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Beyond frequency: who is most bothered by vasomotor symptoms?

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Abstract

Objective—Most menopausal women report vasomotor symptoms (hot flashes, night sweats). However, not all women with vasomotor symptoms, including frequent symptoms, are bothered by them. The primary aim was to identify correlates of vasomotor symptom bother beyond symptom frequency.

Design—The Study of Women's Health Across the Nation participants reporting vasomotor symptoms at annual visit 7 comprised the sample (N = 1,042). Assessments included hot flash and night sweats frequency (number per week) and bother (1, not at all– 4, very much). Negative affect (index of depressive symptoms, anxiety, perceived stress, negative mood), symptom sensitivity, sleep problems, and vasomotor symptom duration (number of years) were examined cross-sectionally in relation to bother in ordinal logistic regression models with symptom frequency and covariates. Hot flashes and night sweats were considered separately.

Results—In multivariable models controlling for hot flash frequency, negative affect (odds ratio [OR] = 1.27, 95% CI: 1.08–1.51), symptom sensitivity (OR = 1.18, 95% CI: 1.03–1.37), sleep problems (OR = 1.38, 95% CI: 1.04–1.85), poorer health (OR = 1.24, 95% CI: 1.03–1.48), duration of hot flashes (OR = 1.14, 95% CI: 1.06–1.23), younger age (OR = 0.94, 95% CI: 0.89–0.99), and African American race (vs white, OR = 1.59, 95% CI: 1.12–2.26) were associated with hot flash bother. After controlling for night sweats frequency and covariates, sleep problems (OR = 1.84, 95%

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CI: 1.33–2.55) and night sweats duration (OR = 1.10, 95% CI: 1.02–1.20) were associated with night sweats bother.

Conclusions—Beyond frequency, factors associated with bothersome hot flashes include mood, symptom sensitivity, symptom duration, sleep problems, age, and race. Correlates of bothersome night sweats include sleep problems and symptom duration. In addition to reducing frequency, interventions for vasomotor symptoms might consider addressing modifiable factors related to symptom bother.

Keywords

Vasomotor symptoms; Hot flashes; Hot flushes; Night sweats; Mood; Sleep

The majority of women report vasomotor symptoms (VMS), or hot flashes and night sweats, during the menopausal transition.[1] Although most women experience VMS for the several years around the final menstrual period, a sizable minority of women report VMS that persist for decades.[2,3] VMS are associated with impairments in quality of life,[4] poor sleep,[5] and negative mood[6] and are a leading reason women seek menopause-related medical care.[7] As VMS are associated with no known physical health risk, their clinical significance derives mainly from the interference that they pose on women's quality of life. In the wake of the early termination of the Women's Health Initiative hormone therapy (HT) arms[8,9] and subsequent discontinuation of HT by many women,[10] there has been considerable interest in better understanding VMS to inform a wider range of treatments for them.[11]

Whereas the majority of women experience VMS, not all women are bothered by them. Thus, additional factors beyond symptom frequency may predict bother associated with VMS. However, it is often assumed that VMS frequency is the sole predictor of bother associated with VMS. Results from menopause symptom scales that variously assess frequency or bother are often used interchangeably.[1–3,12–14] Women targeted in treatment studies are those with frequent VMS, and clinically significant treatment responses are usually based on changes in symptom frequency.[15] However, although treatments aim to reduce VMS frequency, they are ultimately aimed at improving quality of life and reducing the interfering nature of VMS.

A wider range of factors beyond VMS frequency are likely to predict bother and impairment associated with VMS. It is well established that psychological factors involved in the perception and appraisal of pain and other symptoms influence symptom interference and impairment. For example, independent of differences in objective health indicators, negative affect and the tendency to focus on physical sensations, or symptom sensitivity, predict increased reporting of and impairment associated with symptoms.[16–19] Moreover, some women report sleep problems during the menopausal transition,[5] which are frequently attributed to nighttime VMS, or night sweats.[20] Sleep problems may influence the perceived bother of VMS.[20] Further, experiencing VMS for a longer duration has been suggested to be associated with more distress and symptom interference.[21,22] Understanding who is most bothered by VMS or, conversely, characteristics of women coping effectively with high levels of symptomatology can provide important information to inform VMS management strategies.

