



Cognitive Symptoms of Midlife Women and Their Influencing Factors in Four Racial/Ethnic Groups in the U.S.

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The authors declared no potential conflicts of interest.

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Age 18



Age 20-30



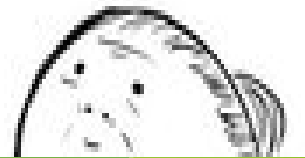
Age 30-50



Age 60-70



Age 120



Introduction

- ▶ In midlife, memory problems are commonly reported mainly due to aging process.
 - ▶ Especially among midlife women in menopausal transition, a decrease in estrogens reportedly has salutary neurophysiologic effects that are harmful to women's cognition.
 - ▶ Subsequently, the decrease of estrogens in menopausal transition could result in alternations in cognitive symptoms of midlife women.
- ▶ Vague racial/ethnic differences in hormone levels during the menopausal transition could still influence midlife women's cognitive symptoms differently in different racial/ethnic groups.
- ▶ Multiple contextual factors could differently affect midlife women's cognitive symptoms in different racial/ethnic groups.

Purpose

- To determine differences in cognitive symptoms of midlife women by race/ethnicity among four major racial/ethnic groups in the U.S. (Aim #1) and
- To determine the contextual factors that differently affect the women's cognitive symptoms in different racial/ethnic groups (Aim #2).

Theoretical Basis

- ▶ The UCSF symptom management model (Dodd et al., 2001)
 - ▶ Targeted to determine the influences of race/ethnicity—a demographic characteristic of a person (under the major domain of person)—on symptom experience (the sub-concept of perception of symptoms under the major concept of symptom experience)(Aim #1).
 - ▶ Targeted two factors related to the major domain of person (background characteristics and health and illness) (Aim #2).

Study Design

- ▶ A Secondary Analysis

- ▶ The data from two larger national studies on midlife women's menopausal symptoms and attitudes toward physical activity (NIH/NINR/NIA, 1R01NR008926 and NIH/NINR/ NHLBI, R01NR010568).

Samples

- ▶ 1,054 midlife women (316 Non-Hispanic [NH] Whites 255 Hispanics, 250 NH African Americans, and 233 NH Asians).
- ▶ Inclusion Criteria
 - ▶ Midlife women aged 40 to 60 years;
 - ▶ who were able to read and write English; and
 - ▶ who self-identified their racial/ethnic identity as NH White, Hispanic, NH African American or NH Asian.

Sample Size & Response Rate

- ▶ The pre-determined sample size (N=1,054) from the two studies was adequate for multivariate regression analyses with more than 99.9% power to detect an effect size of 0.4 with 8-10 predictors and a 0.05 alpha level (two-sided).
- ▶ Response Rate: 95%.

Instruments

- ▶ Questions on background characteristics;
- ▶ Questions on health and menopausal status; and
- ▶ The Cognitive Symptom Index for Midlife Women (CMW)
 - ▶ Adopted from the Midlife Women's Symptom Index (MSI).
 - ▶ Consisted of 21 items on cognitive symptoms.
 - ▶ The reliability of the CMW was:
 - ▶ KR-20=.87 for the prevalence sub-scale; and
 - ▶ Cronbach's alpha=.91 for the severity sub-scale.

Data Collection Procedures

- ▶ In the original studies;
 - ▶ Project websites were developed based on the Health Insurance Portability and Accountability Act (HIPAA) and the SysAdmin, Audit, Network, Security (SANS)/Federal Bureau of Investigation (FBI) recommendations.
 - ▶ When a woman came to the project websites after viewing the study announcement, she was required to review the informed consent sheets and give her consent by clicking “I agree to participate in the study.”
 - ▶ She was checked against the screening questions related to inclusion criteria and quota requirement.
 - ▶ When she passed the screening questions, she was asked to answer the Internet survey questions.

Data Analysis Methods

- ▶ To determine racial/ethnic differences in the cognitive symptoms (Aim#1),
 - ▶ Chi-square tests and analysis of variance (ANOVA).
 - ▶ Post hoc tests using the Duncan's method.
 - ▶ The one way ANCOVA: to find out racial/ethnic differences in the individual severity scores of cognitive symptoms.
 - ▶ Multinomial logistic regression analyses to compare the frequencies and severity scores of individual cognitive symptoms among racial/ethnic groups.

