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Menopausal Symptoms Among Four Major Ethnic Groups in the U.S

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Abstract

The purpose of the study was to explore ethnic differences in symptoms experienced during the menopausal transition among four major ethnic groups in the U.S. This study was done via a cross-sectional Internet survey among 512 midlife women recruited using a convenience sampling. The instruments included: questions on background characteristics, health, and menopausal status, and the Midlife Women's Symptom Index. The data was analyzed using descriptive and inferential statistics. Significant ethnic differences in the total number and severity of the symptoms were found. The most frequently reported symptoms and predictors of the total number and severity of the symptoms differed by ethnic identity. More in-depth cultural studies are needed to understand the reasons for the ethnic differences in menopausal symptom experience.

Keywords

Ethnicity; Menopausal Symptom; Midlife Women

The increasing ethnic and racial diversity of the U.S. population requires rethinking health care practices. According to projections by the U.S. Census Bureau (USCB), by the year 2020 non-Hispanic Whites will comprise only 64 percent of the population, down from almost 75 percent in 2000 (U.S. Census Bureau [USCB], 2000). This changing racial and ethnic composition of the U.S. population makes it necessary for health professionals to be aware of cultural diversities in health/illness experience, including menopausal symptom experience, and to practice health care with greater cultural competence. Despite the increasing need for culturally competent care, very little is still known about ethnic diversities and variations in menopausal symptom experience (Andrist & MacPherson, 2001; Thurston, Matthews, & Everson Rose, 2009). This lack of knowledge could easily result in culturally inadequate or inappropriate health care for more than 4 million menopausal women in ethnic minority groups (Bell, 1995; Strickland & Dunbar, 2000). Moreover, research on menopausal symptoms rarely incorporates women's own perspectives on menopausal symptom experience (Andrist & MacPherson, 2001).

Ethnic Differences in Menopausal Symptom Experience

Many researchers and women themselves have begun to consider menopause a normal transition in women's lives (Avis et al., 2001; Andrist & MacPherson, 2001). However, women's ability to manage symptoms associated with this life transition has been reported to greatly influence their quality of life and impose physical, psychological, and economic burdens (Chen et al., 2008; Chiu et al., 2006; Waidyasekera et al., 2008; Umland, 2008). Thus, strengthening women's ability to manage symptoms during the menopausal transition in culturally competent ways is imperative for the health and well-being of more than 40 million midlife women in the U.S. (Thurston et al., 2009).

Recent studies, including the Study of Women's Health across the Nation (SWAN), have indicated significant ethnic differences in menopausal symptoms (Avis et al., 2001; Fu, Anderson, & Courtney, 2003; Kravitz et al., 2003; Lasley et al., 2002; Lovejoy et al., 2001; McCrohon, Woo, & Celermajer, 2000; Probst-Hensch et al., 2000; Randolph et al., 2003; Wilbur et al., 1998). Menopausal symptoms among Brazilian women were highly prevalent and similar to those described among Western women (Pedro et al., 2003). However, only a few Asian women (12–20%) reported the experience of "typical menopausal symptoms" (Chim et al., 2002; Im & Meleis, 2000; Lock & Kaufert, 2001; Pan et al., 2002). No hot flashes were even reported among Mayan women in Mexico (Beyene & Martin, 2001).

Despite the increasing need for cultural competence in menopausal symptom management, our current knowledge is not adequate to direct culturally competent management of symptoms for the increasing number of ethnic minority women reaching midlife. Most studies have not focused on ethnic populations in the U.S., and few of them have been national in scope (Gold et al., 2000; 2006; Sampselle et al., 2002). Reaching women from each major ethnic group in numbers that produce valid comparative data is methodologically difficult (Avis et al., 2001; Gold et al., 2000). Furthermore, little is known about the etiology of the ethnic differences in menopausal symptoms (Avis et al., 2003; Luborsky et al., 2002). The etiology of the ethnic differences is multifactorial, driven not only by biological differences, but also by pronounced differences in social, economic, and cultural conditions among groups (Thurston et al., 2009). Researchers have asserted that better understanding of the racial and ethnic differences is an important area for future research on menopausal symptoms (Thurston et al., 2009).

Purpose

The purpose of the study was to collect national data on specific ethnic differences in menopausal symptom experience among four major ethnic groups in the U.S. (Non-Hispanic Whites, Hispanic, non-Hispanic African Americans, and non-Hispanic Asians). This was part of a larger study comparing the menopausal symptom experience of four major ethnic groups in the U.S. through an Internet survey and qualitative online forums (Im, Lee, Chee, Dormire, & Brown, in press; Im, Liu, Dormire, & Chee, 2008;). Only the findings from the Internet survey are presented in this paper. The Internet method was used to reach an adequate number of ethnic minorities because ethnic minority populations in a specific geographical area are limited. The specific aims were:

Aim #1. Explore ethnic differences in menopausal symptom experience reported by four of the most common ethnic groups of women across the U.S. (Hispanic, non-Hispanic (N-H) White, N-H African American, and N-H Asian). The research questions (RQs) addressed were:

RQ1.1. What are the most frequently reported menopausal symptoms (MS), perceived causes of MS, meanings of MS, and management strategies for MS by ethnic group?

RQ1.2. What are ethnic differences in women's self-reported menopausal symptoms (MS)?

Aim #2. Explore ethnic-specific contexts of women's daily lives that influence women's self-reported menopausal symptom experience in each ethnic group. The research question (RQs) addressed was:

RQ2.1. What are the relationships between contextual factors (sociodemographic characteristics, availability of social supports, smoking status, physical activity, soy consumption, BMI, menopausal status) and women's self-reported menopausal symptoms in each ethnic group?