The aim of this investigation was to determine what factors predict bother associated with VMS above and beyond symptom frequency. It is hypothesized that, controlling for symptom frequency, women with higher negative affect, a greater sensitivity to physical symptoms, and a greater number of years of having VMS will report more VMS-associated bother. We also hypothesized that women with more sleep problems will report more bother associated with night sweats, beyond night sweats frequency. Racial/ethnic differences in VMS bother were examined in an exploratory fashion.

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METHODS

Study population and procedures

The Study of Women's Health Across the Nation (SWAN) is a multiethnic cohort study designed to characterize the biological and psychosocial changes during the menopausal transition. Details of SWAN recruitment and design have been previously reported.[23] Briefly, each SWAN site recruited white women and a sample of a predetermined minority group (African Americans in Pittsburgh, Boston, Detroit, Michigan, and Chicago; Japanese in Los Angeles; Hispanic in Newark, New Jersey; Chinese in Oakland area of California). Baseline SWAN eligibility criteria included age 42 to 52 years, having an intact uterus and at least one ovary and in the previous 3 months at least one menstrual cycle, without pregnancy, breast-feeding, or reproductive hormone use. Seventy-three percent of the women selected were contacted and provided information to determine eligibility. Of the eligible women, 51% (N = 3,302) enrolled. SWAN was approved by each site's institutional review board, and each participant provided written informed consent. SWAN baseline assessments were conducted in 1996 to 1997. At baseline and annually thereafter, assessments included an interview, physical examination, blood draw, and questionnaires. Assessment of VMS bother was initiated at annual SWAN visit 7 (2003–2005). Thus, the present investigation was a cross-sectional analysis at visit 7.

Of the 2,870 women attending SWAN visit 7, 1,292 (45%) reported hot flashes or night sweats and provided data on symptom bother. Of these 1,292 women, 108 women who had a hysterectomy and/or bilateral oophorectomy, 87 women reporting HT use in the past month, and 55 women with missing data on one or more covariates (antidepressant use, n = 5; sleep problems, n = 1; negative affect, n = 25; general health, n = 10; education, n = 5; body mass index [BMI], n = 1; symptom sensitivity, n = 19; smoking, n = 1; 17 women had more than one missing value) were excluded. Values for BMI were carried forward from the last available observation for 14 women. One additional extreme value for night sweats frequency (110 per week) was excluded from night sweats analyses. The final sample included 1,042 women in either hot flash (n = 928) or night sweats (n = 685) models. Women excluded for any reason (no VMS, surgical menopause, HT use, missing data, or extreme value) were less likely to have sleep problems ($P < 0.0001$), had lower negative affect ($P < 0.0001$), and were less likely to be peri- or postmenopausal and more likely to be premenopausal or of indeterminate status ($P < 0.0001$) than women included in the sample.

Materials and Measures

Frequency of and bother associated with hot flashes and night sweats were assessed by six questions at annual SWAN visit 7. Participants were first asked to report the number of days in which hot flashes or night sweats were experienced in the previous 2 weeks (not at all, 1–5 days, 6–8 days, 9–13 days, every day). If indicating at least 1 day, they reported how many hot flashes or night sweats that they experienced per day. Symptom frequency per week was calculated by choosing the midpoint of number of days experiencing the symptom in the previous 2 weeks, dividing it by 2 for number of days per week, and multiplying it by the number of symptoms per day to obtain the number of hot flashes or night sweats per week. Women reporting hot flashes or night sweats were then asked to rate how much they were usually bothered by the symptom (1, not at all; 2, very little; 3, moderately; 4, a lot).

Five aspects of negative mood and stress (negative affect, depressive symptoms, perceived stress, anxious symptoms, trait anxiety) were assessed during annual SWAN visit 7. Negative affect was assessed via the Positive and Negative Affect Schedule,[24] depressive symptoms via the Center for Epidemiologic Studies for Depression scale,[25] perceived stress via the Perceived Stress Scale,[26] and trait anxiety via the Spielberger State Trait Anxiety Inventory.[27] Anxious

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symptoms were a sum score of the number of days in the past 2 weeks (0 = no days to 4 = every day) a woman reported irritability or grouchiness, feeling tense or nervous, heart pounding or racing, and feeling fearful for no reason. Because the five affect/mood measures were highly correlated (r = 0.50–0.80) and related to VMS similarly, they were combined into an index of negative affectivity by standardizing each scale to a mean of 0 and an SD of 1 and summing across them. The index had high internal consistency (Cronbach $\alpha = 0.89$).

