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Original article

Hot flashes in breast cancer survivors: Frequency, severity and impact

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ABSTRACT

Purposes: To (1) determine the frequency and severity of hot flashes, (2) examine the associations between hot flash frequency and severity and quality of life, and (3) identify the predictors of hot flash activity in breast cancer survivors.
Methods: The study used a cross-sectional design and mailed survey of 253 breast cancer survivors recruited from a cancer wellness clinic. Participants provided information regarding cancer history, hot flashes, pain intensity, sleep problems, physical functioning, and psychological functioning.
Results: About half of the survivors reported at least one hot flash in the past 24 h (45%) or past week (52%). The average frequency of hot flashes was 1.9 in the past 24 h and 1.8 in the past week. Hot flash severity was usually mild or asymptomatic. However, participants with hot flashes reported significantly more sleep problems and higher pain severity than those reporting no hot flashes. Moreover, the severity of hot flashes was associated with more sleep problems, higher pain severity, and more psychological dysfunction. History of hormonal suppression therapy and younger age predicted hot flash activity in the study sample.
Conclusions: In breast cancer survivors, hot flashes are common and are associated with unpleasant symptoms and poor quality of life. Research is needed to determine if treatments that reduce the frequency and severity of hot flashes in breast cancer survivors also result in improvements in symptoms such as sleep problems, pain, and psychological dysfunction.

Introduction

Hot flashes are a common problem in breast cancer survivors. Six times as many breast cancer survivors experience hot flashes compared to age-matched controls [1]. In the breast cancer survivor population, hot flashes are reported as one of the most prevalent and bothersome vasomotor symptoms [2,3]. Furthermore, breast cancer survivors report work performance loss due to hot flashes [4,5].

Recent research regarding hot flashes in breast cancer survivors focuses on potential treatments and management options. Evidence regarding the prevalence, frequency, severity of hot flashes, and the correlates of quality of life disturbances is limited. Previous studies have shown that the majority of postmenopausal women report hot flashes as mild (29%), moderate (37%), and severe (34%) [3]. Among young breast cancer survivors (aged 40 years or younger), 46% reported hot flashes [6].

However, limited studies examine hot flashes and menopausal symptoms in breast cancer survivors in wider age range. Further knowledge would provide useful information to providers regarding treatment. Moreover, survivors with hot flashes were found to have significantly greater interference with daily activities, overall quality of life, sleep, concentration, mood, and sexuality than the health controls [7]. Research also indicates that several factors, such as quality of life, poor or disrupted sleep [8,9], could be associated with hot flashes. Hot flashes also have been associated

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with fatigue, worse physical health and pain [10–12]. However, to our knowledge, no studies have yet evaluated the association between hot flash severity and psychological functioning.

Thus, this study aims to address these knowledge gaps by (1) investigating the frequency and severity of hot flashes, (2) examining the associations between hot flash frequency and sleep problems, pain, psychological functioning and physical functioning, and (3) identifying the predictors of hot flash activity in breast cancer survivors.

Methods

Participants

Participants were women with a history of breast cancer being seen in a cancer care follow-up clinic (the Seattle Cancer Care Alliance Women's Wellness Follow-up Clinic). The clinic sees patients who have completed primary treatment (including surgery, if indicated; they could be still receiving adjuvant hormone therapy) and are disease-free. One paper, focusing on the frequency, severity and impact of pain in this population has already been published [10]. Eligible participants must: (1) have completed primary treatment; (2) be disease-free; (3) be at least 18 years old; and (4) be able to read and write in English.

Measures

Hot flashes and its impact were assessed by paper-and-pencil questionnaires.

Demographic characteristics and cancer history

Participants provided information about their sex, age, race/ethnicity, educational level, and marital and employment status. Information was also elicited about participants' cancer history, including the initial approximate date of breast cancer diagnosis, time since breast cancer diagnosis, type of other cancer diagnosis, and type of cancer treatments (including surgery, radiation therapy, chemotherapy, and hormonal suppression therapy).

