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Acupuncture versus medication for pain management: a cross-sectional study of breast cancer survivors

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Abstract

Aim of the study—Breast cancer survivors who take aromatase inhibitors (AI) often suffer from chronic pain. Emerging evidence supports the use of acupuncture as an effective pain management strategy for this condition, but its acceptability among cancer survivors is unknown. We evaluated breast cancer survivors' preferences for acupuncture as compared with medication use and identified factors predictive of this preference.

Methods—We conducted a cross-sectional study among breast cancer survivors who were currently, or had been, taking an AI. The primary outcome was degree of preference for acupuncture as compared with medication for pain management. We conducted multivariate logistic regression analyses to evaluate the effects of socioeconomic status (SES) factors and health beliefs on treatment preference.

Results—Among 592 participants, 160 (27.0%) preferred acupuncture, 153 (25.8%) preferred medication and 279 (47.1%) had no clear preference. In a multivariate analysis that only included SES, higher education and white race were significantly associated with greater preference for acupuncture. When health beliefs were added, SES effects were attenuated, while greater expectation of acupuncture's effect, lower perceived barriers to its use, higher social norm (endorsement from family members and healthcare professionals) related to acupuncture and higher holistic health beliefs were associated with greater preference for acupuncture.

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Contributors TB analysed the data, and drafted and revised the paper. SQL cleaned and analysed the data, and revised the paper. JLD and CMS conducted the study, collected the data and revised the paper. LAP and RS analysed the data and revised the draft paper. JJM designed the trial, analysed the data and revised the paper.

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Conclusion—We found similar rates of preference for acupuncture versus medication among breast cancer survivors for pain management. Specific attitudes and beliefs predicted such preferences, highlighting the importance of a patient-centred approach to align patient beliefs and preferences with therapeutic options for more effective pain management.

Trial registration number—NCT01013337; Results.

INTRODUCTION

Each year, over 230 000 women are diagnosed with invasive breast cancer and join the growing number of breast cancer survivors.¹ Approximately 25%–60% of breast cancer survivors suffer from chronic pain resulting from surgery, chemotherapy, radiation therapy and antioestrogen therapy.^{2–4} In particular, up to 50% of breast cancer survivors who take aromatase inhibitors (AIs) experience AI-associated musculoskeletal symptoms (AIMSS), leading 20% of these patients to discontinue treatment.^{4–7} Despite limited evidence of their effectiveness and the potential for unwanted side effects, medications such as acetaminophen and non-steroidal anti-inflammatory drugs are prescribed for up to 53% of patients with AIMSS.⁵ Concurrently, it is known that breast cancer survivors are amenable to complementary therapies for pain and symptom management.^{1–8}

Acupuncture is an integrative medicine modality that has shown both efficacy and effectiveness in treating chronic pain in non-cancer populations.⁹ Recent studies indicate that 69%–81% of oncology patients were interested in acupuncture during cancer therapy.^{10–11} It has minimal toxicity and emerging research indicates that it may alleviate pain and reduce AIMSS among breast cancer survivors.^{12–14} Because of challenges with clinical pain management, acupuncture has evolved into a reasonable pain reduction option for cancer survivors according to an American Society for Clinical Oncology (ASCO) guideline.¹⁵

Nevertheless, in routine clinical practice, pain medication prescription remains the first-line treatment for pain, while acupuncture is often not offered as an option. If given a choice, it is unknown to what degree patients would prefer acupuncture versus medication to reduce pain. In the era of patient-centred care, it is important to understand patients' preferences for utilising acupuncture versus medication for pain management to achieve better therapeutic outcomes and patient satisfaction. As such, we conducted a cross-sectional survey study to evaluate breast cancer survivors' preferences for acupuncture over medication in pain management and to identify factors predicting such preference.

METHODS

Study design and patient population

Participants were drawn from the follow-up assessment of Wellness After Breast Cancer, a longitudinal prospective study that focused on identifying biological determinants of symptom distress and disease outcomes in women with hormone receptor-positive breast cancer taking AIs. Details of the study design have been published previously.¹⁶ Survey participants were initially recruited from breast cancer clinics in an academic tertiary care teaching hospital and a community hospital between November 2011 and June 2014 and were followed up between January 2014 and November 2015. Eligible participants for the

longitudinal study were postmenopausal women with a history of stage I–III hormone receptor-positive breast cancer who were current users of a third-generation AI for at least 6 months or who had discontinued AI use before the full duration of prescribed therapy. Trained research assistants approached potential study subjects in the waiting area of oncology clinics and, after obtaining written informed consent, asked participants to complete a survey. Of the original 613 participants who participated in the follow-up questionnaires, 21 were excluded from analysis because they did not answer the pain preference question, resulting in a sample size of 592.