Conceptual and Theoretical Basis

In this study, a feminist approach was used to guide the research process. More details on the feminist approach that was used in this study can be found elsewhere (Im, 2007). In this study, a feminist approach was chosen because it not only helps disclose ethnic minority women's perceptions of menopausal symptom experience, but also provides a contextual understanding of menopause in ethnically diverse situations. Throughout the research process of the study, we took a feminist stance and assumed that inadequate management of menopausal symptoms reported by ethnic minority groups of women does not come only from purely biological factors, but may also come from women's interactions with their environments.

We also prioritized women's views and experiences. Feminists observe that, when science is misused to support predominant androcentric and ethnocentric views and interests, those who are not part of dominant groups are marginalized, and their issues deemed irrelevant or treated inaccurately when research occurs (Andrist & MacPherson, 2001; Hesse-Biber & Piatelli, 2007; Ford-Gilboe & Campbell, 1996). Therefore, feminist researchers consider research participants' own views, perspectives, opinions, and experiences as much as or more than researchers' (Andrist & MacPherson, 2001; Hesse-Biber & Piatelli, 2007; Hall & Stevens, 1991). In this study, we used the Midlife Women's Symptom Index (MSI) that allows for reporting of a wide range of symptoms rather than instruments measuring fewer menopausal symptoms (which have been developed among Western women and list symptoms that are prevalent among Western women).

Finally, all feminist theory posits gender as a significant characteristic that interacts with factors such as race, ethnicity, and class to structure relationships among individuals (Ford-Gilboe & Campbell, 1996; Hesse-Biber & Piatelli, 2007). In this study, we viewed ethnicity as one of the significant characteristics that circumscribe women's menopausal symptom experience, and we tried to see how other contextual factors including socioeconomic status influenced the women's menopausal symptoms.

In this study, the term "symptom experience" refers to subjective experiences reflecting changes in a person's bio-psycho-social function, sensation, and cognition (Blacklow, 1983). Here, menopausal symptoms refer to the symptoms experienced during the menopausal transition. We studied symptoms that women themselves perceived as resulting from menopause. The current nomenclature for female reproductive senescence is confusing, although the World Health Organization (WHO) and the Council of Affiliated Menopause Societies (CAMS) have attempted to address these concerns (Den Tonkelaar et al., 2002; Soules et al., 2001a; 2001b; WHO, 1998; Utian, 1999). At the Stages of

Reproductive Aging Workshop (STRAW) in 2001, a revision in the nomenclature was proposed (Soules et al., 2001a; 2001b). We followed the STRAW revision in this study. Thus, menopause means the anchor point that is defined after 12 months of amenorrhea following the final menstrual period, which reflects a near complete but natural decrease in ovarian hormone secretion. Menopause is classified as natural or surgical menopause. Natural menopause is defined as the permanent cessation of menstruation resulting from the loss of ovarian follicular activity (recognized to have occurred after 12 consecutive months of amenorrhea), for which there is no other obvious pathological or physiological cause. Surgical menopause is defined as the cessation of menstruation resulting from removal of the uterus, with or without bilateral oophorectomy. The menopausal transition means the period that begins with variation in menstrual cycle length in a woman who has a monotropic FSH rise and ends with the final menstrual period.

The menopausal transition can be categorized into several stages. In the SWAN study, the menopausal status was categorized into pre-, early peri-, late peri-, and post-menopausal (Avis et al., 2001). In this study, we used the categories used in the SWAN study because the focus of the study was similar to the SWAN study. Thus, when a woman reported menses in the previous 3 months, with no increase in irregularity, she was regarded as pre-menopausal. Women who had menstrual bleeding in the previous 3 months, but who had experienced increasing irregularity in cycle length over the past year were regarded as early peri-menopausal. Women with menses in the previous 12 months but not in the previous 3 months were considered late peri-menopausal. Women who had no menstrual bleeding in the previous 12 months (not due to medication, pregnancy, or severe weight loss) were regarded as postmenopausal.

Methods

This was a cross-sectional descriptive Internet survey study. The study was approved by the Institutional Review Board of the institution where the researchers were affiliated. More details on the methodological issues related to this study can be found elsewhere (Im & Chee, In press).

Settings and Participants

Since this study explored ethnic differences in menopausal symptom experience, it was important to reach middle-aged women in geographically dispersed areas, in order to gather a sufficient number of subjects for each ethnic group. Thus, Internet communities/groups among middle-aged women (ICMWs) and Internet communities/groups for ethnic minorities (ICEMs) in the U.S. formed by churches, organizations, forums, health care centers, and professional groups, all of which were ethnic specific, were contacted and asked to announce the study.

Using a quota sampling method, 512 research participants (160 N-H Whites, 120 Hispanics, 121 N-H African Americans, and 111 N-H Asians) were recruited using multiple strategies through the Internet settings (ICMWs and ICEMs). Participants were included in the Internet survey if they were middle-aged women between 40 and 60 years old who could read and write English, who were online, and whose self-reported ethnic identity was Hispanic, N-H White, N-H African American, or N-H Asian. "Middle-aged" meant the period of life from age 40 to age 60 when women go through physiological changes associated with the cessation of menstruation. Being "online" meant that the women were familiar with the Internet as a medium of communication and had regular access to it.

