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Somatosensory amplification and menopausal symptoms in breast cancer survivors and midlife women

Janet S. Carpenter[a,*], Christele M. Igega[a], Julie L. Otte[a], Debra S. Burns[b], Menggang Yu[c], Jingwei Wu[a]

[a] School of Nursing, Indiana University, Indianapolis, IN 46202, United States
[b] School of Engineering and Technology, Indiana University-Purdue University, Indianapolis, IN 46202, United States
[c] Department of Biostatistics and Medical Informatics, University of Wisconsin, Madison, WI, United States

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ABSTRACT

Objectives: Somatosensory amplification is the experience of sensing everyday bodily sensations as intense, agitating, and unpleasant. Using data from menopausal breast cancer survivors and midlife women without cancer, the study purposes were to (1) explore the psychometric properties of the Somatosensory Amplification Scale and (2) to describe somatosensory amplification and its relationship to menopausal symptoms of hot flashes, mood and sleep disturbance.
Study design: This was a cross-sectional, descriptive, correlational study using demographic, e-diary, and questionnaire data from 99 breast cancer survivors and 138 midlife women.
Main outcome measures: Somatosensory amplification, hot flashes (frequency, severity, bother, interference, perceived control), mood, and sleep.
Results: Cronbach's alphas for the scale were low. When an 8-item version of the scale was evaluated, alphas improved and item-total correlations remained strong or improved. Midlife women and breast cancer survivors did not have significantly different somatosensory amplification total or item scores after adjusting for group differences in demographics. Somatosensory amplification was significantly correlated with hot flash interference, perceived control over hot flashes, and mood and sleep disturbance in both groups but the patterns of correlations differed slightly between groups and depending on whether the 10-item or 8-item scale was used.
Conclusion: Somatosensory amplification may be a relevant concept to assess in relation to the menopausal symptom experience of midlife women with and without breast cancer as it may represent a potential intervention target to improve the menopausal symptom experience.

1. Introduction

Somatosensory amplification refers to the ability to perceive every day or normal bodily sensations at a more intense, agitating, and unpleasant level [1]. Somatosensory amplification is sometimes referred to as "amplification". Greater understanding of somatosensory amplification and menopausal symptoms could provide a better understanding of women's symptom experiences. Other studies have linked somatosensory amplification to symptoms in individuals with upper respiratory infections and migraines [2], as well as overall health worries [3]. Because breast cancer survivors are known to be more symptomatic at menopause than midlife menopausal women [4], understanding differences in somatosensory amplification between these two groups could lead to a new avenue for intervention research.

To the best of our knowledge, there is no published research exploring somatosensory amplification in relation to menopausal symptoms. Using the PubMed search engine, a literature search was conducted to identify articles on somatosensory amplification and menopausal symptoms. The goal was to find English language, human subjects, original research studies. Search phrases were (1) (somatosensory amplification) and (menopause or hot flashes or sleep) and (2) (somatosensory amplification) and (menopause and mood). The first search phrase produced 2 results, neither of which was relevant. The second search phrase produced no articles. These search results indicated that somatosensory amplification had not been previously studied in menopausal women, suggesting the need to explore the psychometric properties of the Somatosensory Amplification Scale (SSAS) in this population

* Corresponding author at: Indiana University, School of Nursing, 1111 Middle Drive NU E409, Indianapolis, IN 46202, United States. Tel.: +1 317 278 6093.
E-mail addresses: carpentj@iu.edu, carpentj@iupui.edu (J.S. Carpenter).

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and explore relationships between this concept and menopausal symptoms.

Therefore, using data from menopausal breast cancer survivors and midlife women without cancer, the study purposes were to (a) explore the psychometric properties of the Somatosensory Amplification Scale and (b) to describe somatosensory amplification and its relationship to menopausal symptoms of hot flashes, mood and sleep disturbance. We explored Cronbach's alpha and item-total correlations as measures of internal consistency reliability, group differences in somatosensory amplification, and relationships between somatosensory amplification and menopausal symptoms.

2. Methods

This was a cross-sectional, descriptive, correlational study. Data used was from information collected at baseline of a larger hot flash intervention study. All study procedures were approved by an Institutional Review Board and the Cancer Center's Scientific Review Committee. The study population included 99 breast cancer survivors and 138 midlife women without cancer [5]. Participants were recruited from the breast cancer and high risk clinics at a Midwestern National Cancer Institute-designated cancer center and from the community using mass mailings of brochures and flyers, website and newsletter advertisements, and word of mouth. Eligible and interested women provided written informed consent, written approval to use health information, and completed a packet of questionnaires at baseline before being randomized in the intervention study. Data from all women who completed baseline questionnaires are used here for this analysis.

Demographics were assessed using a questionnaire. Questions were both personal characteristics (e.g., age, race, marital status) and medical information (e.g., comorbidities, use of hot flash treatments).