The Barsky Symptom Sensitivity Scale,[18] which assesses sensitivity to bodily sensations, was obtained at SWAN annual visits 1 and 3, with the last available observation for each woman used. Sleep problems were evaluated annually and defined as endorsing trouble falling asleep, waking up several times each night, or waking up earlier than planned, and unable to fall asleep again at least three times per week in each of the previous 2 weeks.[28] Duration of hot flashes or night sweats was the sum total of the number of previous annual SWAN visits (baseline through annual visit 6) in which the participant reported the symptom.

Covariates race/ethnicity and educational attainment (years of completed education, categorized as high school or less, some college/vocational, college or higher) were obtained in the baseline SWAN interview. Age, smoking (current vs past/never), marital status, employment status, antidepressant use, BMI, and self-rated health were derived from annual SWAN visit 7. Race/ethnicity was determined in response to the question “How would you describe your primary racial or ethnic group?” Marital status was categorized as married versus unmarried (divorced, single, widowed, separated). Women were considered employed if working for pay in the past 2 weeks. Given the impact of certain antidepressants on VMS,[29] reported antidepressant use (medications for nervous condition, eg, sedatives, antidepressants) since the last study visit was considered as a covariate. BMI was measured as weight (kg)/height (m^2). Self-rated health was assessed by the question: “In general, would you say your health is excellent, very good, good, fair or poor?,” with higher scores indicating poorer health. Physical activity was assessed at SWAN visit 6 via the modified Kaiser Permanente Health Plan Activity Survey.[30]

Menopausal status was obtained from self-reported bleeding patterns over the year preceding visit 7 and was categorized as follows: bleeding in the previous 3 months with no change in cycle predictability in the past year was considered premenopausal, bleeding in the previous 3 months with decrease in cycle predictability in the past year was considered early perimenopausal, less than 12 and more than 3 months of amenorrhea was considered late perimenopausal, and 12 months or more of amenorrhea was considered postmenopausal. Because of the small number of premenopausal women in this investigation (n = 15), premenopausal and early perimenopausal women were combined in all analyses. Women reporting taking hormones (oral contraceptives, oral estrogens, and/or progestins, estrogen injections or patch with or without progestins) within the previous month were classified as HT users and were excluded from the analysis. Women last classified as pre- or perimenopausal who reported HT use since this study visit were considered of indeterminate status due to the impact of hormone discontinuation on bleeding patterns. All analyses were repeated excluding women of indeterminate status or who were premenopausal, and findings were unchanged.

Statistical analysis

Hot flashes and night sweats were considered separately in all analyses given the potential for differential predictors of hot flash or night sweats bother. Correlations between symptom frequency and bother were estimated via Spearman’s ρ. Associations between demographic, psychosocial, and medical characteristics and symptom bother, controlling for symptom frequency, were estimated in ordinal logistic regression models. As the distribution of hot flash or night sweats frequency was skewed, all models were estimated with both log-transformed and untransformed frequency variables. Results were comparable, and therefore models with

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the untransformed frequency variable are presented to increase interpretability of results. Given the differential distribution of hot flash and night sweats bother, to meet model assumptions of proportionality, a differential categorization for hot flash and night sweats bother was necessary. Specifically, both hot flash and night sweats bother were categorized into three levels, although hot flash bother was categorized as not at all, very little, and moderately or a lot, and night sweats bother as not at all or very little, moderately, and a lot. The lowest group was the reference. Models were first estimated with the predictors negative affect, symptom sensitivity, sleep problems, and duration of hot flashes or night sweats in models controlling for site and symptom frequency. Negative affect and symptom sensitivity are expressed as SD increases for increased interpretability. Covariates considered were age, race, education, menopausal status, HT use, antidepressant use, BMI, self-rated health, smoking status, physical activity, marital status, and employment status and were selected based on association with symptom bother in ordinal logistic regression models controlling for symptom frequency at $P < 0.10$. Covariates were together added in the second step. Interactions of primary predictors with race/ethnicity were examined in all models and, because no significant interactions were observed, were not included in final models. Goodness of fit was evaluated by the Wald test for global null hypothesis, test for proportional odds assumption, and Akaike information criterion for nested models.

