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Feasibility Study of Acupuncture for Reducing Sleep Disturbances and Hot Flashes in Post-Menopausal Breast Cancer Survivors

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Abstract

Objectives—This was a feasibility study of a tailored acupuncture intervention in post-menopausal breast cancer survivors (BCS) reporting sleep disturbances and hot flashes. Objectives were: 1) to describe patterns of acupuncture point use, 2) evaluate outcome expectancy, credibility, and acceptability relative to the intervention; and 3) evaluate patterns of symptom change over time.

Design—Single group, non-randomized, quasi-experimental 8-week study.

Sample/Setting—Ten BCS with both sleep disturbances and hot flashes were referred to any of 4 Midwestern community acupuncturists.

Methods—Assessments were done at baseline (weeks 1, 2), during treatment (weeks 3, 4), and after treatment (week 5, 8). Acupuncture treatment was tailored to the individual by community acupuncturists and provided as 3 sessions within a 2 week period (weeks 3, 4). Patients wore a wrist actigraph during weeks 1, 2, 3, 4, 5, and 8 and a sternal skin conductance monitor for 24 consecutive hours during weeks 1, 2, 3, 4, 5, and 8. Subjective data were obtained by questionnaire at weeks 1, 2, 3, 4, 5 and 8.

Findings—Women were a mean age of 53, with an average 6.75 years since diagnosis. A mean of 10 needles were used per session with the most common points located in the LU or lung meridian. BCS had high expectancy that acupuncture would decrease their symptoms, believed it was a credible treatment and felt it an acceptable form of treatment. Three significant patterns of symptom change were noted from baseline: an increase in the number of minutes it took to fall asleep after treatment (from week 5 to 8, (p=.04); a decrease in the percentage of time awake after sleep onset from baseline to follow-up 2 (week 8) (p=0.05); and a decrease in number of hot flashes from baseline to follow-up 1 (week 5) (p=0.02).

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Implications for Nursing—Findings may be used by Clinical Nurse Specialists to consider recommending acupuncture to improve sleep and reduce hot flashes in BCS.

Conclusions—Acupuncture treatment seems to be a feasible treatment option for highly motivated BCS with sleep disturbances and hot flashes but needs to be further evaluated in a larger randomized-controlled clinical trial.

Introduction and Background

Breast cancer survivors (BCS) represent the largest cancer survivor group in the United States, and the number is growing.[1] Up to 65% of BCS experience menopausal symptoms such as sleep disturbances and hot flashes after treatment for breast cancer, with symptoms extending well over 5 years after diagnosis.[2,3] These symptoms can be due to estrogen withdrawal resulting from natural menopause, abrupt withdrawal of hormone therapy at time of diagnosis, chemotherapy-induced ovarian dysfunction, and/or long-term treatment with estrogen ablation therapies. Even if women are post-menopausal (cessation of menstrual cycle for 12 months or more) prior to diagnosis, symptoms can often reoccur as a result of cancer treatment. These symptoms have been reported to negatively affect health-related quality of life in BCS.[4]

Sleep disturbances and hot flashes are menopausal symptoms that continue to be research priorities at the national level. Sleep disturbances are physiological, psychological, environmental, or behavioral nighttime disruptions that have an impact on daytime functioning and are defined as perceived or actual disruptions in nighttime sleep or daytime wakefulness. For BCS, the most common sleep disturbance is chronic insomnia, in which women have a hard time falling asleep and staying asleep. Hot flashes are a sudden sensation of heat over the face, neck, and chest, and may be accompanied by patches of flushed skin. Patients may experience sudden drenching perspiration with or without shivering.[5] Hot flashes are frequently quite debilitating, and the best therapy (hormone therapy) is contraindicated in BCS. [6]

Although these are common problems in BCS, there are few known effective interventions. Women are often offered separate pharmacological interventions for each symptom, and these typically have only minimal positive effects and often undesirable side effects. For example, medications for sleep disturbance in cancer patients have yielded variable results.[7,8] Several trials of hot flash treatments such megestrol acetate, [6] clonidine,[9,10] methyldopa,[11] bellergal,[12] venlafaxine,[12,13] gabapentin,[14] Vitamin E,[15] soy,[16] and black cohosh[17] have shown minimal success. Thus, these symptoms are exceptionally fertile areas for study using nontraditional therapies.

