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The Psychometric Properties of the Midlife Women's Symptom Index

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Abstract

Objective: To evaluate the psychometric properties of the Midlife Women's Symptom Index (MSI) among four racial/ethnic groups of midlife women in the United States.

Design: A secondary data analysis.

Setting: Internet communities/groups.

Participants: A total of 494 midlife women with symptoms of menopause who self-reported using an Internet survey and completed all sections of the MSI questionnaire.

Methods: Data were collected from January 1, 2008 to December 31, 2010. The psychometric properties of the MSI were evaluated using measures of internal consistency, item-total correlation coefficients, and discriminant validity.

Results: There were statistically significant differences in marital status, employment, income, religion, country of birth, level of education, diagnosed disease, and self-reported health status across the four racial/ethnic groups. The Kuder-Richardson Formula 20 (KR-20) coefficients for the three subscales of the MSI prevalence section (i.e., physical, psychological, and psychosomatic) ranged from 0.58 (psychosomatic symptoms in Whites) to 0.91 (psychological symptoms in Asian Americans). The Cronbach's alpha coefficients for the three subscale scores ranged from 0.60 (psychosomatic symptoms in Whites) to 0.93 (psychological symptoms in Asian Americans). The mean scores of the MSI differed significantly by race/ethnicity among midlife women of each menopausal status, except for the prevalence section of the psychosocial symptoms.

Conclusion: The MSI has demonstrated an acceptable reliability and appropriate discriminant validity across the four racial/ethnic groups, except in the domain of psychosomatic symptoms.

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Health care providers as well as researchers could use the MSI to assess the symptoms of menopause of midlife women from diverse racial/ethnic backgrounds.

Keywords

psychometric properties; reliability; validity; symptoms of menopause; race/ethnicity

Menopause is a transitional period in every woman's life, as it signifies that a woman is moving from being reproductive to nonreproductive (Greene, 1998). During this period, more than 80% of women experience physical or psychological symptoms with varying degrees of severity and duration that are called symptoms of menopause (Freeman, Sammel, Liu, & Martin, 2003). Although it generally has been assumed that all women experience similar symptoms, some sociocultural factors such as race/ethnicity influence individual women's experiences of symptoms of menopause (Fu, Anderson, & Courtney, 2003).

Considering differences in women's experiences of symptoms of menopause based on their racial/ethnic background is necessary but difficult for health care providers who lack culturally appropriate assessment instruments. For this reason, the Midlife Women's Symptom Index (MSI) was created to measure various types and clusters of symptoms of menopause reported by racially/ethnically diverse groups of midlife women (Im, 2006; Im, Meleis, & Lee, 1999; Lee, Im, & Chee, 2010). There have been modifications to the MSI based on psychometric testing, but only one study was conducted to evaluate the psychometric properties of the most current version of the MSI (Lee et al., 2010). Researchers suggested that further research was warranted to reappraise the instrument's performance among diverse racial/ethnic groups of midlife women.

Background

Researchers have reported significant racial/ethnic differences in symptoms of menopause (Freeman et al., 2001; Im, Lee, & Chee, 2010), perceptions and tolerance of physical discomfort, and approaches to symptom management among healthy women in the United States (Gold et al., 2006; Im, Lee, Chee, Brown, & Dormire, 2010). However, results are inconsistent regarding whether women experience increased or decreased symptom severity based on their race/ethnicity, especially in comparisons of hot flash symptoms and sleep disturbances between African American and White women (Freeman et al., 2001; Im, 2006; Im et al., 2010). For example, in the Freeman et al., (2001), African American women tended to report more severe symptoms than White women. On the other hand, Im et al. (2010) found that African American women tended to under-report hot flash symptoms in comparison to White women. In other research, White women reported more frequent nighttime waking than any other racial/ethnic group (Kravitz et al., 2003). Thus, instruments which accurately measure variation in symptoms of menopause across different racial/ethnic groups are essential to guide competent women's health care.