Study variables

Primary outcome—The primary outcome measure was preference for pain treatment among breast cancer survivors who were currently taking, or who had previously taken, an AI. Participants were asked to rate their preference for using acupuncture versus medication by answering the following question: ‘Since there are pain medications to manage pain, what is your preference for taking a pain medication vs. getting acupuncture to manage your pain?’ Response options included ‘very much prefer acupuncture’, ‘much prefer acupuncture’, ‘slightly prefer acupuncture’, ‘no preference’, ‘slightly prefer medication’, ‘much prefer medication’ and ‘very much prefer medication’.

Measurement of attitudes and beliefs

Since attitudes and health beliefs may shape preference for therapy, we based our conceptual framework guiding the selection of instruments on the theory of planned behaviour (TPB). The TPB claims that a person chooses a particular behaviour due to the expected consequence of such behaviour, such as reduced symptom burden; difficulty engaging in the behaviour due to lack of insurance coverage or appropriately trained providers; or social norm pressure for such behaviour, such as cultural attitudes towards acupuncture or advice from the treating oncologist. The TPB has been shown to be predictive of complementary and alternative medicine (CAM) usage among patients.^{17–19} Based on prior qualitative research suggesting that the perception of acupuncture as more ‘natural’ than medication influences patient decision-making, we expanded our conceptual model to include measurement of holistic health beliefs.

We used the Acupuncture Expectancy Scale (AES), a validated instrument to measure outcome expectancy related to pain treatment preference for acupuncture, as expectancy in acupuncture may affect treatment preference. The AES was previously validated in patients with breast cancer, with scores ranging from 4 to 20 and a higher score indicating greater outcome expectancy. The internal consistency of the scale (Cronbach’s alpha coefficient) was 0.95.²⁰

We used modified perceived barrier and social norm domains from the Attitudes and Beliefs about Complementary and Alternative Medicine (ABCAM) instrument to measure perceived barriers and social norms related to pain treatment preference. The perceived barrier domain contains 10 questions about reasons patients are unlikely or hesitant to use acupuncture, like ‘they may have side effects’. The sum score ranges from 10 to 50, with a higher score indicating more barriers to using CAM. The social norm domain in ABCAM has six

questions that aim to measure how social norms (ie, opinions of family member or care provider, or other patients with cancer) may have influenced the patient's preference in pain management.²¹ The sum score ranges from 6 to 30, with a higher score indicating more social support. ABCAM was previously validated in 317 patients with cancer, with acceptable internal consistency (Cronbach's alpha coefficients of 0.76 and 0.75, respectively).²¹

We used the modified Complementary and Alternative Medicine Belief Inventory (CAMBI) to measure beliefs in natural treatment and holistic health related to pain treatment preference. Our modified version has two components: the natural treatment domain and the orientation towards holistic health domain. The natural treatment domain contains six questions, like 'Pain management should have no negative side effects' or 'Pain management treatments should enable my body to heal itself'. The holistic health domain contains six questions, such as 'Health is about harmonizing body, mind and spirit'. Each domain score ranges from 6 to 30, with a higher score indicating more preference for using natural treatment or holistic health to manage pain. CAMBI was previously validated in 328 completed questionnaires. The subscales of the CAMBI measuring beliefs in natural treatment and holistic health were significantly correlated with CAM use (Spearman's $r=0.18$ and 0.47 for natural treatment and holistic health).²² In addition, the subscales of the CAMBI measuring beliefs in natural treatment and holistic health have acceptable internal consistency (Cronbach's alpha coefficients of 0.80 and 0.70, respectively).

Sociodemographic variables

We acquired demographic factors such as age, race, education level and employment status, through patient self-reporting.

