iran percentiles*			*Portugal percentiles*		
	M	*SD*	*M*	*SD*					*25*	*50*	*75*	*25*	*50*	*75*
Identity	3.66	1.01	3.23	0.89	5.81	640.85	< .001	0.45	2.89	4.00	4.44	2.78	3.33	3.89
Positive consequences	3.38	0.99	3.02	0.73	5.22	583.70	< .001	0.41	2.75	3.25	4.00	2.50	3.00	3.50
Negative consequences	3.24	1.21	2.53	0.86	8.71	570.83	< .001	0.68	2.00	3.00	4.44	2.00	2.50	3.00
Control/awareness/cause	4.23	0.67	4.15	0.63	2.54	653.33	.011	0 .05	3.80	4.40	5.00	3.80	4.20	4.60

Discussion

This study evaluated the psychometric properties of the Persian version of the Menopause Representations Questionnaire (MenoSentations-Q) among Iranian women and compared it with the Portuguese version. The items accounted for over 65.83% of the cumulative variance in the Menopause Representations concept. Our results indicated that the Persian version of the Menopause Representations Questionnaire exhibited a clear four-factorial structure, including: Identity (9 items), Positive consequences (4 items), Negative consequences (4 items), and Control, awareness, and cause (5 items), which is consistent eith the Portuguese structure. All reliability indices, such as Cronbach's alpha, Composite Reliability, and maximum reliability, were excellent for these four subscales.

The present questionnaire was previously psychometrically evaluated only in Portugal, where it also demonstrated strong performance [21]. Our study confirms the four-dimensional structure, which is consistent with the original scale. In Portugal, the content validity was assessed with a Kappa coefficient of 0.79, indicating excellent agreement among experts regarding item relevance and clarity [38]. In our study, the target group had no issues understanding the items, except for item 13, which was revised slightly. The content validity of the expert questionnaire was approved, and the CVI was 0.7.

The original version used both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). In the original version, the four factors explained 58.01% of the total variance; in the present study, the explained variance was higher at 61.29%. Both the translated and original versions demonstrated favorable validity and reliability. Significant correlations between MRQ (Menosentations-Q) dimensions and external variables further supported criterion validity, highlighting the instrument's ability to capture relevant aspects of menopause representations associated to symptoms experienced [38].

In the original version, convergent validity was assessed using the average variance extracted (AVE), with values ranging from 0.53 and 0.56, although the control, awareness, and cause factor demonstrated an AVE of 0.45, which was below the desired threshold. Our findings align with these results, as all AVE values exceeded 0.5, indicating strong convergent validity across all factors.

In the study by Albergaria and colleagues [21], who designed the original version of this 22-item questionnaire, internal consistency for all subscales was adequate (Cronbach's alpha $\geq$ 0.70). Similarly, our study found high internal consistency for all subscales. The first factor, Identity, includes nine items reflecting symptoms of menopause, such as hot flashes, sexual changes, changes in appearance, weight gain, joint and muscle discomfort, sleep problems, and mood swings.. Studies show that up to 80% of women experience bothersome vasomotor symptoms (hot flashes) during menopause, often alongside psychological symptoms and decreased quality of life [39]. Research in the United Arab Emirates revealed that hot flashes and night sweats were particularly challenging for women, contributing to lower life satisfaction and more negative beliefs about menopause[40]. A study involving peri and postmenopausal women aged

45 to 55 from urban India, found that those with poorer health and negative beliefs about menopause struggled more with hot flashes [41]. Self-help cognitive behavioral therapy (SH-CBT) and a booklet on hot flushes and night sweats (HFNS) shown to improve well-being and reduce somatic symptoms [42].

A systematic review conducted in South Asian and Middle Eastern countries suggests that variations in the reported prevalence of VMS across studies are primarily due to methodological differences rather than ethnic, cultural, or socioeconomic factors [43]. In line with this, zour research, as well as the study conducted in Portugal, used similar methods to assess symptom representations (except for item 13, which was slightly revised), and women perceived menopause similarly (cultural invariance was confirmed). However, Iranian women reported higher scores across several dimensions: symptoms (identity), positive consequences, cause awareness, and menopause-related negative consequences. It is essential to recognize that the samples were different—a clinical sample vs. a community sample, which could have impacted the results. In addition, sociodemographic differences (e.g., education levels or professional status) can also play a role in shaping menopausal symptoms [44].