Many researchers have developed instruments to measure symptoms of menopause. For example, Kupperman, Wetchler, and Blatt (1959) recorded 11 menopausal complaints, and their list subsequently evolved into the Blatt-Kupperman Menopausal Index (Alder, 1998). Several other instruments are also available to assess women's symptoms of menopause: the

Greene Climacteric Scale (Greene, 1998), the Menopausal Symptoms List (Freeman et al., 2003), and the Menopausal Rating Scale (Heinemann, Potthoff, & Schneider, 2003). However, most of these instruments have failed to consider racial/ethnic differences in symptoms of menopause, because they were developed and used primarily among White women (Alder, 1998; Avis et al., 2001; Im, 2006). These prior instruments, except for the Menopausal Rating Scale, also had other limitations, including their development by mostly male researchers (Alder, 1998; Im, 2006) and unclear definitions of terms for symptoms of menopause (Alder, 1998).

Unlike other instruments, the MSI was developed with a focus on assessing ethnic differences in symptoms of menopause based on the literature about the diversity of symptom experiences of menopause among Western and Asian populations (Im, 2006). Previous studies verified that the MSI scale could be sensitive to differences in symptom reporting among different racial/ethnic groups (Im, 2009; Im et al., 2010). However, the initial instrument development study examining the psychometric properties of the MSI was conducted with a relatively small sample of 77 midlife women (Im, 2006). Later studies validated the MSI using data collected from four racial/ethnic groups of midlife women, including Hispanic, Asian American, African American, and White participants (Im, 2009; Lee et al., 2010). Further reevaluation of the MSI's psychometric performance using a new study population would further support its reliability and validity for symptom characterization among diverse racial/ethnic groups of midlife women.

The purpose of this secondary analysis was to evaluate the psychometric properties of the current version of the MSI among four racial/ethnic groups of midlife women in the United States using existing data from an Internet survey on midlife women's attitudes toward physical activity. The specific aims were (a) to evaluate the reliability of the MSI including internal consistency and item-total correlation coefficients by race/ethnicity, (b) to evaluate whether the MSI mean scores differ by race/ethnicity, and (c) to evaluate discriminant validity of the prevalence and severity MSI scores among women of different menopausal statuses.

Methods

This study was a secondary analysis of data from a cross-sectional Internet survey on attitudes toward physical activity among midlife women. The parent study used the MSI to measure self-reported symptoms of menopause to determine whether symptoms of menopause influenced the physical activity of midlife women (Chang, Chee, & Im, 2013; Im et al., 2012). The 542 midlife women who participated in the parent study were recruited through Internet communities/groups for midlife women in the United States, using a convenience sampling method. Inclusion criteria were women who (a) were between age 40 and 60 years, (b) could read and write in English, and (c) self-reported their racial or ethnic identities as Hispanic, Asian American, African American, or White (Chang et al., 2013; Im et al., 2012). Self-reported race and ethnicity categories were based on National Institutes of Health guidelines (Boehmer et al., 2002). The data were collected between January 1, 2008 and December 31, 2010 (Chang et al., 2013). Potential participants who visited the project website after seeing the study announcement and agreeing to participate in the study were

checked against the inclusion and quota criteria (Chang et al., 2013; Im et al., 2012). If they met these criteria, they were automatically linked to the Internet survey site (Im et al., 2012). For the Internet survey, each participant was provided with a gift certificate to provide motivation. Further details are provided in the parent study publication (Im et al., 2012).

Sample

To adequately evaluate the psychometric properties of an instrument, Gorsuch (1983) recommended that there be at least five respondents per item and a preferred sample size of at least 200 respondents. For this secondary analysis, a total of 365 participants were needed because there are 73 items on the MSI. To use ANOVA, while assuming a medium effect size of .25 (Gor-such, 1983) with 80% power and an alpha level = .05, 45 or more participants were needed in each racial/ethnic group, according to calculations completed using ©G*Power 3. For this study, responses from 494 midlife women who completed all sections of the MSI questionnaire were retrieved, and this sample size was deemed sufficient to evaluate the psychometric properties of the MSI.

The Institutional Review Boards of the researchers' home institutions approved and served as the host sites for the parent study. The participants were required to complete an informed consent form on the project website prior to beginning the survey. To protect participant confidentiality, personal information was not linked to responses; only study identification numbers assigned by the researchers were used as participant identifiers.