Hot flashes activity and severity

We assessed the severity and frequency of hot flash activity using questions from a self-report measure of hot flash activity and severity used in previous studies of hot flashes in cancer survivors [13]. Fig. 1 presents the definitions of hot flash severity (none, mild, moderate, severe, and very severe) and questions used. We computed two global weighted measures of hot flash severity; one for the past 24 h and one for the past week. The 24-h hot flash severity measure was computed by summing: (1) mild hot flashes reported in the previous 24 h X 1; (2) moderate hot flashes reported in the previous 24 h X 2; (3) severe hot flashes reported in the previous 24 h X 3; and (4) very severe hot flashes reported in the previous 24 h X 4 [19]. The past week hot flash severity measure was computed by multiplying the number of reported hot flashes during the past week by the reported average severity of those hot flashes [19]. We also computed a dichotomous measure representing the "presence" of hot flash activity.

Pain intensity

Two 0–10 numerical ratings scales (NRS) were used to assess average and worst pain intensity over the past week (with "0" meaning "*No pain*" and "10" meaning "*Pain as bad as could be*") [14]. NRS of pain intensity have demonstrated excellent validity via their strong associations with measures of pain intensity [15] and good reliability via good test-retest stability over a two-day period (e.g., $r = 0.78$) [16].

Sleep quality

Sleep quality was assessed using the 6-item Sleep Problem Index-I (SPI-I) [17]. The 12-items of the SPI-I assess overall sleep quality and sleep problem domains. The SPI-I scale score is transformed to a 0 to 100 scale, with higher scores reflecting more sleep problems [17]. The SPI-I shown good reliability (Cronbach's alpha = 0.78) in a large normative sample [17]. In our sample, the internal consistency of the SPI-I items were also good (Cronbach's alpha = 0.79).

Psychological functioning

The five-item SF-36 Mental Health scale (SF-36 MH) [18] was used to assess psychological functioning. The SF-36 MH scale has been used widely in studies of breast cancer survivors [19,20]. Also, the SF-36 MH scale has been shown to have high internal consistency, high test-retest stability, and good criterion validity which the MH was associated with other measures of mental health [18]. The MH five items are transformed to a 0 to 100 scale, with higher scores demonstrating better psychological functioning. In our sample, the internal consistency reliability of the SF-36 MH items was excellent (Cronbach's alpha = 0.85).

Physical functioning

The 10-item SF-36 Physical Functioning scale (SF-36 PF; 18) was used to assess the physical functioning. The SF-36 PF is used widely in research for breast cancer survivors [19,20]. The SF-36 PF scale has also demonstrated good internal consistency and test-retest stability [24]. The SF-36 PF scale has been shown good criterion validity through its associations with physical health, general health and global quality of life [18]. The 10 PF items are transformed to a 0 to 100 scale, with higher scores demonstrating better physical functioning. In our sample, the internal consistency reliability of the SF-36 PF items was excellent (Cronbach's alpha = 0.91).

Procedures

Four hundred and eighty-seven invitations and consent materials were sent to potential participants who were on the active patient list of the Wellness Follow-up Clinic. Three invited potential participants were deceased. In addition, five potential participants indicated either by mail or telephone they did not have a history of cancer. One potential participant was unable to complete the survey because of leaving the country. An additional 36 potential participants refused to participate in the study.

Data analysis

We first computed descriptive statistics of the available demographic and cancer history variables. Then, we compared the means of the study criterion measures (average and worst pain intensity, sleep problems, psychological functioning, and physical functioning) between those who reported no versus at least one hot flash in the past 24 h and past week, using *t*-tests. We then compared the mean scores on the pain and functioning measures between participants who described their typical hot flash as mild, moderate, severe, and very severe, using one-way ANOVAs. Next, we computed correlation coefficients between (1) the 24-h and past week hot flash severity scores and (2) sleep problems, pain, psychological functioning, and physical functioning. Spearman's Rho coefficients were used because of the skewed distribution of the hot flash frequency data. Then, we performed chi-square analyses to see if the presence of one or more hot flashes in the past 24 h and week was associated with type of treatment received and type of cancer, and *t*-tests to see if age or duration of cancer (i.e.,