The reason for excluding women under 40 and over 60 was that most women experience menopause around the age of 50, ranging from 40 to 60 years old (U.S. Department of

Health and Human Services [USDHHS], 2001). Women who go through menopause before 40 years old are regarded as prematurely menopausal (USDHHS, 2001). Since it was not possible to offer the survey in every language and dialect we might encounter, only English was used throughout the research process. Thus, only those who could read and write English were recruited. The four ethnic groups were chosen because they were general enough to capture many or most ethnicities but specific enough to allow us to examine ethnic differences, and because these four are the most common ethnic groups in the U.S. (USCB, 2000). For this study, quota sampling by menopausal status and socioeconomic status was used to recruit an adequate number of women from each socioeconomic level and stage of menopause.

Sample size calculation was based upon the most complex multivariate analysis conducted in the study, multiple regressions to predict the total number and total severity of menopausal symptoms (MS) with 14 contextual factors in each ethnic group. With an alpha level of 0.05, a moderate effect size ($R^2 = 0.40$), and a power level of 0.80, 108 research participants per ethnic group (a total of 432) would be needed to detect a statistically significant relationship in a standard regression equation with 14 predictors (Borenstein & Cohen, 1988). The moderate effect size was assumed based on the findings of previous studies (Avis et al., 2001; Brzyski et al., 2001; Gold et al., 2000). This sample size was sufficient to explore ethnic differences in the total number of MS, the total severity of MS, and the severity of each MS using analysis of variance (ANOVA). With an effect size of about 0.20 assumed based on the findings of previous cross-cultural studies (Avis et al., 2001; Gold et al., 2000; 2006) and an alpha level of 0.05, about 68 participants would be needed to detect a statistically significant difference with power greater than 0.80 (Cohen, 1988). This sample size was also sufficient to explore a difference in the frequency of each individual MS by self-reported ethnic identity using chi-square tests. With an effect size of 0.20 based on the previous studies (Avis et al., 2001; Gold et al., 2000; 2006) and an alpha level of 0.05, 386 women were needed to detect a statistically significant difference with power greater than 0.80.

Instruments

Background Characteristics—Fourteen questions on age, education, religion, marital status, employment, financial status, body weight, height, smoking status, perceived social support, number of close friends/relatives, number of children, level of physical activity, and soy consumption were used to describe background characteristics of the participants. Socioeconomic status was determined using the same question used in the SWAN study because this study had a similar focus. Thus, in this study, SES was determined based on the women's self report on their degree of difficulty in paying for basics, and categorized into: (a) low (very hard to pay for basics), (b) middle (somewhat hard to pay for basics), and (c) high (not hard to pay for basics). For data analysis, body mass index (BMI) was calculated in kg/m^2 from the self-reported height and weight at the time of the Internet survey and added as a variable.

Ethnicity-related Factors—Self-reported ethnic identity was measured using the ethnic identity question required in NIH guidelines with an open space where participants could describe their specific ethnicity. Race was specified with the categories required by the NIH format, and a question about country of birth was included. When the country of birth was not the U.S., degree of acculturation was measured using six questions about length of stay in the U.S. and preferences for foods, music, customs, language, and close friends. Length of stay in the U.S. was measured in months or years. Preferences for foods, music, customs, language, and close friends were measured using a Likert scale (1=exclusively own ethnic group, 5=exclusively American). These five questions were adopted from the Suinn-Lew

Asian Self-Identity Acculturation Scale (SL-ASIA) (Suinn, Ahuna, & Khoom, 1992), and modified to measure level of acculturation among multiethnic groups. The level of acculturation was calculated by summing the five items, which can range from 5 to 25. The reliability and content validity of the modified five questions were supported in previous studies (Im & Chee, 2005; Im et al., 2005). The reliability of the questions in the study was high (Cronbach's $\alpha=0.98$).

Health and Menopausal Status—Self-reported health status was measured using one Likert scale item rating general health and two open-ended questions on diagnosed diseases and medicine. Self-reported menopausal status was determined using seven items asking about last menstrual cycle, menstrual regularity, and menstrual flow. Menopausal status was categorized into pre-menopause, early peri-menopause, late peri-menopause, and post-menopause based on the data collected through these seven items. As mentioned above, we chose to use the categories of the menopausal status used in the SWAN study.

Menopausal Symptom Experience—Self-reported symptom experience during the menopausal transition was measured using the Midlife Women's Symptom Index (MSI) (Im, 2006). The MSI includes 73 items, which can be categorized into physical, psychological, and psychosomatic symptoms. The MSI includes an open-ended question about other symptoms (that participants might be experiencing, but not included in the MSI), severity measures (5-point Likert scales), and open-ended questions on the perceived causes, meanings of, and management strategies for menopausal symptoms. The reliability of the MSI was supported in multi-ethnic groups (test-retest correlation, $r = 0.94 - 0.98$), and the content validity was supported by expert reviews (Im, Meleis, & Lee, 1999; Im, 2006). The reliability of the MSI in this study was high (Cronbach's $\alpha=0.95$).

Data Collection Procedures

A website conforming to the Health Insurance Portability and Accountability Act (HIPAA) and the SANS/FBI recommendations was developed and published on an independent, dedicated website server consisting of five Pentium-based computers. The website contained an informed consent sheet, Internet survey questions, and ethnic-specific online forum sites. When potential participants visited the project website, the opening page explained the general purpose of the study, and visitors were asked to click to enter the "informed consent sheet." Informed consent was obtained through the Internet by asking them to click the "I agree to participate" button. When they clicked the button, they were queried to verify that they met the inclusion criteria (age, literacy, Internet access, and ethnic identity). Then, questions on menopausal symptoms (MS) and socioeconomic status (SES) were asked. Only those women who had the ethnicity, MS, and SES characteristics of the strata that still needed participants were automatically connected to the Internet survey web page. When participants were connected to the Internet survey web page, through the Internet, they were asked to answer the questions on background characteristics, ethnicity-related factors, health and menopausal status, and the MSI. While the participants were entering their answers, several random questions that participants had already answered were repeated to check consistency for the purpose of identity verification.