Instrument

The Midlife Women's Symptom Index.—The MSI is a menopause-specific instrument initially created based on modifications to the Cornell Medical Index (CMI), which consisted of 195 items that used dichotomous scales to screen general health status (Brodman, Erdman, & Wolff, 1956; Im, 2006, 2009; Im et al., 2005; Im et al., 1999). The CMI was modified for use in a menopausal study with the addition of questions about specific symptoms of menopause and the deletion of questions that were considered unrelated to menopause, such as family medical history (Im, 2006 , 2009; Im et al., 2005; Im et al., 1999). However, this modified CMI still included unnecessary items that constituted a burden for study participants and did not measure symptoms of menopause (Im, 2006, 2009; Im et al., 2010). Thus, the modified CMI was refined, and the resulting instrument called the MSI, consisted solely of symptom items of menopause relevant to diverse racial/ethnic groups of midlife women (Im, 2006, 2009; Lee et al., 2010). The MSI was developed from a feminist perspective to measure symptoms of menopause relevant to women's experiences, with consideration given to the participants' race/ethnicity and cultural background (Im, 2009).

The first version of the MSI consisted of 88 items (Im, 2006, 2009; Im et al., 2005), but 15 items were eliminated based on findings of item-total correlations of greater than 0.7 or less than 0.3, which yielded the most updated version of the instrument (Im et al., 2010). The current version of the MSI contains 73 items and three subscales, including physical (51 items), psychological (18 items), and psychosomatic (four items) symptoms of menopause, and has two sections: prevalence and severity (Im et al., 2010; Lee et al., 2010). Prevalence

items are dichotomous responses (yes = 1 or no = 0), and items in the severity section are measured with a 5-point Likert-type scale (0 = *not at all* to 4 = *extremely*) (Im et al., 2010; Lee et al., 2010). The possible scores range from 0 to 73 for the prevalence subscale, and 0 to 292 for the severity subscale with higher scores representing higher prevalence and severity.

Sample Characteristics used in this Study.—Sociodemographic characteristics, such as age, marital status, employment status, family annual income, religion, country of birth, and level of education were collected. The question of family annual income had three response options: *very hard, somewhat hard,* and *not hard* to pay for basic life necessities such as food, clothing, housing, and health care (Im et al., 2010; Im, Ko, & Chee, 2014). Level of education was categorized into three levels based on completing high school, having an associate's degree, and having a bachelor's degree.

Clinical-related characteristics, including menopausal status, diagnosed disease, and overall self-reported health status were also measured. The respondents' menopausal statuses were categorized into four levels as determined by responses to survey questions about menstrual regularity and the respondents' last menstrual cycles. *Premenopause* was defined as having had no change in predictability of menses; *early perimenopause* was defined as experiencing decreased predictability of menses but having no gaps of > 3 months; *late perimenopause* was defined as having no menses for 3 to 11 months; and *postmenopause* was defined as the absence of menses for >12 months (Soules et al., 2001a, 2001b, 2001c, 2001d). Diagnosed diseases were dichotomized (yes/no); if a participant had at least one diagnosed disease, she answered *yes* and specified the name of the diagnosed disease. The question of overall self-reported health status was based in the participant's subjective impressions about her general health status.

Data Analysis

All data analyses were conducted in SAS version 9.4. First, the relationships among racial/ethnic groups and sociodemographic and clinical characteristics of the participants were assessed using chi-squared or Fisher's Exact tests for the binary/categorical/count variables and *t* tests for continuous variables. For categorical variables, count and percentage were computed, and for continuous variables, mean and standard deviation were computed.

Next, the psychometric properties of the MSI in measuring self-reported symptoms of menopause were evaluated for reliability. Reliability was estimated by examining the internal consistency of the MSI and item-total correlation coefficients. Two reliability tests were used: (a) the internal consistency of the MSI was measured using the Kuder-Richardson Formula 20 (KR-20) for the prevalence section (dichotomous items) and Cronbach's alpha coefficients for the severity section (ordinal rating scale), and (b) item-total correlation coefficients by computing item analyses were measured. The ranges of KR-20 and Cronbach's alpha coefficients were divided into three categories; low, for values less than 0.5; moderate, for values between 0.5 and 0.8; and high, for values greater than 0.8 (Tan, 2009). The acceptable range of item-total coefficients was between 0.2 and 0.8 (Everitt & Skrondal, 2010). Finally, two-way ANOVA was conducted to test differences in MSI

scores by race/ethnicity and by menopausal status. A generalized linear model was used for ANOVA analysis. The significance level was set at an alpha level of 0.05.