An ancillary analysis was conducted to better understand factors that may predict bothersome yet infrequent symptoms and frequent but not bothersome symptoms. Four groups were created for hot flashes and night sweats: (1) low frequency with high bother, (2) low frequency with low bother, (3) high frequency with high bother, and (4) high frequency with low bother. Frequency cut points for categorization of these groups reflects the most extreme categorization allowing for adequate sample size. Given differential distributions of hot flashes and night sweats, frequent hot flashes and night sweats were categorized as 12 or more per week and three or more per week, respectively, and infrequent hot flashes and night sweats were categorized as three or fewer per week and two or fewer per week, respectively. Low and high bother were categorized as not at all/a little and moderately/a lot, respectively. Women with moderate-frequency hot flashes (less than three per week and less than 14 per week) were not included in these models. All four frequency-bother groups were included in all models, although the reference group varied between models to allow the comparison of interest. Thus, two multinomial models were estimated for hot flashes and night sweats: (1) high frequency with low bother versus high frequency with high bother (reference) and (2) low frequency with high bother versus low frequency with low bother (reference). Covariates associated with the comparison of interest at $P < 0.10$ in univariate models were selected for each model. Analyses were performed with SAS version 9.1 (SAS Institute, Cary, NC) and were two sided at $\alpha = 0.05$.

RESULTS

Sample characteristics are shown in Table 1. Frequency and bother were significantly related for hot flashes ($P = 0.47$, $P < 0.0001$) and night sweats ($P = 0.55$, $P < 0.0001$). Average symptom frequency was fairly low and increased monotonically with bother, although there was a wide range in symptom frequency in each bother category for hot flashes (not at all: mean = 6.0, SD = 13.2, range: 1.5–105; very little: mean = 7.1, SD = 10.9, range: 1.5–105; moderately: mean = 18.2, SD = 21.6, range: 1.5–140; a lot: mean = 35.7, SD = 30.1, range: 1.5–140) and night sweats (not at all: mean = 1.9, SD = 0.8, range: 1.5–4.5; very little: mean = 3.1, SD = 4.0, range: 1.5–35; moderately: mean = 7.5, SD = 9.1, range: 1.5–71.5; a lot: mean = 14.4, SD = 10.3, range: 1.5–56).

In minimally and fully adjusted hot flash models, women with higher negative affect, greater symptom sensitivity, sleep problems, and a greater number of previous study visits reporting

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hot flashes reported more bothersome hot flashes, beyond the frequency of hot flashes (Table 2). Other factors significantly related to bothersome hot flashes in multivariable models were poorer health, younger age, and race/ethnicity. Controlling for frequency of hot flashes, African American women reported their hot flashes to be more bothersome than did white women.

For night sweats, in minimally adjusted models, negative affect, sleep problems, and more previous study visits with night sweats were associated with more bothersome night sweats, above and beyond symptom frequency (Table 3). In fully adjusted models, sleep problems and a greater number of previous visits reporting night sweats remained significant predictors of bother. Women who were smokers and in poorer health were also marginally more likely to rate their night sweats as more bothersome, controlling for symptom frequency.

Several additional analyses were conducted to determine what characteristics identified women with frequent symptoms who were not bothered by them, as well as women with infrequent symptoms who were quite bothered by them (Table 4). Relative to women with infrequent and not bothersome hot flashes, women with infrequent but bothersome hot flashes were more likely to be in poorer health, have lower education, and to be African American (vs white). These women were less likely to be Japanese. Women with frequent but not bothersome hot flashes had lower negative affect and were somewhat more likely to be married. For night sweats, women with infrequent yet bothersome night sweats were those in poorer health and with somewhat more sleep problems. Conversely, women with frequent but not bothersome night sweats were somewhat less likely to have sleep problems, to be late perimenopausal (vs pre-/early perimenopausal), and were somewhat more likely to be married.

DISCUSSION

This investigation was aimed at identifying the predictors of bother associated with VMS above and beyond the frequency of VMS. In the present investigation, VMS frequency was a consistent predictor of VMS bother. However, they were not interchangeable. Other important factors, including affect, symptom sensitivity, general health, race, and sleep problems, were associated with VMS bother above and beyond VMS frequency.