Statistical analysis

We performed statistical analysis using Stata V.12.0 for Windows. For pain treatment preference, we initially coded responses of 'very much prefer acupuncture' and 'much prefer acupuncture' as prefer acupuncture for pain management; 'slightly prefer acupuncture,' 'no preference' and 'slightly prefer medication' as no clear preference; and 'much prefer medication' and 'very much prefer medication' as prefer medication. We performed X^2 analyses to determine the relationship between relevant covariates (eg, age, education and race/ethnicity), AES, CAMBI, ABCAM and pain treatment preference. To simplify data interpretation, we dichotomised the outcome as preferring acupuncture versus not preferring acupuncture (combining those who had no clear preference with those who preferred medications). Bivariate and multivariate logistic regression models were built in two steps with preference for acupuncture versus not preferring acupuncture as the dependent variable. Variables that were associated with acupuncture preference at the significance level of less than 0.20 in bivariate analyses were included. In model 1, we sought to identify the sociodemographic factors related to pain treatment preference. In model 2, we incorporated sociodemographic factors with expectancy, attitude and belief scores. All analyses were two-sided with a P value less than 0.05 indicating significance. Our sample size was determined by the parent study.

RESULTS

Baseline characteristics of participants

Among 592 participants, the mean age was 62.8 (SD 9.4, range 26–87). The majority of participants were white (84.8%). Educational status varied among the participants: 19% had a high school-level education or less, and 81% had college-level education or above. Of the participants, 52% were employed and 48% were not employed. Other study participant characteristics are found in table 1.

Pain management preference

Among the 592 participants, 27% (n=160) preferred acupuncture, 26% (n=153) preferred medication and 47% (n=279) had no clear preference for pain management. χ^2 analyses (table 2) and bivariate analyses (table 3) showed that younger age (<60), white race, college-or-above education, higher acupuncture expectancy, natural treatment belief, holistic health belief, social norm scores and lower perceived barrier scores were all statistically significantly associated with preference for acupuncture over medication for pain management ($P<0.05$). Interestingly, employment status was not associated with pain management preference.

Multivariate analysis: factors related to pain management preference

Model 1 multivariate analysis showed that when combining all sociodemographic factors, age was no longer a significant factor, but race and education remained significant factors for predicting preference for acupuncture to manage pain. Non-white race significantly reduced the probability of preferring acupuncture for pain management with adjusted OR (AOR)=0.51 (95% CI 0.3 to 0.9, $P=0.032$). Lower education status also significantly reduced the probability of preferring acupuncture for pain management, with AOR=0.35 (95% CI 0.2 to 0.5, $P=0.001$) (table 3).

When attitudes and beliefs were incorporated into the multivariate analysis model, age, race and education level were no longer significant factors predicting acupuncture pain preference (model 2 in table 3). Rather, higher acupuncture expectancy scores (AOR=1.1, 95% CI 1.0 to 1.2, $P=0.002$), higher social norm scores (AOR, 1.15, 95% CI 1.1 to 1.2, $P<0.001$) and higher holistic health belief scores (AOR, 1.10, 95% CI 1.0 to 1.2, $P=0.014$) were all significantly associated with increased likelihood to prefer using acupuncture to manage pain. Higher perceived barrier scores (AOR=0.85, 95% CI 0.8 to 0.9, $P<0.001$) were associated with decreased likelihood of acupuncture preference. Natural treatment belief scores did not significantly predict pain management preference.

Sociodemographic variations in attitudes and beliefs

We found that white participants with higher education have higher acupuncture expectancy, social norm and holistic health belief scores, and lower perceived barrier scores. Compared with white participants, non-white participants had significantly higher perceived barrier scores, but lower social norm scores and holistic health belief scores (figure 1). Compared with participants with college or higher education level, those with high school or less

education had significantly lower acupuncture expectancy, social norm and holistic health belief scores, and higher perceived barrier and natural treatment belief scores (figure 2).

DISCUSSION

Our study demonstrated that among 592 postmenopausal oestrogen receptor-positive breast cancer survivors, 27% preferred acupuncture, 26% preferred medication and 47% had no clear preference for pain management. Multivariate analysis showed that health attitudes and beliefs played a more important role than social demographic factors (eg, race, educational status) in predicting pain management preference; higher acupuncture expectancy, social norm and holistic health belief scores, and lower perceived barrier scores predicted the preference for acupuncture over medication for pain management. Further, specific health beliefs and attitudes like perceived barriers and holistic health beliefs differed by race and education. These findings have significant implications for designing patient-centred pain management for breast cancer survivors and are particularly relevant for addressing potential health disparities.