Results

Sociodemographic and Clinical Characteristics

Sociodemographic and clinical characteristics of the participants are shown in Table 1. The number of each racial/ethnic group was 113 Hispanics (23%), 120 Asian Americans (24%), 115 African Americans (23%), and 146 Whites (30%). The overall mean age of the participants was 49.0 years (SD = 6.1). There were statistically significant differences in marital status, employment, income, religion, country of birth, level of education, diagnosed disease, and self-reported health status across the four racial/ethnic groups (Table 1). Asian American women had the highest proportion of married/partnered participants (χ^2 = 24.5, p < .01), of being unemployed (χ^2 = 15.8, p < .01), of being born outside the United States (χ^2 = 209.8, p < .01), and the lowest proportion of having diagnosed disease (χ^2 = 24.8, p < .01). The majority of participants expressed some sort of religious beliefs across all four racial/ethnic groups (χ^2 = 126.2, p < .01) and most reported being healthy (χ^2 = 20.9, p < .01). Hispanic participants had the lowest proportion of bachelor's degree education (χ^2 = 19.1, p < .01). There was no statistical association between menopausal status and race/ethnicity.

Internal Consistency

The internal consistency estimates for the sub-scales of the MSI are shown in Table 2. The KR-20 coefficients for the total MSI scores on the prevalence section ranged from .92 (in Asian Americans, African Americans, and Whites) to .93 (in Hispanics). The KR-20 coefficients for the three subscale scores on the prevalence section ranged from .58 (psychosomatic symptoms in Whites) to .91 (psychological symptoms in Asian Americans). The Cronbach's alpha coefficients for the total MSI scores on the severity section ranged from .93 (in African Americans) to .95 (in Hispanics and Asian Americans). The range of the Cronbach's alpha coefficients for the three sub-scale scores was from .60 (psychosomatic symptoms in Whites) to .93 (physical and psychological symptoms in Hispanics and psychological symptoms in Asian Americans). Overall, the MSI had adequate Cronbach's alpha coefficients, except for the subscale of psychosomatic symptoms.

Item Analyses

Table 3 shows the results of the item analyses. For the prevalence section, the item-total correlation coefficients ranged from −.07 (total menopausal symptom scales in Hispanics) to .82 (psychosomatic symptom scale in African Americans). Of the 73 items, one item regarding weight loss had a negative coefficient across all racial/ethnic groups, except for Whites, in relation to total menopausal symptom scores. In addition, the item–total correlation coefficients of two items (i.e., skin rash and vaginal bleeding/spotting) were less than .20 across the four racial/ethnic groups, in relation to total MSI scores. One item regarding nasal bleeding showed an item-total correlation coefficient less than .20 in Asian and African American women. When an item-total correlation coefficient was calculated in accordance with the subscales of the MSI, the item-total correlation coefficient of 40 items

in the physical symptom subscale was greater than .20 for overall participants. In the psychosomatic subscale, the item-total correlation coefficient of one item (i.e., difficulty in falling asleep or staying asleep) was greater than .80 in African Americans.

For the severity section, the item-total correlation coefficients ranged from −.01 (total symptoms of menopause in African Americans) to .81 (psychosomatic symptoms in African Americans). Across racial/ethnic groups, one item (i.e., weight loss) and three items (i.e., skin rash, vaginal bleeding/spotting, and burning pain during urination) had a negative coefficient and coefficients less than .20, respectively. Also, one item (i.e., nasal bleeding as symptoms of menopause) had a coefficient less than .20 in African and Asian Americans.