Data Management and Analysis

The Internet survey data were directly saved in the ASCII format and were analyzed using the Statistical Package for Social Science. When a participant submitted her answers to the Internet survey questionnaire, the validity of the data and the missing fields were automatically checked by the Java script codes attached to the questionnaire. If missing fields or invalid data (outliers) were detected by the codes, the participant was reminded to enter her answers for the missing fields or to provide valid data by a server-side program. If

the participant did not enter her answers for the missing fields even after the reminder, and the missing fields were less than 10%, the participant's data was included in the data analysis, using mean substitution to determine the value of missing data for continuous variables and allowing missing data for categorical variables (missing data was categorized as "999"). Participants for whom 10% or more data was missing were not included in the data analysis. To describe characteristics of the research participants and to address research question 1.1 (RQ1.1), the data on background characteristics, ethnicity-related factors, health and menopausal status, and menopausal symptoms were analyzed using descriptive statistics, including frequency, percentage, proportion, mean, standard deviation, range, skewness, kurtosis, and 95% confidence intervals. Data from the open-ended questions in the MSI on perceived causes and meanings of MS and management strategies for MS were printed from the ASCII files of the Internet survey data as transcripts. Then, the printed data was reviewed and coded using the content analysis suggested by Weber (1990). Units of analysis were individual words that the participants entered, and the words in the data were classified into categories that emerged from the coding process. The categories were described with frequencies and percentages. To address RQ1.2, the data were analyzed using ANOVA and chi-square tests. For ANOVA, Tukey's Honestly Significant Differences (HSD) test was used to assist in interpreting any significant effects. For chi-square tests, we assumed each observation was independent and the categories were mutually exclusive. To evaluate the nature and extent of any differences found in chi-square tests, the adjusted residuals were inspected.

To address RQ2.1, the data were analyzed using multiple regression analysis. Standard stepwise regression analyses were performed to determine the relative contributions of selected contextual factors to the predictions of the total number of menopausal symptoms. Dummy variables were calculated to represent key categorical variables as a series of dichotomous variables in the regressions. Bivariate correlations were then computed among all variables to determine the degree of multicollinearity among predictors and to determine the relationship of each to the outcome measure. As part of the regression analyses, scatter plots of residuals were examined to evaluate the assumptions of linearity and equality of variance. Tolerance statistics associated with each variable were examined to detect possible multicollinear relationships in the regression equations. Separate analyses were conducted for each major ethnic group, and the beta weights of predictors were examined to determine their relative contributions in each equation. The R^2 associated with the equations for each group were compared to determine if the set of predictors examined here were more predictive of perceived menopausal symptoms for some ethnic groups than for others.

Results

Menopausal Symptoms

Background characteristics, ethnicity-related factors, and health and menopausal status of the participants are summarized in Table 1. There were ethnic differences in the most frequently experienced menopausal symptoms ($\chi^2=7.93$, $p<.05$). Across the ethnic groups, "feeling hot or cold" was the most frequently reported symptom, and "forgetfulness" was the second most frequently reported symptom. The most frequently experienced menopausal symptom among N-H Whites, Hispanics, and N-H African Americans was "feeling hot or cold"; among N-H Asians it was "decreased sexual interest." "Forgetfulness" was among the top 10 most frequently reported symptoms for all the ethnic groups, and "hot flush" was one of the top 10 most frequently reported symptoms for all of the ethnic groups except N-H Asians. "Urination at night" was reported as one of the top 10 frequently experienced symptoms only among N-H Whites and N-H African Americans. "Muscle and joint stiffness" was reported only among N-H Whites and N-H Asians. "Decreased sexual interest" was reported only among Hispanics and N-H Asians. "Weight gain" was not one of

the top 10 frequently reported symptoms among N-H Whites. The most frequently reported perceived cause of symptoms was “menopause” across the ethnic groups, and “I don’t know,” “existing diseases,” “stress,” and “natural aging process” were also common perceived causes of symptoms across ethnic groups. The most frequently used management strategy across the ethnic groups was “no management”; “rest” and “medication” were used across all ethnic groups; and “trying to be optimistic” and “trying to calm down” were used only by N-H Asians. “No meaning” was the most frequently reported meaning of the symptoms across the ethnic groups.

Ethnic Differences in Menopausal Symptoms

There was a statistically significant ethnic difference in the total number of symptoms experienced during the menopausal transition ($F=7.98$, $p<0.01$); that of physical symptoms ($F=8.25$, $p<0.01$); that of psychological symptoms ($F=7.10$, $p<0.01$); and that of psychosomatic symptoms ($F=11.20$, $p<0.01$). Hispanics reported significantly larger numbers of total symptoms, physical symptoms, and psychosomatic symptoms than N-H Asians. N-H Whites reported significantly larger numbers of total symptoms, physical symptoms, psychological symptoms, and psychosomatic symptoms than N-H Asians. N-H African Americans reported a significantly larger number of psychosomatic symptoms than N-H Asians. There were statistically significant ethnic differences in the frequencies of 41 individual symptoms (see Table 2).