We believe this is the first study investigating cancer survivors' preferences for acupuncture as a pain management strategy. One prior study evaluated preference in chronic pain management among physicians and medical students; it showed that over-the-counter pain medication and topical pain modalities were the most recommended treatments, followed by physical therapy and lifestyle activities. Acupuncture was not a treatment option in this study.²³ Since we found approximately the same proportion of survivors preferred acupuncture and medication, it is likely that patients' preference and physicians' preference in chronic pain management may differ. A recent study showed that 69% of patients with cancer were interested in receiving acupuncture during cancer therapy, and that both patients and physiotherapists believed acupuncture was effective for treating cancer pain, nausea and vasomotor symptoms.¹⁰ Another study showed that 81% of patients with cancer intended to use acupuncture to manage cancer and/or cancer treatment-related symptoms.¹¹ Enquiring about patients' beliefs and preferences may help direct patients to therapies of their choice, give them a sense of control, and improve both pain management satisfaction and outcome.

The 2016 ASCO management guideline for cancer survivors with chronic pain states that there is a lack of strong evidence to recommend use of either pharmacological or non-pharmacological approaches for chronic pain treatment in this population. However, it suggests that, when making decisions about a pain management regimen, cancer clinicians consider the potential for harm associated with pain medication, like drug–drug interactions, drug-induced toxicity (ie, QT interval prolongation), and persistent adverse events such as constipation and possible drug misuse or abuse, in addition to efficacy.¹⁵ The guideline states that in addition to traditional pharmacological interventions, 'clinicians may prescribe directly or refer patients to other professionals to provide' non-pharmacological approaches such as acupuncture 'to mitigate chronic pain in cancer survivors'.¹⁵ While the current evidence supporting acupuncture use is modest due to high risk of bias in many studies, this recommendation was made due to the minimal adverse reactions associated with such approaches, thereby making acupuncture a reasonable option for cancer survivors with chronic pain. Echoing this recommendation, our study suggests that, from the perspective of

patient choice, acupuncture is a preferred pain management option for a significant proportion of cancer survivors.

Our study identified a number of sociodemographic attitudes and beliefs that are associated with the preference for acupuncture over medication, including white race, higher education, higher acupuncture expectancy, social norm and holistic health belief scores, and lower perceived barriers. Our findings are consistent with prior studies demonstrating higher CAM usage among whites compared with African-Americans,^{24–25} and among those with higher education.^{8,26–27} Our study showed that higher acupuncture expectancy, social norm and holistic health belief scores, and lower perceived barrier scores were all significantly associated with an increased likelihood to prefer acupuncture for pain management. This is not surprising, since higher expectancy for acupuncture and encouragement from healthcare providers and family members likely persuade patients to use acupuncture. Additionally, acupuncture is a type of complementary medicine focused on whole body healing and is associated with few known side effects, which are all ideas aligned with holistic health beliefs. Understandably, preference for acupuncture treatment would increase if there were fewer perceived barriers like cost and qualified providers. A recent study showed that high levels of catastrophising, rumination and magnification were associated with greater acupuncture use among breast cancer survivors using AIs.²⁸ Further studies on psychological factors and acupuncture for pain management preferences are needed.

To the best of our knowledge, this is the first study to attempt to explain why certain sociodemographic factors predict preference for acupuncture over medication for pain management. Our study showed that attitudes and beliefs about CAM and acupuncture accounted for more variance in preference for acupuncture as pain management than sociodemographic factors alone. Participants who were white and more educated had significantly higher acupuncture expectancy, as well as higher social norm and holistic health belief scores, and lower perceived barrier scores than non-white and less educated participants. This finding suggests the potential for health disparities among non-white and less educated populations. Specific outreach and education, along with efforts to decrease structural barriers such as cost and insurance coverage, may be needed to make acupuncture an equitable pain management option for survivors from diverse backgrounds. There have been limited cost-effectiveness studies on acupuncture in oncology patients. Outside of the oncology field, studies have demonstrated that acupuncture is a cost-effective treatment option for patients with various conditions, including chronic lower back pain,²⁹ chronic neck pain³⁰ and osteoarthritis pain.³¹

Our study has several limitations. First, because our patient population only included postmenopausal oestrogen receptor-positive breast cancer survivors, our findings cannot be generalised to premenopausal breast cancer survivors or other cancer populations. Second, our study was conducted in an academic medical centre and the majority of our participants were white, which may limit generalisability to community settings or other settings including populations from different racial backgrounds. Lastly, we did not collect information on factors such as household income, which has been associated with differential usage of CAM.