Table 4 shows the mean MSI scores by race/ethnicity and by the menopausal status of the participants. The range of mean scores for the total prevalence section of the MSI was from 12.1 (African Americans in premenopausal status) to 22.1 (Hispanics in late perimenopausal status), whereas the range of the mean scores of the total severity section of the MSI was from 31.9 (Asians in premenopausal status) to 70.3 (Hispanic in late perimenopausal status). ANOVA results indicated that the main effects of race/ethnicity after controlling for menopausal status were statistically significant for the total symptom score in the prevalence and severity sections, as well as all of the subscale symptom scores ($p < .05$) except for the psychological symptom prevalence section. In general, Hispanic and White women had higher mean scores on the MSI than Asian and African American women regardless of menopausal status, except for the means of the severity psychosocial and psychosomatic scores in the postmenopause group.

The main effects of menopausal status after controlling for race/ethnicity were statistically significant for the total symptom score in the prevalence and severity sections as well as most of the subscale symptom scores ($p < .05$), except for the psychosomatic symptom score in the prevalence and severity sections. In general, women in the early and late-perimenopausal groups had higher scores on the MSI than the pre- and postmenopausal status categories across all four racial/ethnic groups. Overall, the interaction between race/ethnicity and menopausal status was not statistically significant.

Discussion

Our findings indicate acceptable internal consistency of the total MSI based on criteria by Tan (2009) that an internal consistency coefficient (i.e., KR-20 and Cronbach’s alpha) greater than .80 indicates a highly reliable instrument. The coefficients for the KR-20 and the Cronbach’s alpha for the psychosomatic menopausal symptom sub-scale were of moderate values across all four racial/ethnic groups, as reported in a previous study (Lee et al., 2010). These findings may be due to the small number of items used to measure psychosomatic symptoms of menopause in the MSI. Hayes (2008) suggested that the number of items may influence the internal consistency of an instrument because when an instrument includes more items to measure a phenomenon, the reliability tends to increase, due to a reduction in measurement error. The small number of items in the psychosomatic menopausal symptom subscale may have limited its internal consistency. Thus, psychosomatic symptoms of menopause should either be combined in one of the other sub-

scales or be excluded from the MSI when differences across diverse racial/ethnic groups are measured.

Regarding the item-total correlation coefficients, Everitt and Skrondal (2010) recommended that acceptable ranges of item-total correlation coefficients were from .20 to .80. In this study, the item-total correlation coefficients of vaginal bleeding/spotting and burning pain during urination were less than .20 across racial/ethnic groups. This may be partially due to word choice in the MSI items: words such as “spotting” and “urination” may not be a part of the colloquial English known to immigrant women. The item wording could be a source of misunderstanding, especially among Asian American and Hispanic women. Thus, the performance of the MSI should be reevaluated after removing items for vaginal bleeding/spotting and burning pain during urination to determine whether the change improves the scale’s reliability for use among women of diverse racial/ethnic groups.

The low item-total correlation coefficients for items such as “weight loss” across racial/ethnic groups and “nasal bleeding” among African Americans are consistent with previous research (Lee et al., 2010). These findings may be due to the fact that menopausal women are more likely to gain rather than lose weight (Lobo, Kelsey, & Marcus, 2000; Mekary et al., 2009), and that nasal bleeding in mature women has been reported as an infrequent occurrence. However, hormonal changes during menopause can induce nasal bleeding (Lund et al., 2006). Thus, further evaluation of weight loss and nasal bleeding as symptoms of menopause is needed to determine either their inclusion or exclusion as items in the MSI.

Our findings of significant differences in the menopausal symptom experiences across racial/ethnic groups are consistent with previous studies (Im et al, 2010; Lee et al., 2010), though the specific racial/ethnic differences in symptoms reported by our participants were somewhat different. For example, in this study Hispanic and White women tended to report more symptoms of menopause in their total MSI than Asian American or African American women, whereas in Im et al., (2010) study White and African American women reported more symptoms in their total MSI than Asian women.

Overall, the finding of differences in mean MSI scores according to menopausal status indicates validation of the MSI. To be precise, the tests for discriminant validity in this study support the assertion that the MSI can differentiate symptoms of menopause among four different menopausal statuses. This finding that the MSI differentiated between women of varying menopausal statuses confirms the findings from Lee et al. (2010).