There was a statistically significant ethnic difference in the total severity of total symptoms experienced during the menopausal transition ($F=12.71$, $p<0.01$), that of physical symptoms ($F=13.33$, $p<0.01$), that of psychological symptoms ($F=7.01$, $p<0.01$), and that of psychosomatic symptoms ($F=12.64$, $p<0.01$). Hispanics reported significantly higher severity scores of total symptoms, physical symptoms, and psychosomatic symptoms compared with N-H Asians. Whites reported significantly higher severity scores of total symptoms, physical symptoms, and psychosomatic symptoms compared with N-H African Americans. Whites reported significantly higher severity scores of total symptoms compared with N-H Asians. N-H African Americans also reported significantly higher severity scores of the total symptoms, physical symptoms, and psychosomatic symptoms compared with N-H Asians. There were statistically significant ethnic differences in the severity of 10 individual symptoms (see Table 3).

Relationships between Contextual Factors and Menopausal Symptoms

Among all participants, age, employment, income level, ethnicity (being Asians), general health status, BMI, and menopausal status were significant predictors of the total number of total symptoms with an alpha level of 0.05 (see Table 4). The 14 predictors explained about 23% of the total variance of the total number of the total symptoms. Among N-H Whites, age, income level, general health status, and menopausal status were significant predictors of the total number of total symptoms ($p<0.01$); among Hispanics, employment and BMI were significant predictors of it ($p<0.01$); among N-H African Americans, income level and BMI were significant predictors of it ($p<0.01$); and among N-H Asians, the level of acculturation and the level of physical activity were significant predictors of it. ($p<0.01$). The 14 predictors explained about 35% of the total variance of the total number of the total symptoms among N-H Whites, 23% among Hispanics, 15% among N-H African Americans, and 15% among N-H Asians.

Among all participants, age, employment, income level, ethnicity (being Asians), smoking status, general health status, BMI, and menopausal status were significant predictors of the total severity of total symptoms with an alpha level of 0.05 (see Table 5). The 14 predictors explained about 27% of the total variance of the total severity of the total symptoms. Among

N-H Whites, age, income level, general health status, and BMI were significant predictors of the total severity of total symptoms ($p<0.01$); among Hispanics, employment and BMI were significant predictors ($p<0.01$); among N-H African Americans, income level and BMI were significant predictors ($p<0.01$); and among N-H Asians, only the level of physical activity was a significant predictor ($p<0.01$). The 14 predictors explained about 42% of the total variance of the total severity of the total symptoms among N-H Whites; 27% among Hispanics; 22% among N-H African Americans; and 16% among N-H Asians.

Discussion

The findings reported in this paper supported significant ethnic differences in the total number and total severity of the total, physical, psychological, and psychosomatic symptoms. Studies on menopausal symptoms have reported inconsistent findings on ethnic differences in menopausal symptoms, especially vasomotor symptoms; some reported significant ethnic differences (Gold et al., 2000; National Health and Nutrition Examination Survey [NHANES], 2003), while others reported non-significant ethnic differences (Brown et al., 2001; Pham, Grisso, & Freeman, 1997). The findings reported in this paper agree with the former.

The findings also indicated differences in the most frequently reported symptoms by self-reported ethnic identity, which reaffirms findings in the most current literature. Recent studies have indicated that post-menopausal women from Asian countries reported backaches, muscle pain, shoulder pain, or joint pain, but suffered less frequently from vasomotor disturbances (Ho et al., 2003; Haines et al., 2005). The findings of this study also indicated that “hot flush” was not in the top 10 list of the most frequently reported symptoms among N-H Asians and that “muscle and joint stiffness” was reported only among N-H Asians and N-H Whites as being in the top 10 most frequently reported symptoms.

The perceived causes of and management strategies for symptoms were similar across the ethnic groups. Studies have reported that women’s attitudes, beliefs, and values primarily influence their decision making on management strategies for menopausal symptoms (Theroux & Taylor, 2003; Hall et al., 2007). Women with more positive or optimistic outlooks about menopause (for instance, those who considered menopause not illness but part of the normal aging process) were less likely to use the medication to treat symptoms and were able to tolerate symptoms (Theroux & Taylor, 2003; Fu et al., 2003). In contrast, a pessimistic appraisal of menopause was significantly related to increased numbers of symptoms (Busch et al., 2003). In this study, the findings on management strategies for and the meaning of symptoms showed that the midlife women across the ethnic groups considered menopausal symptoms a sign of aging and a result of their normal lifespan development. Most women chose “no management” as a management strategy, and only those who had serious symptoms took medications for temporary relief. Interestingly, many N-H Asians adopted mind control strategies such as “trying to be optimistic” and “trying to calm down” to manage symptoms.

The findings also supported that ethnicity was a significant predictor of the total number or severity of symptoms across ethnic groups, and that level of acculturation was a significant predictor of the total number of total symptoms among N-H Asian women, which agrees with previous studies. Several studies demonstrated reduced frequencies of menopausal symptoms among Asian women (Green & Santoro, 2009; Thurston et al., 2008a; Thurston et al., 2008b; Appling, Paez, & Allen, 2007; Gold et al., 2006). In a study by Im et al. (1999), the mean number of menopausal symptoms was significantly different based on the length of stay in the U.S. (less than 10 years versus more than 10 years). Level of acculturation was

also associated with menopausal symptoms (Im et al., 1999; Bell, 1995). However, none of the ethnicity-related factors were significant predictors of the total number or severity of symptoms among the N-H White, N-H African American, and Hispanic women. A possible reason could be a lack of variation in the ethnicity-related factors among these three ethnic groups, which may be due to inherent limitations of Internet recruitment.