Negative affect and the tendency to attend to bodily sensations played a role in the bother associated with VMS that transcended symptom frequency. Not only were high levels of negative affect associated with more severe bother, but those women identified as highly symptomatic but not bothered were those with low levels of negative affect. These findings are consistent with a large body of literature concerning psychological factors in the perception, reporting, and interference of symptoms. Negative affectivity, or a propensity to experience negative emotions, is linked to increased symptom reporting and functional impairment associated with symptoms, above and beyond objective health indicators.[16,17] Moreover, cognitive processes, such as vigilance to physical sensations and catastrophic thought in response to physical symptoms, predict distress and impairment associated with symptomatic conditions.[18,19] These cognitive processes are posited to precede and influence subsequent emotional and behavioral responses to symptoms. However, with some notable exceptions,[31–33] there has been limited work relating the psychology of symptom reporting to VMS. As suggested by initial investigations,[34] intervening on cognitive and affective factors to reduce interference of symptoms may warrant further investigation.

Night sweats were experienced as more bothersome at a lower frequency than hot flashes. Moreover, sleep problems were an important predictor of bother associated with VMS, particularly night sweats. These findings are consistent with reports that overnight VMS disrupt sleep, which is quite bothersome.[20] In the present investigation, the frequency of symptoms was controlled. Thus, it was those women who were experiencing sleep problems who were

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most bothered by their VMS. Women with VMS but without sleep problems were less bothered by them. Although it is often assumed that sleep disturbance during menopause is due to night sweats, the causal role of night sweats in sleep disturbance remains unclear. Consistent links between poor sleep and VMS are observed when self-report measures of sleep and VMS are used,[5] but findings with physiologic measures are less consistent.[35–37] It is also notable that sleep problems were associated with more bothersome hot flashes, suggesting that poor sleep may affect women's ability to tolerate VMS during the day. Thus, improving sleep, whether or not frequency of VMS is reduced, may assist in rendering VMS less bothersome.

A longer duration of experiencing VMS, as indexed by the number of previous annual study visits reporting the symptom, was consistently associated with greater symptom bother. VMS were generally thought to be restricted to peri-and early postmenopause,[20] although recent findings have indicated that VMS may persist well into the 60s and 70s for a sizable minority (20%–30%) of women.[2,3] It is not known who is most likely to experience VMS for an extended period of time. According to the current findings, this extended period of symptomatology does not appear to result in adaptation, but rather increasing bother associated with VMS. These findings are consistent with previous investigations indicating that a longer perimenopause predicted increased symptom bother[21] and distress among midlife women.[22]

Other factors associated with VMS bother included poor health, younger age, and race/ethnicity, while controlling for multiple potentially confounding factors. Interestingly, African American race was consistently associated with increased bother associated with hot flashes. African American women in the SWAN have previously been documented to have more VMS than white women.[1] However, when frequency was controlled here, African American women were also more bothered. In additional analyses, African American race was also associated with high bother at a relatively low hot flash frequency. Although it is well-known that Asian women report fewer VMS,[1] the present investigation also suggested that Asian women were less bothered controlling for symptom frequency. The reason for these racial/ethnic differences is unclear. However, previous research documents less use of treatments such as HT among African American women,[38,39] leaving women with bothersome VMS untreated. There is also suggestion of differential patterns of pain perception and disability by race.[40] Although these racial/ethnic variations in symptom bother are in need of further investigation, it does suggest that African American women may be a group particularly affected by bothersome VMS.

Several limitations deserve mention. First, this investigation was cross-sectional and observational, and the causal nature of relations cannot be assumed. It is plausible that bothersome VMS may affect some of the factors assessed here, such as affect. Further, VMS were reported rather than physiologically assessed. However, given that the outcome was VMS bother and that physiologically measured VMS are not always perceived,[33] the most appropriate measure of VMS here is subjectively experienced VMS. Women taking HT were excluded, which may have excluded the women with the most frequent or bothersome VMS. Finally, although VMS frequency and bother ratings were obtained, severity ratings were not, and conclusions about severity cannot be made here. It is notable, however, that VMS severity is often defined with respect to the interference, distress, or bother that accompanies them.[41]

This study has several strengths. It is a large, population-based study that includes several racial/ethnic groups across several sites in the United States. This study included a wide range of behavioral, demographic, and psychosocial characteristics for investigation in relation to bothersome VMS. Unlike most investigations about bothersome VMS, the frequency of VMS was a covariate in all analyses, allowing for investigation of predictors of bother above and beyond the frequency at which VMS occur.