Recommendations

The good psychometric performance of the MSI shown in this study leads to several recommendations for future research. First, in future studies on the MSI researcher should consider excluding certain items, such as “weight loss” or “nasal bleeding” because poor item performance that was found, is consistent with the work of Lee et al. (2010). Second, further research is needed to strengthen the psychosomatic symptom sub-scale of the MSI to be more sensitive to differences by race/ethnicity and menopausal status. Next, translation of the MSI into other languages and adaptations of the words/terms for non-English speakers could be carefully made to make the MSI more applicable to those who are not fluent in

English. Finally, health care providers who plan to develop interventions for diverse racial/ethnic groups of midlife women undergoing menopausal transitions should consider using the MSI to assess women's symptoms of menopause. Comprehensive assessment of racially/ethnically types and clusters of symptoms of menopause, using an appropriate instrument, is essential for clinicians to develop culturally appropriate, individualized interventions for diverse groups of midlife women.

Limitations

This study has limited external validity, because the web-based administration of the MSI instrument could differ from the paper format in which it was originally validated. Due to the use of an Internet survey, midlife women who did not have Internet access are likely missed. This would include those who are impoverished, had a low education level, and/or were not familiar with English terms for their symptoms of menopause. Furthermore, because this was a secondary data analysis, it was not possible to evaluate potential disparities in education and socioeconomic status among respondents that might have contributed to differences in symptom experiences in racial/ethnic minority populations of midlife women.

Conclusion

In evaluating the psychometric performance of the MSI, the instrument had adequate reliability, but the psychosomatic symptoms of menopause should not be used as a separate subscale based on the poor internal consistency estimates across groups. From this study's findings, the psychometric properties of the MSI showed sufficient reliability to recommend its use in the evaluation of symptoms of menopause among diverse racial and ethnic groups of midlife women of differing menopausal statuses. Thus, the MSI could be used to help health care providers accurately assess symptoms of menopause of midlife women from different racial/ethnic backgrounds.

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Table 1:

Sociodemographic and Clinical-related Characteristics of Participants ($N = 494$)

	Hispanics (*n* = 113, 23%)	Asian Americans (n = 120, 24%)	African Americans (*n* = 115, 23%)	Whites (*n* = 146, 30%)	χ^2 or *F*
			n (%)		
Age (Mean ± *SD)*	48.9 (5.6)	48.0 (6.4)	49.5 (6.4)	49.7 (5.9)	2.0
Marital status					24.5**
Married/partnered	74 (65.5)	99 (82.5)	62 (53.9)	107 (73.3)	
Single/separated	39 (34.5)	21 (17.5)	53 (46.1)	39 (26.7)	
Employment					15.8**
Yes	96 (85.0)	79 (65.8)	96 (83.5)	108 (74.0)	
No	17 (15.0)	41 (34.2)	19 (16.5)	38 (26.0)	
Income					26.6**
Very hard	14 (12.4)	10 (8.3)	16 (13.9)	42 (28.8)	
Somewhat hard	51 (45.1)	45 (37.5)	47 (40.9)	52 (35.6)	
Not hard	48 (42.5)	65 (54.2)	52 (45.2)	52 (35.6)	
Religion					126.2**
Protestant	16 (14.2)	25 (20.8)	39 (33.9)	52 (35.6)	
Catholic	69 (61.1)	16 (13.3)	17 (14.8)	23 (15.8)	
Others	19 (16.7)	38 (31.7)	45 (39.1)	34 (23.3)	
None	9 (8.0)	41 (34.2)	14 (12.2)	37 (25.3)	
Country of Birth					209.8**
United States	83 (73.5)	33 (27.5)	111 (96.5)	142 (97.3)	
Outside United States	30 (26.5)	87 (72.5)	4 (3.5)	4 (2.7)	
Level of education					19.1**
High school	12 (10.6)	14 (11.7)	7(6.1)	16 (11.0)	
Associate's degree	40 (35.4)	17 (14.2)	23 (20.0)	37 (25.3)	
Bachelor's degree	61 (54.0)	89 (74.1)	85 (73.9)	93 (63.7)	
Menopausal status					13.0
Premenopausal	20 (17.7)	25 (20.8)	22 (19.1)	17 (11.6)	
Early perimenopausal	32 (28.3)	32 (26.7)	44 (38.3)	62 (42.5)	