The 10-item Somatosensory Amplification Scale includes a 5-item Likert-type response scale for participants to indicate the degree they are bothered by different somatic and visceral sensations [6]. A higher total score suggests greater symptom amplification with the scores ranging between 10 and 50.

An electronic hot flash diary was used to collect real-time, prospective ratings of hot flash frequency, severity and bother. Women carried a small monitor in a waist pack and pressed buttons on the monitor each time they had a hot flash. Severity and bother of each hot flash was rated by pressing the buttons and using a 0 (not at all) to 10 (extremely) scale. Women wore the monitor for a minimum of 24-h and a maximum of 7-days based on their personal preference. Twenty-four hour average hot flash frequency, severity, and bother were calculated.

The 10-item hot flash related daily interference scale [7] was used to assess hot flash interference or disruption. Participants rated each of the items using a 0–10 numeric rating scale. Scores range from 0 to 100 with higher scores indicating greater interference.

The Perceived Control over Hot Flashes Index (PCI) is a 15-item questionnaire (e.g., If I do all the right things, I can successfully manage hot flush symptoms) that uses a 4-point Likert scale (ranging from 'strongly disagree' to 'strongly agree') [8]. Higher total scores convey more perceived control over hot flashes.

The 37-item Profile of Mood States (POMS) questionnaire is a psychological self-report assessment using a 5-point Likert scale that measures affective mood states [9]. It yields a total mood disturbance score as well as 6 sub-scores with higher scores signifying greater mood disturbance on all except vigor/activity. The subscales are tension/anxiety, anger/hostility, fatigue/inertia, depression/dejection, vigor/activity and confusion/bewilderment.

The Pittsburgh Sleep Quality Index (PSQI) is a self-rated questionnaire that evaluates sleep quality and patterns over the past month [10]. Nineteen items generate seven subscale scores: sleep quality, sleep latency, sleep duration, sleep disturbance, sleep medication, daytime sleep and sleep efficiency. These seven scores are used to distinguish good sleep from poor sleep and the total of these subscales produces one global score. A global sum of 5 or greater signifies a poor sleeper.

Descriptive statistics (means, standard deviations, frequencies, percentages) were used to describe demographic characteristics in each group. Cronbach's alpha coefficients item-total Pearson correlations for the SSAS were calculated in each group. Cronbach's alpha is a measure of internal consistency reliability, or a measure of how similar the scale items are to one another. Alpha ranges from 0 to 1.00 with >70 generally seen as an acceptable cutoff for a new scale and >80 acceptable for an existing scale. Between group comparisons on demographics and baseline measures were done using *t*-tests and chi-squared analyses. Pearson correlations were used to evaluate relationships between item and total scores in both groups. An analysis of covariance was done to compare somatosensory amplification between groups controlling for baseline demographic differences. Spearman correlations were used to evaluate relationships between total scores and menopausal symptom variables because of the skewed distribution of the latter. Because this was a correlative study from a larger clinical trial [5] and because no formal hypotheses were stipulated for this descriptive analysis, no corresponding sample size justification was made related to these outcomes in the original clinical trial protocol. Given the descriptive/exploratory nature of our analyses, our moderately large sample size seemed appropriate to address our purpose.

3. Results

3.1. Sample characteristics

As shown in Table 1, there were no group differences in ethnicity, employment status, menopausal status, age, body mass index, or years of education. However, compared to midlife women, breast cancer survivors were more likely to be White, married, have less difficulty paying for basics, less likely to be smokers, more likely to be using a hot flash treatment, more likely to be taking Tamoxifen/aromatase inhibitor (both of which cause hot flashes) and using more medications in general. Breast cancer survivors were a mean of 7.57 years post diagnosis (SD = 7.61).

There were no differences between groups in hot flash frequency, severity, bother, interference, perceived control over hot flashes or sleep ($p > 0.05$). Total mood disturbance was significantly higher in the midlife women than in the breast cancer survivors ($p < 0.05$).

3.2. SSAS psychometrics

When using the full 10-item scale, Cronbach's alpha coefficient was sub-optimal in both groups (0.66 breast cancer group, 0.68 midlife women group) and item-total correlations ranged from 0.270 to 0.610 in the breast cancer group and 0.365 to 0.615 in the midlife women (Table 2). Based on these results, we removed the items most poorly correlated with total scores in both groups: item #1 "I can't stand smoke, smog, or pollutants in the air" and item #3 "When I bruise myself, it stays noticeable for a long time". Removal of these two items resulted in slightly improved alphas (0.70 both groups). For the 8-item scale, most item-total correlations improved ranging from 0.441 to 0.660 in the breast cancer group and 0.447 to 0.644 in the menopausal women (Table 2). For