Despite these limitations, our study is the first to evaluate the inclusion of acupuncture as an option for pain management preference in breast cancer survivors. We found that a quarter of survivors have a strong preference for using acupuncture to alleviate pain and that a quarter prefer medication, while half have no strong preference. In oncology and chronic pain clinics, clinicians and other care providers often offer patients medication to reduce pain as the first line of treatment despite the fact that the evidence supporting such an approach is as limited as the evidence supporting the use of acupuncture for pain control. Our findings regarding patients' preferences could lead to the inclusion of acupuncture as a more mainstream option for pain reduction, especially in patients oriented towards holistic health with a greater expectation of acupuncture. More research is needed to determine whether aligning patients' treatment beliefs and preferences will lead to better patient satisfaction and pain management outcomes in cancer survivors.

CONCLUSION

We found similar preference rates for acupuncture and medication use among patients with breast cancer for pain management. This suggests that acupuncture may have an important role as an integrative approach for pain management. Specific attitudes and beliefs predicted such preferences, highlighting the importance of a patient-centred approach to align patient beliefs and preferences with therapeutic options.

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* $p < 0.05$, ** $p < 0.001$

Figure 1.
Attitudes and health beliefs scores by race.

Figure 2.
Attitudes and health beliefs scores by education.

Table 1

Baseline characteristics of participants

	Total participants n (%)
Total	592
Age (mean, SD)	62.8±9.4
Race	
White	502 (85)
Non-white	90 (15)
Educational level *	
High school or less	110 (19)
College or above	481 (81)
Employment	
Employed	305 (52)
Not employed	287 (48)
Preference for pain treatment	
Prefer medication	153 (26)
Prefer acupuncture	160 (27)
No preference	279 (47)
Acupuncture expectancy (mean, SD)	11.2±4.9
Perceived barrier (mean, SD)	26.0±5.8
Social norm (mean, SD)	16.9±3.8
Natural treatment belief (mean, SD)	21.8±4.0
Holistic health belief (mean, SD)	22.7±3.5

* Missing data.

Table 2

Relationship between clinical/demographic factors and pain management preference

	Prefer medication n (%)	No preference n (%)	Prefer acupuncture n (%)	P value
Age				0.039
<60 years	46 (21)	99 (46)	70 (33)	
60 years	107 (28)	180 (48)	90 (24)	
Race				0.001
White	116 (23)	240 (48)	146 (29)	
Non-white	37 (41)	39 (43)	14 (16)	
Educational level*				<0.001
High school or less	46 (42)	51 (46)	13 (12)	
College or above	107 (22)	227 (47)	147 (31)	
Employment				0.26
Employed	78 (26)	136 (44)	91 (30)	
Not employed	75 (26)	143 (50)	69 (24)	
Acupuncture expectancy (mean, SD)	9.1±5.2	10.9±4.4	13.8±4.3	<0.001
Perceived barrier (mean, SD)	28.8±5.0	26.6±5.3	22.4±5.5	<0.001
Social norm (mean, SD)	14.9±4.2	17.1±3.2	18.6±3.2	<0.001
Natural treatment belief (mean, SD)	21.5±4.2	21.6±3.8	22.6±4.2	0.039
Holistic health belief (Mean SD)	21.6±3.8	22.4±3.1	24.3±3.5	<0.001

* Missing data.

Table 3

Factors associated with preference for acupuncture use

	Preference for acupuncture			
	Bivariate	Model 1		Model 2
	OR (95% CI)	P value	AOR (95% CI)	P value
Age				
<60 years	1	0.023	1	1
60 years	0.65 (0.4 to 0.9)		0.72 (0.5 to 1.1)	0.11
Race				
White	1	0.009	1	1
Non-white	0.45 (0.2 to 0.8)		0.51 (0.3 to 0.9)	0.032
Educational level				
College or above	1	<0.001	1	1
High school or less	0.30 (0.2 to 0.6)		0.35 (0.2 to 0.6)	0.001
Employment				
Employed	1	0.11	1	1
Not employed	0.74 (0.5 to 1.1)		0.98 (0.6 to 1.5)	1.05 (0.6 to 1.7)
Acupuncture expectancy	1.20 (1.1 to 1.3)	<0.001	-	1.10 (1.0 to 1.2)
Perceived barrier	0.85 (0.8 to 0.9)	<0.001	-	0.89 (0.8 to 0.9)
Social norm	1.26 (1.2 to 1.4)	<0.001	-	1.15 (1.1 to 1.2)
Natural treatment belief	1.06 (1.0 to 1.1)	0.009	-	1.01 (0.9 to 1.1)
Holistic health belief	1.20 (1.1 to 1.3)	<0.001	-	1.10 (1.0 to 1.2)

AOR, adjusted OR.