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CONCLUSIONS

There has been increased interest in developing new treatments for VMS. However, these treatments have primarily been focused on reducing VMS frequency. This study underscores the fact that some women are very bothered at low symptom levels, and other women are fairly unaffected by frequent VMS. Thus, a sole focus on frequency may not be the only or even the most effective approach to treating VMS. Factors such as negative mood, sensitivity to physical symptoms, sleep problems, a longer symptom duration, as well as poorer health may play a role in the perceived bother of VMS. In addition, certain groups, such as African American women, may be most affected by bothersome VMS and in need of intervention. This refined understanding of who is most bothered by VMS can assist clinicians in screening patients for optimal VMS counseling and treatment. Moreover, in addition to reducing VMS frequency, treatments addressing factors influencing VMS bother, such as mood and sleep, may be considered. Both approaches may assist in reaching the goal of improving the quality of life and functioning of midlife women.

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TABLE 1

Sample characteristics

Characteristic	N = 1,042
Site, no. (%)	
Detroit	208 (20.0)
Boston	189 (18.1)
Chicago	134 (12.9)
Oakland	152 (14.6)
Los Angeles	187 (17.9)
Pittsburgh	172 (16.5)
Race/ethnicity, no. (%)	
African American	348 (33.4)
White	506 (48.5)
Chinese	85 (8.2)
Japanese	103 (9.9)
Education, no. (%)	
≤ High school	218 (20.9)
Some college/vocational	373 (35.8)
≥College	450 (43.2)
Current smoker, no. (%), yes	145 (13.9)
Menopausal status, no. (%)	
Premenopausal	15 (1.4)
Early perimenopausal	258 (24.8)
Late perimenopausal	142 (13.6)
Postmenopausal	603 (57.8)
Indeterminate	24 (2.3)
Marital status, no. (%), married	688 (66.1)
Antidepressant use, no. (%), yes	208 (20.0)
Overall health, mean (SD)	2.5 (0.9)
Employed, no. (%), yes	814 (78.1)
Sleep problem, no. (%), yes	532 (51.1)
Hot flashes bother, no. (%)	
Not at all	78 (8.3)
Very little	423 (45.6)
Moderately	354 (38.2)
A lot	73 (7.8)
Night sweats bother, no. (%)	
Not at all	53 (7.7)
Very little	271 (39.6)
Moderately	275 (40.2)
A lot	86 (12.5)
Age, mean (SD) (range: 49–60)	53.0 (2.6)
BMI, mean (SD) (range: 16.3–61.2)	29.1 (7.5)

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Characteristic	N = 1,042
Physical activity score, mean (SD) (range: 3–13.5)	7.7 (1.8)
Symptom sensitivity, mean (SD) (range: 0–20)	10.1 (3.5)
Negative affect, mean (SD) (range: 0.6–26.3)	6.4 (4.3)
No. of hot flashes/wk, mean (SD) (range: 0–140)	13.5 (19.7)
No. of night sweats/wk, mean (SD) (range: 0–72)	6.2 (8.2)

BMI, body mass index.

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TABLE 2

Factors associated with hot flash bother, adjusting for hot flash frequency

	Hot flash bother	
Factor	**Minimally adjusted OR (95% CI)**	**Fully adjusted OR (95% CI)**
No. of hot flashes/week	1.06 (1.05–1.08)[e]	1.07 (1.05–1.08)[e]
Negative affect[a]	1.40 (1.20–1.64)[e]	1.27 (1.08–1.51)[d]
Symptom sensitivity[a]	1.23 (1.07–1.41)[d]	1.18 (1.03–1.37)[c]
Sleep problems	1.37 (1.03–1.81)[c]	1.38 (1.04–1.85)[c]
No. of visits reporting hot flashes	1.16 (1.08–1.25)[e]	1.14 (1.06–1.23)[d]
Age	—	0.94 (0.89–0.99)[c]
Race/ethnicity		
African American	—	1.59 (1.12–2.26)[c]
Chinese		0.47 (0.23–0.98)[b]
Japanese		0.57 (0.30–1.12)
White		Reference
Poorer self-rated health[a]	—	1.24 (1.03–1.48)[c]
Education	—	
≤ High school		0.84 (0.57–1.24)
Some college/vocational		0.96 (0.65–1.43)
≥College		Reference
Antidepressant use	—	1.35 (0.94–1.95)
BMI[a]	—	1.01 (0.99–1.03)