Self-regulation theory posits that the positive and negative consequences factors reflect how individuals interpret the severity of symptoms and their broader health impacts, shaping their response to menopause. Our EFA, consistent with the original study, indicates that Iranian women also distinguish between the positive and negative consequences of menopause. The adverse effects of menopause are varied, ranging from physical [45] to emotional [46], and they impact both work and family life [47]. Supporting menopausal women in the workplace can improve their income, retirement, security, well-being, and financial benefits for the organization [48]. Empowering women to manage their symptoms and consequences during and after menopause can increase their sense of security, value, and satisfaction [49].

The third factor, control, awareness, and cause, mirrors the original version. Studies shows that many women lack adequate information about menopause and how to manage its symptoms [50]. Raising awareness about menopause can reduce complications, increase self-efficacy in symptom management, and improve women's overall health and quality of life [51]. Providing training on physical activity and diet for perimenopausal women can further help with better symptom management [52].

Measurement invariance was confirmed, with statistically significant differences in mean scores between Iranian and Portuguese women, with Iranian women scoring higher across all dimensions. This reveals that while menopausal representations were assessed similarly in both groups, Iranian women reported more intense experiences across all factors. Despite the cultural differences and the lack of additional studies using this instrument for comparison, Makara-Studzińska and collaborators (2014) [53] studied menopausal women across various regions, including America, Africa, Australia, and Eurasia, and concluded that menopausal symptoms were universally reported, regardless of ethnic origin or sociodemographic factors. However, other studies suggest that attitudes toward menopause can be influenced by several factors, including menopausal stage, symptom severity, psychological characteristics, and socioeconomic status [54]. Our findings highlight the need for further research to better understand these influences and draw more robust conclusions.

Additionally, it is necessary to address changes in dietary habits due to shifting body composition, which is associated with an increased risk of cardiovascular diseases. The Identity dimension includes items related to increasing weight and pain in bones, muscles, and joints, which are common clinical phenomena related with menopause. These factors significantly affect women's health, longevity and quality of life [55]. This underscores the importance of a tailored approach to weight management during middle age, a life stage marked by bio-psycho-social changes that influence weight gain/maintenance [56].

Iranian women frequently visit comprehensive community health centers for services related to both themselves and their children, making these centers ideal locations for providing education on menopausal management.

Limitations and strengths

In the Portuguese study, a limitation was noted due to the high participation of women with higher education levels. In contrast, most participants in the present study were lower-educated housewives, with only 17% holding university degrees. While a random sampling approach was attempted, the data collection was limited to urban areas, which may affect the generalizability of the results. Future research could expand the study to include both urban and rural populations across the country. Finally, the relatively small sample size presents another limitation. However, a notable strength of this study is its contribution of a menopause symptom tool in the Persian language, as well as the cross-cultural comparison between two culturally distinct samples.

Conclusion

This study validates the Persian version of the MenoSentations-Q, confirming its effectiveness in assessing menopausal representations among Iranian women. The scale demonstrated satisfactory psychometric properties,

including a clear factor structure, internal consistency, and structural validity. As a valid and reliable tool, the MenoSensations-Q is a valuable resource for assessing menopausal symptoms in both research and clinical contexts. It can also play a crucial role in psychosocial interventions for this high-risk population. Moreover, despite cultural differences, Iranian and Portuguese women exhibit similar representations of menopause, as assessed by the Menosentations-Q. This suggests that the tool is effective across diverse cultural contexts, making it an important instrument for designing culturally appropriate support strategies, educational programs, and interventions. These efforts aim to improve the management of menopause-related symptoms and set realistic expectations for women undergoing this bio-psycho-social stage of life. This research contributes to the broader public health effort to provide comprehensive and informed care for women during the menopausal transition, highlighting the need for effective support and education tailored to their unique needs.

Abbreviations

SPSS	Statistical Product and Service Solutions
MRQ	Menopause Representations Questionnaire
CVI	Content validity index
CVR	Content validity ratio
CFA	Confirmatory Factor Analysis
GFI	Goodness of Fit Index
CFI	Comparative Fit Index
IFI	Incremental fit index
TLI	Tucker-Lewis index
RMSEA	Root mean square error of approximation

Acknowledgements
We should thank the student research committee of Saveh University of Medical Sciences for their financial support, and the invaluable participation of women would be appreciated.