	Hispanics (*n* = 113, 23%)	Asian Americans (n = 120, 24%)	African Americans (*n* = 115, 23%)	Whites (*n* = 146, 30%)	χ^2 or *F*
			n (%)		
Late perimenopausal	33 (29.2)	36 (30.0)	27 (23.5)	40 (27.4)	
Postmenopausal	28 (24.8)	27 (22.5)	22 (19.1)	27 (18.5)	
Diagnosed Disease					24.8**
Yes	59 (52.2)	32 (26.7)	62 (53.9)	76 (52.1)	
No	54 (47.8)	88 (73.3)	53 (46.1)	70 (47.9)	
Self-reported Health					20.9**
Healthy	83 (73.5)	95 (79.2)	94 (81.7)	106 (72.6)	
Don’t know	3 (2.6)	13 (10.8)	6 (5.2)	5 (3.4)	
Unhealthy	27 (23.9)	12 (10.0)	15 (13.1)	35 (24.0)	

* $p < .05$.

** $p < .01$

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Table 2:

Internal Consistency of the Midlife Women's Symptom Index, by Racial/Ethnic Group (N = 494)

	Hispanics (n= 113)	Asian Americans (n = 120)	African Americans (n= 115)	Whites (n= 146)
Prevalence (KR-20)				
TMS	0.93	0.92	0.92	0.92
PMS	0.90	0.86	0.85	0.86
CMS	0.90	0.91	0.89	0.90
SMS	0.66	0.64	0.64	0.58
Severity (Cronbach's alpha)				
TMS	0.95	0.95	0.93	0.94
PMS	0.93	0.90	0.87	0.89
CMS	0.93	0.93	0.91	0.92
SMS	0.70	0.68	0.61	0.60

Note. TMS = total symptoms of menopause; PMS = physical symptoms of menopause; CMS = psychological symptoms of menopause; SMS = psychosomatic symptoms of menopause.

Table 3:

Item Analyses of the Midlife Women's Symptom Index, by Racial/Ethnic Subgroup ($N = 494$)

	Item-Total Correlation Coefficients (Range)			
	Hispanics (*n*= 113)	**Asian Americans (*n* = 120)**	**African Americans (*n*= 115)**	**Whites (*n* = 146)**
Prevalence				
TMS	−.07~.73	−.04~.66	−.06~.63	.06–.65
PMS	−.06~.58	.05~.61	.00~.58	.05~.57
CMS	.36~.73	.44~.73	.39~.69	.37~.73
SMS	.61~.76	.56~.78	.44~.82	.53~.78
Severity				
TMS	~.05~.73	−.03~.68	−.01~.63	.02~.66
PMS	−.07~.61	.04~.62	.03~.60	−.01~.58
CMS	.36~.78	.42~.72	.39~.70	.37~.71
SMS	.58~.80	.53~.80	.41~.81	.42~.79

Note. TMS = total symptoms of menopause; PMS = physical symptoms of menopause; CMS = psychological symptoms of menopause; SMS = psychosomatic symptoms of menopause.

Table 4:

An ANOVA Analysis of the Midlife Women's Symptom Index Scores by Race/Ethnicity and by the Menopausal Status (N = 494)