Also, this study indicated significant associations of sociodemographic status, lifestyle, and health-related contextual factors with menopausal symptoms, although the predictors were slightly different according to self-reported ethnic identity. Existing studies have reported that women with more menopausal symptoms tended to be over 50 years old, peri- or post-menopausal, and have low educational attainment or work as homemakers. In addition, they tended to have more children, report their health as not so good, have difficulty paying for basic necessities, smoke cigarettes, and rate themselves less physically active than other women of similar age (Gold, 2000; 2006; Ho et al., 2003). By contrast, women who were employed, or had higher levels of education or income reported better overall health and fewer menopausal symptoms (Brzyski et al., 2001). The study findings reported in this paper agree with previous studies in terms of its general predictors of the total number and total severity of symptoms. Some unique findings of this study were that BMI was not a significant predictor of the total number and total severity of menopausal symptoms among N-H Asians; that no income-related significant predictor was identified among N-H Asians; and that level of physical activity was a significant predictor only among N-H Asians. Also, the selected contextual variables tested in this study explained the total variance of the total number and the total severity of the total symptoms among N-H Whites better than any other ethnic groups.

The study has several limitations from inherent characteristics of Internet research. First, study participants tended to be a select group of midlife women, as mentioned above. Although we adopted a quota sampling method, low-income women were somewhat under-represented (about 19% of the total participants). Also, the participants tended to be highly educated women who could read and write English, excluding participants who could not read and write English. Furthermore, the sample might not represent sub-ethnic groups within each major ethnic group. Thus, the generalizability of the study findings is limited. Third, the data were collected through the Internet based only on self-reports; current technology for verifying online identity is limited. Thus, there was a possibility of inauthentic cases of midlife women (Im & Chee, In press).

Conclusion

Based on these findings, we conclude with the following suggestions for future research and health care practice for multi-ethnic midlife women in the U.S. First, health care providers and researchers need to consider ethnic differences in symptoms experienced during the menopausal transition in their health care practice and research projects. Second, as the findings indicated, most of the women in this study opted to live with symptoms because they considered them signs of normal developmental transition and aging. Thus, when a woman does express concerns about specific symptoms to a health care provider, the health care provider may need to comprehend that her complaints might signal that she considers her symptoms indicative of a more serious condition that she could not or does not want to tolerate. Third, health care providers and researchers need to consider the influences of contextual factors on menopausal symptom experience. As the findings reported in this paper indicate, contextual factors were certainly influencing the menopausal symptom experiences of midlife women across ethnic groups. Also, the significant predictors were different according to self-reported ethnic identity. More in-depth cultural studies on the relationships between contextual factors and menopausal symptoms would help health care

providers and researchers understand the reasons for the existence of ethnic differences in menopausal symptom experience. Finally, the study included only four major ethnic groups in the U.S., limiting the generalizability of the study findings. Further studies including diverse sub-groups of the major ethnic groups would also help complete the picture of ethnic differences in menopausal symptom experience.

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Table 1

Characteristics of the participants (N = 512)

Characteristics	NH White n (%)	Hispanic n (%)	NH AA n (%)	NH Asian n (%)	Total n (%)
<i>Age (M±SD)</i>	48.61±5.25	48.61±5.19	49.24±5.04	49.27±5.74	48.90±5.29
<i>Education</i>					
Low	3 (1.9)	5 (4.2)	0 (0.0)	5 (4.5)	13 (2.5)
Middle	85 (53.1)	54 (45.0)	47 (38.8)	20 (18.0)	206 (40.2)
High	72 (45.0)	61 (50.8)	74 (61.2)	86 (77.5)	293 (57.2)
<i>Marital status</i>					
Married/Partnered	98 (61.3)	83 (69.2)	70 (57.9)	95 (85.6)	346 (67.6)
Non-married/Partnered	62 (38.7)	37 (30.8)	51 (42.1)	16 (14.4)	166 (32.4)
<i>Employed</i>					
Yes	113 (70.6)	96 (80.0)	99 (81.8)	64 (57.7)	372 (72.7)
No	47 (29.4)	24 (20.0)	22 (18.2)	47 (42.3)	140 (27.3)
<i>Income</i>					
Very hard	45 (28.1)	25 (20.8)	16 (13.2)	10 (9.0)	96 (18.8)
Somewhat hard	57 (35.6)	42 (35.0)	48 (39.7)	42 (37.8)	189 (36.9)
Not hard	58 (36.3)	53 (44.2)	57 (47.1)	59 (53.2)	227 (44.3)
<i>Social support (M±SD) *</i>	2.79±1.02	2.87±1.06	2.72±1.12	2.86±0.99	2.81±1.04
<i>Level of physical activity (M±SD) **</i>	2.88±1.04	3.07±1.24	2.95±1.25	3.05±1.05	2.98±1.14
<i>Soy consumption (M±SD) ***</i>	1.64±0.84	1.68±0.95	1.64±0.94	2.69±0.91	1.88±1.00
<i>Country of birth</i>					
U.S.	157 (98.1)	96 (80.0)	118 (97.5)	30 (27.0)	401 (78.3)
Outside U.S.	3 (1.9)	24 (20.0)	3 (2.5)	81 (73.0)	111 (21.7)
<i>Level of acculturation (M±SD)</i>	21.33±3.06	13.75±3.19	16.67±0.58	13.51±2.22	13.86±2.78
<i>General health (M±SD) ****</i>	3.51±1.10	3.57±1.14	3.77±0.90	3.67±0.95	3.62±1.04
<i>BMI (kg/m²) (M±SD)</i>	29.92±8.68	28.47±7.09	31.17±8.55	23.95±4.50	28.58±7.97

Note.