Authors' contributions
In the first phase of the study, PHK and ZA were responsible for conceptualizing and planning the research and obtaining ethical approval. ZKH and PHK were involved in data collection and inputting information into statistical software. PHK and ZA conducted the data analysis and created tables and figures for the Iranian sample. ML performed the trans-cultural invariance and group comparison analysis. RA collected the Portuguese sample. The initial manuscript draft was written and organized by PHK, MK, who enhanced the language and corrected errors. PHK, ML, FP, RA, and ZA made subsequent revisions. Finally, all authors reviewed and approved the final version of the manuscript.

Funding
National funds fund the William James Center for Research through the FCT in the context of the project UID/04810/2020, DOI: 10.54499/UIDB/04810/2020 and 10.54499/UIDP/04810/202.

Data availability
The datasets generated and/or analysed during the current study are not publicly available due to limitations of ethical approval involving the women data and anonymity but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate
The study was conducted following the Declaration of Helsinki and was sponsored by the Deputy of Research and Technology student research committee at Saveh University of Medical Sciences(IR.SAVEHUMS.REC.1401.016). Written informed consent was obtained from all participants before their inclusion in the study.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Author details
[1]Department of Epidemiology &Biostatistics, School of Health, Zahedan University of Medical Sciences, Zahedan, Iran. [2]Department of Public Health, Social Determinants of Health Research Center, Saveh University of Medical Sciences, Saveh, Iran. [3]Health Sciences Faculty, Universidade Europeia, Lisboa, Portugal. [4]Student Research Committee, Saveh University of Medical Sciences, Saveh, Iran.

Received: 30 July 2024 Accepted: 14 February 2025
Published online: 25 February 2025

References

1. Wang L, Zhang R, Yang Y, Sun X, Zhang B, Zhu H, et al. Severity and factors of menopausal symptoms in middle-aged women in Gansu Province of China: a cross-sectional study. BMC Womens Health. 2021;21:1–9.
2. Hajesmaeel-Gohari S, Shafiei E, Ghasemi F, Bahaadinbeigy K. A study on women's health information needs in menopausal age. BMC Womens Health. 2021;21:1–9.
3. Monteleone P, Mascagni G, Giannini A, Genazzani AR, Simoncini T. Symptoms of menopause—global prevalence, physiology and implications. Nat Rev Endocrinol. 2018;14(4):199–215.
4. Refaei M, Mardanpour S, Masoumi SZ, Parsa P. Women's experiences in the transition to menopause: a qualitative research. BMC Womens Health. 2022;22(1):53.
5. Thakur M, Kaur M, Sinha AK. Assessment of menopausal symptoms in different transition phases using the Greene Climacteric Scale among rural women of North India. Ann Hum Biol. 2019;46(1):46–55.
6. Martins R, de Sousa B, Rodrigues V. The geography of the age at menopause in central Portugal since the early twentieth century. Sci Rep. 2022;12(1):22020.
7. Gazibara T, Kovacevic N, Nurkovic S, Kurtagic I, Radovanovic S, Rancic B, et al. Menopause-specific Quality of Life Questionnaire: factor and Rasch analytic approach. Climacteric. 2019;22(1):90–6.
8. Utian WH, Janata JW, Kingsberg SA, Schluchter M, Hamilton JC. The Utian Quality of Life (UQOL) Scale: development and validation of an instrument to quantify quality of life through and beyond menopause. Menopause. 2018;25(11):1224–31.
9. Freeman E, Sherif K. Prevalence of hot flushes and night sweats around the world: a systematic review. Climacteric. 2007;10(3):197–214.
10. Erci B, Güngörmüş Z, Öztürk S. Psychometric validation of the Women's Health Questionnaire in menopausal women. Health Care Women Int. 2014;35(5):566–79.
11. Brown L, Brown V, Judd F, Bryant C. It's not as bad as you think: menopausal representations are more positive in postmenopausal women. J Psychosom Obstet Gynecol. 2018;39(4):281–8.
12. Reyhani M, Kazemi A, Farajzadegan Z, Keshvari M. Design and psychometric analysis of a climacteric adjustment questionnaire for middle-aged women. Menopause. 2020;27(3):333–8.
13. Sergeant J, Rizq R. 'Its all part of the big CHANGE': a grounded theory study of women's identity during menopause. J Psychosom Obstet Gynecol. 2017;38(3):189–201.