- ▶ To identify significant variables associated with the total numbers of cognitive symptoms (Aim #2)
 - ▶ Poisson regression analyses
 - ▶ Because the assumption of normal distribution (tested with Kolmogorov-Smirnov test) was violated ($p < 0.001$), Poisson regression analyses were chosen (Osgood, 2000).
 - ▶ Logistic regression analyses to determine the factors that were associated with the total severity scores of cognitive symptoms in each racial/ethnic group (with the Hosmer & Lemeshow goodness of fit test; Aim #2) (Cohen, Cohen, West, & Aiken, 2002).

Results

▶ Background Characteristics of Participants

- ▶ Average age = 48.97 years (SD=5.69) in total participants/ 49.08 years (SD=5.62) among NH Whites/ 48.85 years (SD=5.40) among Hispanics/ 49.34 year (SD=5.74) among NH African Americans/ and 48.56 years (SD=6.05) among NH Asians.
- ▶ Education: college graduates or with graduate degrees (86%)/ married or partnered (68%)
- ▶ SES: Not hard to pay for basics (e.g., foods, housing, etc.) with their family income (44%)
- ▶ Race/ethnicity: NH Whites (30%), Hispanics (24%), NH African Americans (23%), and NH Asians (22%).

- ▶ BMI: normal BMI (40%)
- ▶ Diagnosed diseases: Yes (52%)
- ▶ Menopausal status: pre-menopausal (28%)/ early or late peri-menopausal (32%)/Post-menopausal (39%)
- ▶ The average level of acculturation = 4.58 (on a 1~5 scale; SD=0.83) in total participants/ 4.95 (SD=0.35) among NH Whites/ 4.58 (SD=0.81) among Hispanics/ 4.95 (SD=0.30) among NH African Americans/ and 3.66 (SD=0.98) among NH Asians.

Racial/Ethnic Differences in the Total Number of Cognitive Symptoms (Aim #1)

- ▶ The mean total number of cognitive symptoms = 7.13 (SD=5.53, range 1-20).
- ▶ Significant differences in the total numbers of cognitive symptoms among different racial/ethnic groups;
 - ▶ Asian women had the lowest total number of cognitive symptoms among all racial/ethnic groups ($p < .01$)

- ▶ The most frequently reported symptoms across the racial/ethnic groups:
 - ▶ Worrying (54.1%);
 - ▶ Sleep problems (52.6); and
 - ▶ Hot flush (44.8%).
- ▶ Statistically significant racial/ethnic differences were observed in the unadjusted frequencies of 14 symptoms ($p < 0.05$)

► In the multinomial logistic regression analyses,

- Hispanics were less likely to report night sweats (OR=0.49, 95% Confidence Interval [CI]=0.33-0.75), hot flush (OR=0.60, 95% CI=0.42-0.85), sleep problems (OR=0.60, 95% CI=0.42-0.85), mental exhaustion (OR=0.51, 95% CI=0.35-0.75), concentration problems (OR=0.48, 95% CI=0.32-0.71), feeling clumsy (OR=0.36, 95% CI=0.25-0.54), feeling depressed (OR=0.53, 95% CI=0.36-0.79), feeling unhappy (OR=0.56, 95% CI=0.38-0.82), feeling anxious (OR=0.63, 95% CI=0.43-0.93), feeling easily hurt (OR=0.65, 95% CI=0.45-0.94), and feeling grouchy (OR=0.57, 95% CI=0.39-0.83) than NH Whites.

- ▶ **Asians** were less likely to report all symptoms than NH Whites.
- ▶ **African Americans** were more likely to report hot flush (OR=1.50, 95% CI=1.05-2.15), but less likely to report feeling clumsy (OR=0.52, 95% CI=0.35-0.78), feeling easily hurt (OR=0.64, 95% CI=0.44-0.93), and feeling grouchy (OR=0.61, 95% CI=0.41-0.90) compared with NH Whites.

Racial/Ethnic Differences in the Total Severity Scores of Cognitive Symptoms (Aim #1)

- ▶ The mean total severity score = 22.28 (SD=20.38, range 1~100) across all racial/ethnic groups.
- ▶ Significant racial/ethnic differences in the total severity scores of cognitive symptoms ($p < .01$).
 - ▶ Asians (27.61 ± 20.18) had significantly lower total severity scores compared to any other racial/ethnic groups ($p < .05$).