* 1=none of the time ~ 4=most of the time,

** 1=much less than other women ~ 5=much more than other women,

1=none of the time ~ 4=most of the time,

 1=very unhealthy ~ 5=very healthy

Table 2

Differences in the frequency of individual symptoms (N = 512)

Symptoms	NH White n (%)	Hispanic n (%)	NH AA n (%)	NH Asian n (%)	Total n (%)	χ^2
Weight gain	72 (45.0)	61 (50.8)	66 (54.6)	37 (33.3)	236 (46.1)	11.91**
Neck and skull aches	101 (63.1)	72 (60.0)	57 (47.1)	50 (45.1)	280 (54.7)	12.93**
Thumping heartbeat	44 (27.5)	29 (24.2)	25 (20.7)	13 (11.7)	111 (21.7)	10.20*
Heart racing	65 (40.9)	32 (26.7)	30 (24.8)	20 (18.0)	147 (28.7)	18.84***
Difficulty breathing	30 (18.8)	16 (13.3)	16 (13.2)	4 (3.6)	66 (12.9)	13.45**
Ankle swelling	59 (36.9)	27 (22.5)	34 (28.1)	18 (16.2)	138 (27.0)	15.79**
Cold hands or feet	49 (30.6)	24 (20.0)	36 (29.8)	19 (17.1)	128 (25.0)	9.44*
Upset stomach	49 (30.6)	30 (25.0)	22 (18.2)	11 (9.9)	112 (21.9)	18.12***
Bloating	73 (45.6)	55 (45.8)	49 (40.5)	26 (23.4)	203 (39.6)	16.58***
Stomach pain	46 (28.8)	26 (21.7)	27 (22.3)	11 (9.9)	110 (21.5)	13.86**
Loose bowel movement	47 (29.4)	20 (16.7)	12 (9.9)	7 (6.3)	86 (16.8)	30.90***
Joint swelling	45 (28.1)	22 (18.3)	17 (14.1)	16 (14.4)	100 (19.5)	11.79**
Muscle and joint stiffness	105 (65.6)	57 (47.5)	56 (46.3)	48 (43.2)	266 (52.1)	17.65***
Sweating	68 (42.5)	39 (32.5)	56 (46.3)	19 (17.1)	182 (35.6)	26.40***
Prolonged healing time of skin	32 (20.0)	11 (9.2)	7 (5.8)	8 (7.2)	58 (11.3)	18.11***
Itching	45 (28.1)	26 (21.7)	19 (15.7)	11 (9.9)	101 (19.7)	15.40**
Skin rash	35 (21.9)	18 (15.0)	14 (11.6)	10 (9.0)	77 (15.0)	10.15*
Feeling hot or cold	134 (83.8)	81 (67.5)	94 (77.7)	46 (41.4)	355 (69.3)	60.42***
Hot flush	103 (64.4)	63 (52.5)	82 (67.8)	29 (26.1)	277 (54.1)	50.97***
Skin crawling	37 (23.1)	27 (22.5)	28 (23.1)	9 (8.1)	101 (19.7)	12.18**
Headache	53 (33.1)	36 (30.0)	21 (17.4)	14 (12.6)	124 (24.2)	20.35***
Exhaustion or fatigue	110 (62.5)	69 (57.5)	70 (57.9)	36 (32.4)	275 (53.7)	26.71***
Difficulty sleeping	105 (65.6)	67 (55.8)	74 (61.2)	45 (40.5)	291 (56.8)	18.02***
Numbness or tingling	59 (36.9)	43 (35.8)	51 (42.2)	21 (18.9)	174 (34.0)	15.60**

Symptoms	NH White n (%)	Hispanic n (%)	NH AA n (%)	NH Asian n (%)	Total n (%)	χ^2
Heavy menstruation	38 (33.9)	27 (35.5)	26 (32.9)	9 (11.8)	101 (29.4)	14.30**
Breast pain	72(45.0)	52 (43.3)	48 (39.7)	18 (16.2)	190 (37.1)	27.36***
Vaginal dryness	63 (39.4)	45 (37.5)	50 (41.3)	28 (25.2)	186 (36.3)	7.93*
Urination at night	101 (63.1)	53 (44.2)	61 (50.4)	36 (32.4)	251 (49.0)	26.18***
Frequent Urination	77 (48.1)	53 (44.2)	45 (37.2)	32 (28.8)	207 (40.4)	11.36**
Lost control of bladder	64 (40.0)	48 (40.0)	27 (22.3)	18 (16.2)	157 (30.7)	26.34***
Feeling clumsy	82 (51.3)	35 (29.2)	32 (26.5)	17 (15.3)	166 (32.4)	43.13***
Crying often	54 (33.8)	34 (28.3)	30 (24.8)	17 (15.3)	135 (26.4)	11.87**
Feeling depressed	72 (45.0)	46 (38.3)	51 (42.1)	30 (27.0)	199 (38.9)	9.75*
Feeling easily hurt	86 (53.8)	49 (40.8)	50 (41.3)	33 (29.7)	218 (42.6)	15.89**
Upset	85 (53.1)	56 (46.7)	50 (41.3)	38 (34.2)	229 (44.7)	10.26*
Feeling grouchy	81 (50.6)	47 (39.2)	43 (35.5)	27 (24.3)	198 (38.7)	19.79***
Anxiousness	79 (49.4)	52 (43.3)	44 (36.4)	37 (33.3)	212 (41.4)	8.62*
Worrying about body	98 (61.3)	74 (61.7)	69 (57.0)	46 (41.4)	287 (56.1)	12.96**
Difficulty in concentration	69 (43.1)	39 (32.5)	38 (31.4)	24 (21.6)	170 (33.2)	14.02**
Mood swings	87 (54.4)	65 (54.2)	61 (50.4)	36 (32.4)	249 (48.6)	15.63**
Forgetfulness	108 (67.5)	70 (58.3)	66 (54.6)	51 (46.0)	295 (57.6)	13.14**

Note.