14. Hunter M, O'dea I. Cognitive appraisal of the menopause: the menopause representations questionnaire (MRQ). Psychol Health Med. 2001;6(1):65–76.
15. Pimenta F, Ramos MM, Silva CC, Costa PA, Maroco J, Leal I. Self-regulation model applied to menopause: a mixed-methods study. Climacteric. 2020;23(1):84–92.
16. Leventhal H, Brissette I, Leventhal EA. The common-sense model of self-regulation of health and illness. The self-regulation of health and illness behaviour: Routledge; 2012. p. 43–66.
17. Leventhal H, Leventhal EA, Contrada RJ. Self-regulation, health, and behavior: A perceptual-cognitive approach. Psychol Health. 1998;13(4):717–33.
18. Leventhal H, Nerenz DR, Steele DJ. Illness representations and coping with health threats. Handbook of psychology and health, volume IV: Routledge; 2020. p. 219–52.
19. Cattell R. The scientific use of factor analysis in behavioral and life sciences: Springer Science & Business Media; 2012.
20. Kyriazos TA. Applied psychometrics: sample size and sample power considerations in factor analysis (EFA, CFA) and SEM in general. Psychology. 2018;9(08):2207.
21. Albergaria R, Leal I, Hunter M, Pimenta F. Menopause Representations Questionnaire: development and validation with Portuguese women. Climacteric. 2021;24(3):275–81.
22. Beaton DE, Bombardier C, Guillemin F, Ferraz MB. Guidelines for the process of cross-cultural adaptation of self-report measures. Spine. 2000;25(24):3186–91.
23. Hosseini koukamari P, Nikbakht R, Karimy M, Mohammadi Z. Psychosocial Factors and Musculoskeletal Symptoms in Office Workers: Validating the Maastricht Upper Extremity Questionnaire. Med J Islamic Republic Iran. 2024;38(1):187–95.
24. Lenz ER. Measurement in nursing and health research: Springer publishing company; 2010.
25. Hajizadeh E, Asghari M. Statistical methods and analyses in health and biosciences a research methodological approach. Tehran: Jahade Daneshgahi Publications. 2011;395:395–410.
26. Lawshe CH. A quantitative approach to content validity. Pers Psychol. 1975;28(4):563–75.
27. Çokluk Bökeoğlu Ö, Koçak D. Using Horn's parallel analysis method in exploratory factor analysis for determining the number of factors. Educ Sci theory pract. 2016;16(2).
28. Harerimana A, Mtshali NG. Using exploratory and confirmatory factor analysis to understand the role of technology in nursing education. Nurse Educ Today. 2020;92: 104490.
29. Nia HS, Ebadi A, Lehto RH, Mousavi B, Peyrovi H, Chan YH. Reliability and validity of the persian version of templer death anxiety scale-extended in veterans of Iran-Iraq warfare. Iranian journal of psychiatry and behavioral sciences. 2014;8(4):29.
30. Hosseini Koukamari P, Naami A, Allahyari T. Confirmatory and exploratory factor analyses of adaptive performance scale: a study among hospital nurses. Iranian Journal of Ergonomics. 2015;3(1):41–9.
31. Coaley, Keith. "An introduction to psychological assessment and psychometrics." 2014:1-400.
32. Jaccard J, Wan CK. LISREL approaches to interaction effects in multiple regression: sage; 1996.
33. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. J Acad Mark Sci. 2015;43:115–35.
34. Bland JM, Altman DG. Statistics notes: Cronbach's alpha Bmj. 1997;314(7080):572.
35. Millsap RE, Yun-Tein J. Assessing factorial invariance in ordered-categorical measures. Multivar Behav Res. 2004;39(3):479–515.
36. Cheung GW, Rensvold RB. Evaluating goodness-of-fit indexes for testing measurement invariance. Struct Equ Model. 2002;9(2):233–55.
37. Jorgensen TD, Pornprasertmanit S, Schoemann AM, Rosseel Y. semTools: Useful tools for structural equation modeling. R package version 0.5–1. 2018.
38. Matzumura-Kasano, J.P., Gutiérrez-Crespo, H.F., Tserotas-Apostalakos, K. and Hernández-Guzmán, L.R.,. Cuestionario de representaciones de la menopausia: adaptación y propuesta de versión en español. In Anales de la Facultad de Medicina. UNMSM. Facultad de Medicina. 2022;83(4):319-326.