- ▶ The severity scores of all individual symptoms were significantly different by racial/ethnic group ($p < 0.05$).
 - ▶ Across the symptoms, NH Asians had lower severity scores of individual symptoms than other racial ethnic groups.

► In the multinomial logistic regression analyses,

- the participants were divided into two groups by the severity scores: (a) one group with the severity scores of “not at all” and “a little bit;” and (b) the other group with the severity scores of “moderately,” “quite a bit,” and “extremely.”
- Compared with NH Whites,
 - **Hispanics** were less likely to report feeling unhappy (OR=0.51, 95% CI=0.27~0.94) compared with NH Whites.
 - **Asians** were less likely to report hot flush (OR=0.42, 95% CI=0.21~0.83), sleep problems (OR=0.41, 95%CI=0.21-0.82), mental exhaustion (OR=0.37, 95%CI=0.18-0.77), feeling depressed (OR=0.36, 95%CI=0.17-0.77), feeling unhappy (OR=0.38, CI=0.19-0.77), feeling getting down (OR=0.38, 95%CI=0.19-0.78), and feeling irritated (OR=0.49, CI=0.26-0.89).
 - **African Americans** were more likely to report hot flush (OR=1.19, 95%CI=0.72-1.96), but less likely to report feeling anxious (OR=0.55, 95% CI=0.31~0.98).

Racial/Ethnic Differences in Cognitive Symptoms by Menopausal Status (Aim #1)

- ▶ Significant main effects of race/ethnicity and menopausal status on both total numbers and total severity scores of cognitive symptoms ($p < 0.05$).
 - ▶ No significant interactions between race/ethnicity and menopausal status in their relations to cognitive symptoms.

- ▶ Post-menopausal women had higher total numbers and total severity scores than pre- and peri-menopausal women among all racial/ethnic groups except Asians.
 - ▶ Among Asians, peri-menopausal women had significantly higher total numbers and total severity scores of cognitive symptoms than pre- or post-menopausal women.

Factors Associated with Cognitive Symptoms (Aim #2)

- ▶ **Influencing Factors of Total Numbers of Cognitive Symptoms by Race/Ethnicity**
 - ▶ Across the racial/ethnic groups, family income (very hard to pay for basics, $\beta=0.17$, $p<0.01$ & somewhat hard to pay for basics, $\beta=0.08$, $p=0.01$), the country of birth (the U.S., $\beta=0.78$, $p<0.01$), BMI (overweight, $\beta=0.08$, $p<0.01$), perceived health (unhealthy, $\beta=0.10$, $p<0.01$ & don't know, $\beta=0.14$, $p<0.01$), and menopausal status (pre-, $\beta=-1.78$, $p<0.01$ & peri, $\beta=-0.47$, $p<0.01$).

- ▶ Among Whites, age ($\beta=-0.01$, $p=0.04$), family income (very hard to pay for basics, $\beta=0.13$, $p=0.03$), the country of birth (the U.S., $\beta=1.32$, $p<0.01$), diagnosed disease(s) (yes, $\beta=-0.10$, $p=0.02$), perceived health (unhealthy, $\beta=0.15$, $p<0.01$ & don't know, $\beta=0.21$, $p<0.01$), and menopausal status (pre-, $\beta=-1.82$, $p<0.01$ & peri, $\beta=-0.42$, $p<0.01$);
- ▶ Among Hispanics, the level of acculturation ($\beta=0.24$, $p<0.01$), employment (employed, $\beta=-0.19$, $p<0.01$), and menopausal status (pre-, $\beta=-1.65$, $p<0.01$ & peri-, $\beta=-0.45$, $p<0.01$) were significantly associated with the total numbers of cognitive symptoms. Among NH African Americans, menopausal status (pre-, $\beta=-1.82$, $p<0.01$ & peri, $\beta=-0.57$, $p<0.01$);

- ▶ Among Asians, age ($\beta=0.02$, $p<0.01$), education (less than high school, $\beta=-0.22$, $p=0.02$), family income (very hard to pay for basics, $\beta=0.40$, $p<0.01$ & somewhat hard to pay for basics, $\beta=0.24$, $p<0.01$), employment (employed, $\beta=-0.11$, $p=0.09$), the country of birth (the U.S., $\beta=0.41$, $p=0.02$), perceived health (don't know, $\beta=0.30$, $p<0.01$), diagnosed disease(s)(yes, $\beta=0.29$, $p<0.01$), and menopausal status (pre-, $\beta=-1.40$, $p<0.01$).