* P<0.05,

** P<0.001,

*** P<0.0001

Table 3

Differences in severity of individual symptoms

Symptoms	NH White M (SD)	Hispanic M (SD)	NH AA M (SD)	NH Asian M (SD)	Total M (SD)	F
Weight gain	3.11 (0.88)	2.97 (0.87)	3.12 (1.02)	2.54 (0.87)	2.99 (0.93)	3.84*
Loose bowel movement	3.26 (0.97)	2.90 (1.02)	2.58 (1.00)	2.29 (0.49)	3.00 (0.99)	3.25*
Joint pain and swelling	3.40 (0.89)	3.50 (0.91)	2.88 (0.99)	2.40 (0.83)	3.18 (0.97)	6.14***
Muscle and joint stiffness	3.33 (0.91)	3.21 (0.86)	3.18 (0.79)	2.75 (0.70)	3.17 (0.86)	5.39**
Back pain	3.62 (0.90)	3.00 (0.95)	3.00 (1.04)	3.00 (0.96)	3.23 (0.99)	4.43**
Sweating	3.59 (0.98)	3.13 (0.98)	3.39 (0.91)	3.00 (0.75)	3.37 (0.95)	3.10*
Feeling hot/cold	3.10 (1.07)	2.79 (0.89)	3.06 (0.90)	2.59 (0.78)	2.95 (0.97)	4.51**
Exhaustion/fatigue	3.65 (1.03)	3.32 (0.95)	3.23 (0.89)	3.14 (0.87)	3.39 (0.97)	4.11**
Vaginal dryness	3.32 (1.10)	3.38 (0.96)	2.86 (0.97)	3.07 (0.86)	3.17 (1.01)	2.79*
Decreased sexual interest	3.67 (1.11)	3.40 (1.11)	3.32 (1.14)	3.06 (1.18)	3.39 (1.15)	3.17*

Note.

* P<0.05

** P<0.001

*** P<0.0001

Table 4

Predictors of the total number of total symptoms

Predictors	Total		NH White		Hispanic		NH AA		NH Asian	
	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value
Intercept	46.3441	<.0001	75.2984	<.0001	-7.2716	<.0001	12.2089	.1171	11.1895	.2303
Age	-0.4811	.0002	-0.5850	.0062	--	--	--	--	--	--
Employment (yes/no)	3.6468	.0088	--	--	12.5130	<.0001	--	--	--	--
Income level	-2.8024	.0010	-6.1240	<.0001	--	--	-4.8503	.0045	--	--
Ethnicity (being Asians)	-5.5663	.0004	--	--	--	--	--	--	--	--
Country of birth (US or not)	--	--	--	--	--	--	--	--	--	--
Level of acculturation	--	--	--	--	--	--	--	--	0.4039	.0322
Level of physical activity	--	--	--	--	--	--	--	--	-0.5891	.0048
General health	-1.8425	.0031	-3.6387	.0003	--	--	--	--	--	--
BMI	0.2726	.0007	--	--	0.5988	.0006	0.4183	.0027	--	--
Menopausal status	1.3913	.0161	2.2962	.0175	--	--	--	--	--	--
R²	0.2261		0.3494		0.2275		0.1531		0.1544	
F	16.30		16.54		8.47		7.05		4.84	
p-value	<.0001		<.0001		<.0001		.0002		.0013	

Table 5

Predictors of the total severity of the total symptoms

Predictors	Total		NH White		Hispanic		NH AA		NH Asian	
	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value
Intercept	163.8997	<.0001	272.3870	<.0001	-26.8440	.4533	32.1302	.2524	21.5010	.4934
Age	-1.7170	.0002	-1.9300	.0144	--	--	--	--	--	--
Employment (yes/no)	15.0651	.0026	--	--	49.7398	<.0001	--	--	--	--
Income	-13.4706	<.0001	-25.5444	<.0001	--	--	-21.9920	.0003	--	--
Ethnicity (being Asians)	-19.5831	.0005	--	--	--	--	--	--	--	--
Country of birth (US or not)	--	--	--	--	--	--	--	--	--	--
Smoking (yes/no)	13.4433	.0352	--	--	--	--	--	--	--	--
Level of physical activity	--	--	--	--	--	--	--	--	-1.8900	.0072
General health	-7.8237	.0005	-14.8935	<.0001	--	--	--	--	--	--
BMI	1.0104	.0005	10.5996	.0032	2.3436	.0002	1.4229	.0037	--	--
Menopausal status	5.8761	.0046	--	--	--	--	--	--	--	--
R²	0.2659		0.4237		0.2731		0.2192		0.1555	
F	18.15		18.75		8.57		6.46		4.88	
p-value	<.0001		<.0001		<.0001		<.0001		.0012	