Models adjusted for site and covariates as listed. BMI, body mass index; OR, odds ratio.

[a] OR associated with every 1-SD increase.

[b] $P < 0.10$;

[c] $P < 0.05$;

[d] $P < 0.01$;

[e] $P < 0.0001$.

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TABLE 3

Factors predicting night sweats bother, adjusting for night sweats frequency

	Night sweats bother	
Factor	**Minimally adjusted OR (95% CI)**	**Fully adjusted OR (95% CI)**
No. of night sweats/wk	1.13 (1.10–1.15)[e]	1.13 (1.10–1.16)[e]
Negative affect[a]	1.27 (1.08–1.48)[d]	1.17 (0.98–1.38)[b]
Sleep problems	1.83 (1.33–2.53)[d]	1.84 (1.33–2.55)[d]
No. of visits reporting night sweats	1.10 (1.02–1.20)[c]	1.10 (1.02–1.20)[c]
Age	—	0.98 (0.92–1.04)
Poorer self-rated health[a]	—	1.17 (0.98–1.40)[b]
Smoking	—	1.48 (0.97–2.26)[b]
Antidepressant use	—	1.15 (0.78–1.69)

Models adjusted for site and covariates as listed.

[a] OR associated with every 1 SD increase.

[b] $P < 0.10$;

[c] $P < 0.05$;

[d] $P < 0.001$;

[e] $P < 0.0001$.

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TABLE 4

Predictors of the discrepancy between vasomotor symptom frequency and bother

Hot flashes, OR (95% CI)		**Night sweats, OR (95% CI)**	
Low frequency/high bother[a,b]		**Low frequency/high bother[a,c]**	
Race/ethnicity		Poorer self-rated health[d]	1.33 (1.02–1.74)[i]
African	2.40 (1.32–4.37)[j]	Sleep problems	1.26 (0.98–1.63)[h]
American			
Chinese	0.84 (0.33–2.17)		
Japanese	0.34 (0.13–0.89)[i]		
White	Reference		
Education			
≤ High school	1.53 (1.07–2.19)[i]		
Some college/vocational	0.80 (0.58–1.11)		
≥College	Reference		
Poorer self-rated health[d]	1.43 (1.06–1.92)[i]		
High frequency/low bother[e,g]		High frequency/low bother[e,f]	
Negative affect[d]	0.71 (0.51–0.98)[i]	Sleep problems	0.79 (0.62–1.00)[h]
Marital status		Marital status	
Married	1.34 (0.98–1.83)[h]	Married	1.26 (0.98–1.63)[h]
Unmarried	Reference	Unmarried	Reference
		Menopausal status	
		Pre-/early perimenopausal	Reference
		Late perimenopausal	0.52 (0.31–0.88)[i]
		Postmenopausal/indeterminate	0.99 (0.70–1.40)

Low frequency, 3 or fewer hot flashes per week and 2 or fewer night sweats per week; high frequency, 12 or more hot flashes per week; 3 or more night sweats per week; low bother: none (1), a little (2); high bother, moderate (3), a lot (4).

[a] Reference: low frequency/low bother.

[b] Covariates: age, site, body mass index, menopausal status, race/ethnicity, education, sleep problems, negative affect, self-rated health.

[c] Covariates: site, sleep problems, self-rated health.

[d] OR associated with every 1 SD increase.

[e] Reference: high frequency/high bother.

[f] Covariates: site, menopausal status, marital status, sleep problems, negative affect, self-rated health, symptom sensitivity.

[g] Covariates: age, site, body mass index, race/ethnicity, education, marital status, sleep problems, negative affect, self-rated health.

[h] $P < 0.10$;

[i] $P < 0.05$;

[j] $P < 0.01$.