39. Shepherd-Banigan M, Goldstein KM, Coeytaux RR, McDuffie JR, Goode AP, Kosinski AS, et al. Improving vasomotor symptoms; psychological symptoms; and health-related quality of life in peri- or post-menopausal women through yoga: An umbrella systematic review and meta-analysis. Complement Ther Med. 2017;34:156–64.
40. Stefanopoulou E, Gupta P, Mostafa RM, Nosair N, Mirghani Z, Moustafa K, et al. IMS study of climate, altitude, temperature and vasomotor symptoms in the United Arab Emirates. Climacteric. 2014;17(4):425–32.
41. Stefanopoulou E, Shah D, Shah R, Gupta P, Sturdee D, Hunter M, et al. An International Menopause Society study of climate, altitude, temperature (IMS-CAT) and vasomotor symptoms in urban Indian regions. Climacteric. 2014;17(4):417–24.
42. Hardy C, Griffiths A, Norton S, Hunter MS. Self-help cognitive behavior therapy for working women with problematic hot flushes and night sweats (MENOS@ Work): a multicenter randomized controlled trial. Menopause. 2018;25(5):508–19.
43. Islam RM, Bell RJ, Rizvi F, Davis SR. Vasomotor symptoms in women in Asia appear comparable with women in Western countries: a systematic review. Menopause. 2017;24(11):1313–22.
44. Augoulea A, Moros M, Kokras N, Karageorgiou V, Paschou S, Lymberi R, et al. Association of menopausal symptoms with sociodemographic factors and personality traits. Menopause Review/Przegląd Menopauzalny. 2019;18(4):191–7.
45. Xi S, Mao L, Chen X, Bai W. Effect of health education combining diet and exercise supervision in Chinese women with perimenopausal symptoms: a randomized controlled trial. Climacteric. 2017;20(2):151–6.
46. Dennerstein L, Soares CN. The unique challenges of managing depression in mid-life women. World Psychiatry. 2008;7(3):137.
47. Theis S, Baumgartner SJ, Janka H, Kolokythas A, Skala C, Stute P. Quality of life in menopausal women in the workplace–a systematic review. Climacteric. 2023;26(2):80–7.
48. Rees M, Bitzer J, Cano A, Ceausu I, Chedraui P, Durmusoglu F, et al. Global consensus recommendations on menopause in the workplace: a European Menopause and Andropause Society (EMAS) position statement. Maturitas. 2021;151:55–62.
49. Yazdkhasti M, Negarandeh R, Behboodi MZ. An empowerment model of Iranian women for the management of menopause: a grounded theory study. Int J Qual Stud Health Well Being. 2019;14(1):1665958.
50. Verdonk P, Bendien E, Appelman Y. Menopause and work: A narrative literature review about menopause, work and health. Work. 2022;72(2):483–96.
51. Ojo EA, Ope-Babadele O, Gbenga-Epebinu MA, Aina RO, Jolayemi OD. Knowledge and Help Seeking Behaviors for Menopausal Symptoms Among Female Staff Working in a Selected University in Ogun State. International Journal of Public Health, Pharmacy and Pharmacology. 2022;7(1):14–29.
52. Khandehroo M, Tehrani H, Mahdyzadeh M, Peyman N. The Effect of Menopause On Women's Health: A Systematic Review. 2022. https://doi.org/10.21203/rs.3.rs-1118042/v1.
53. Makara-Studzińska MT, Kryś-Noszczyk KM, Jakiel G. Epidemiology of the symptoms of menopause–an intercontinental review. Menopause Review/Przegląd Menopauzalny. 2014;13(3):203–11.
54. Dashti S, Bahri N, Najafi TF, Amiridelui M, Roudsari RL. Influencing factors on women's attitudes toward menopause: a systematic review. Menopause. 2021;28(10):1192–200.
55. Silva T, Oppermann K, Reis F, Spritzer P, Nutrition in Menopausal Women: A Narrative Review. Nutrients,. 13, 2149. Nutrition in Gynecologic. 2021;2021:51.
56. Leitão M, Hartmann-Boyce J, Pérez-López FR, Marôco J, Pimenta F. Weight management strategies in Middle-Aged Women (MAW): Development and validation of a questionnaire based on the Oxford Food and Activity Behaviors Taxonomy (OxFAB-MAW) in a Portuguese sample. Front Psychol. 2023;13:1069775.

Publisher's Note