	Hispanics (n = 113)	Asian Americans (n = 120)	African Americans (n = 115)	Whites (n = 146)	ANOVA F		
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	**Race/ethnicity**	**Menopausal status**	**Interaction**
Prevalence TMS					3.32 *	4.29 **	.36
Premenopause	16.5 (10.1)	12.2 (10.1)	12.1 (9.2)	16.1 (12.7)			
Early perimenopause	18.0 (11.8)	12.6 (11.0)	14.3 (9.9)	17.0 (10.6)			
Late perimenopause	22.1 (15.7)	16.7 (12.2)	17.4 (12.2)	19.8 (13.4)			
Postmenopause	16.4 (10.1)	13.4 (9.3)	16.0 (11.5)	13.2 (8.6)			
Prevalence PMS					3.01 **	4.31 **	.52
Premenopause	9.4 (6.6)	6.8 (5.5)	7.5 (5.6)	8.5 (6.8)			
Early perimenopause	11.0 (7.4)	6.7(5.9)	9.4 (6.2)	10.2 (6.2)			
Late perimenopause	13.0 (10.5)	9.9 (7.4)	10.4 (7.5)	12.2 (8.2)			
Postmenopause	10.0 (6.5)	9.2 (5.9)	10.5 (6.4)	8.6 (5.7)			
Prevalence CMS					2.46	4.22 **	.55
Premenopause	5.8 (3.7)	4.6 (4.8)	4.1 (4.3)	6.4 (6.0)			
Early perimenopause	5.7 (5.3)	5.0 (5.0)	3.7 (3.7)	5.6 (4.9)			
Late perimenopause	7.5 (5.4)	5.6 (5.2)	5.9 (4.9)	6.1 (4.9)			
Postmenopause	5.3 (4.8)	3.4 (4.2)	4.3(4.7)	3.4 (3.7)			
Prevalence SMS					2.77 *	1.95	.39
Premenopause	1.3 (1.3)	0.8 (1.0)	0.6 (.7)	1.1 (1.3)			
Early perimenopause	1.3 (1.3)	0.9 (1.2)	1.2 (1.2)	1.2 (1.1)			
Late perimenopause	1.6 (1.4)	1.2(1.2)	1.1 (1.1)	1.5 (1.2)			
Postmenopause	1.2(1.2)	.9 (1.1)	1.2 (1.3)	1.1 (1.0)			
Severity TMS					3.76 *	4.28 **	.37
Premenopause	45.4 (34.3)	31.9 (29.7)	33.8 (29.4)	48.9 (42.3)			
Early perimenopause	56.5 (46.4)	38.1 (40.5)	41.5 (28.9)	49.3 (34.6)			
Late perimenopause	70.3 (61.3)	48.6 (44.9)	52.0 (41.5)	60.1 (49.8)			
Postmenopause	50.6 (38.2)	35.1(27.0)	49.0 (44.2)	37.6 (30.8)			
Severity PMS					3.56 *	4.42 **	.41

	Hispanics (*n* = 113)	Asian Americans (*n* = 120)	African Americans (*n* = 115)	Whites (*n* = 146)	ANOVA *F*		
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	Race/ethnicity	Menopausal status	Interaction
Premenopause	25.1 (20.0)	16.8 (15.7)	21.3 (19.9)	24.4 (21.9)			
Early perimenopause	32.9 (26.8)	19.7 (21.0)	27.3 (18.5)	28.7 (19.8)			
Late perimenopause	39.9 (39.3)	27.3 (25.7)	30.3 (25.4)	37.4 (31.2)			
Postmenopause	29.5 (24.4)	23.1 (16.1)	21.6 (23.8)	24.0 (18.6)			
Severity CMS					2.91*	3.70*	.75
Premenopause	15.8 (12.8)	12.8 (13.3)	10.3 (11.5)	20.5 (20.0)			
Early perimenopause	18.8 (21.3)	15.3 (18.3)	10.5 (10.9)	16.7 (16.3)			
Late perimenopause	24.8 (21.9)	17.4 (19.4)	18.3 (16.5)	17.5 (17.4)			
Postmenopause	16.8 (16.7)	9.4 (12.6)	13.1 (18.7)	10.4 (14.3)			
Severity SMS					3.95**	1.66	.45
Premenopause	4.5 (5.2)	2.4 (3.1)	2.2 (2.5)	3.9 (4.9)			
Early perimenopause	4.8 (4.9)	3.1 (4.4)	3.8 (3.9)	3.87 (3.7)			
Late perimenopause	5.6 (5.4)	3.9 (4.4)	3.4 (3.7)	5.2 (4.6)			
Postmenopause	4.4 (4.5)	2.63 (3.6)	4.36 (5.3)	3.59 (3.4)			

Note. TMS = total symptoms of menopause; PMS = physical symptoms of menopause; CMS = psychological symptoms of menopause; SMS = psychosomatic symptoms of menopause.

* $p < .05$.

** $p < .01$.

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