- ▶ For binomial logistic regression analyses on the total severity scores;
 - ▶ the participants in the total group and each racial/ethnic group were divided into two groups based on the mean severity scores (low versus high cognitive symptom severity groups).
 - ▶ In total participants (across all the racial/ethnic groups), the influencing factors included:
 - ▶ very low (OR=2.80, 95% CI=1.66-4.75) and somewhat low family income (OR=1.57, 95% CI=1.07-2.31);
 - ▶ overweight (25 to <30)(OR=1.66, 95% CI=1.04-2.64);
 - ▶ perceived health as unhealthy (OR=2.08, 95% CI=1.31-3.31) and don't know (OR=1.98, 95% CI=1.09-3.62); and
 - ▶ pre- (OR=0.00, 95% CI= 0.00-0.01) and peri- menopausal status (OR=0.10, 95% CI= 0.06-0.17)


▶ Influencing Factors of the Total Severity Scores


- ▶ Among NH Whites, age (OR=0.91, 95% CI= 0.85-0.97), very low family income (OR=5.05, 95% CI=1.76-14.51), overweight (OR=2.83, 95% CI=1.08-7.43), perceived health as unhealthy (OR=2.86, 95% CI=1.12-7.30), and pre-menopausal status (OR=0.12, 95% CI=0.05-0.31).
- ▶ Among Hispanics, pre- (OR=0.00, 95% CI=0.00-0.01) and peri- menopausal statuses (OR=0.14, 95% CI=0.05-0.37) were significantly associated with the total severity scores. Among NH Asians, very low (OR=3.32, 95% CI=1.04-10.64) and somewhat low family income (OR=2.12, 95% CI=1.02-4.43), and pre-menopausal status (OR=0.01, 95% CI=0.00-0.23).
- ▶ Among NH African Americans, pre- (OR=0.00, 95% CI=0.00-0.01) and peri-menopausal statuses (OR=0.05, 95% CI=0.01-0.20).
- ▶ The Hosmer and Lemeshow goodness of fit tests indicated that all the logistic regression models had acceptable fit indices ($p>0.05$).

Discussions

- ▶ The findings supported re significant racial/ethnic differences in the total numbers and total severity scores of cognitive symptoms and significant main effects of race/ethnicity and menopausal status on both the total numbers and total severity scores (Aim #1).
 - ▶ Consistent with the existing literature (Greendale et al., 2011a).
 - ▶ Researchers have reported racial/ethnic differences in hormone trajectories during the menopausal transition (Weiss et al., 2004), which could partially explain the significant associations of race/ethnicity to cognitive symptoms that are experienced during the menopausal transition (McEwen, 2002).

- ▶ The directions of racial/ethnic differences
 - ▶ Consistent with those in the literature.
 - ▶ As in most studies (Gold et al., 2000; Randolph et al., 2003; Richard-Davis & Wellons, 2013), White women had larger total numbers and higher total severity scores of cognitive symptoms than other racial/ethnic groups while Asian women had smaller total numbers and lower severity scores of cognitive symptoms than other racial/ethnic groups.

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- ▶ The findings in total participants that post-menopausal women had larger total numbers and higher severity scores of cognitive symptoms than those in the perimenopausal period:
 - ▶ Consistent with those of existing studies (Pérez, Garcia, Palacios, & Pérez, 2009).

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- ▶ Family income, the country of birth, BMI, perceived general health, and menopausal status as significant influencing factors of cognitive symptoms across the racial/ethnic groups (Aim #2).
 - ▶ Consistent with the literature (Bender et al., 2006; CDC, 2015; Greendale et al., 2011b; Lee et al., 2010).

Limitations of the Study

- ▶ Highly educated, married, and employed women;
- ▶ A broad scope of symptoms as cognitive symptoms;
- ▶ Based on self-reports and no objective measurements and/or validation of the self-reported data;
- ▶ Unclear clinical meanings of the racial/ethnic differences in cognitive symptoms at this point; and
- ▶ No way to determine temporal and/or causal relations between race/ethnicity and multiple factors and cognitive symptoms.

Implications for Future Research

- ▶ Further studies with diverse groups of midlife women;
- ▶ More investigations on racial/ethnic differences in individual symptoms and subsequent racial/ethnic specific symptom clusters; and
- ▶ More studies on the factors that are differently associated with cognitive symptoms in different racial/ethnic groups.

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