One non-traditional therapy receiving attention in the cancer and non-cancer research literature is acupuncture. It has been tested in several small cancer-related studies[18–26] and a few randomized-controlled, non-cancer studies, with varying results possibly related to differences in subjective hot flash measurement and acupuncture technique.[27–36] After the National Institutes of Health Consensus Conference on acupuncture,[37] there were several positive prospective trials[38,39] of acupuncture for relief of various symptoms such as adult postoperative- and chemotherapy-related nausea and vomiting, postoperative dental pain, and sleep disturbances.

The theoretical framework for this study is based on Traditional Chinese Medicine (TCM), defined as a holistic system of health and healing grounded in the notions of balance, harmony, moderation, and prevention.[40] TCM recognizes several causes for hot flashes (e.g., excessive Heart Fire or depleted Kidney Water). We have previously documented that hot flashes of either menopausal or iatrogenic etiology may be diagnosed as *Kidney Water*

Exhausted.[41] For this unfamiliar Eastern diagnosis, there are any number of internally logical acupuncture points and treatment regimens prescribed by acupuncturists. These are determined by TCM physical examination of the pulse and the tongue. [42] Similarly, sleep disturbance is associated with particular causes, generally related to a *Yin* vacuity. When associated with hot flashes this portends *chong* and *ren* dysregulation.[43]

The involvement of several different community-licensed acupuncturists was a unique factor in this trial, since most published acupuncture data have been from academic practices; community-licensed acupuncturists traditionally have not been widely involved in academic acupuncture. This is in contrast to standard acupuncture practice in which community-licensed acupuncturists treat virtually all patients.

The purpose of this study was to evaluate the feasibility of acupuncture as a treatment for concurrent complaints of sleep disturbances and hot flashes in BCS. The objectives were: 1) to report patterns of acupuncture point use; 2) evaluate outcome expectancy, credibility, and acceptability relative to the intervention; and 3) evaluate patterns of symptom change over time.

Patients

The study was approved by the institutional review board. Forty-five BCS were screened for treatment for sleep disturbances and hot flashes during a 12-month period. Of those screened for the study, 8 were self-referrals responding to a mailing and 37 from physician clinic referrals. 35 of the 45women screen were not eligible or interested for the following reasons; (1) lived to far from the university for weekly visits (n=10), (2) did not have sleep disturbances and hot flashes (n=4), (3) were not 3 months post-treatment (n=3), (4) had prior acupuncture treatment (n=3), (5) had a current psychiatric disorder (n=3), (6) were not post-menopausal (n= 1), (7) did not want treatment for sleep and/or hot flashes (n=1), (8) were too busy to commit to the 8 weekly visits (n=9), and (9) was participating in another clinical trial (n=1). 10 BCS consented to the study.

Women were eligible if they (1) were least 18 years of age, (2) reported sleep disturbances over the past month, (3) reported daily hot flashes and frequent sleep disturbances with desire for treatment, (4) were peri- or post-menopausal, (5) agreed not to change sleep or hot flash medication use or dosages during the course of this study, (6) lived within a 100-mile radius of the study site, (7) were English-speaking, (8) had a known diagnosis of non-metastatic breast cancer and no history of other cancers, and (9) were at least 3 months post-completion of surgery, radiation, and/or chemotherapy. Women were excluded if (1) they had known psychiatric or cognitive disorders, (2) had a prior personal history of acupuncture use, or (3) were participating in other clinical trials.

Design

The study used a single group, non-randomized, quasi-experimental design.

This was an 8-week study (see Table 1). Each subject selected one of four participating certified community acupuncture providers for three acupuncture treatments over a 2-week period. Demographic and disease and treatment questionnaires were administered during the first week of the baseline assessment. Outcome expectancy and credibility were assessed after the first treatment had been completed (treatment week 1) and acceptability at the first follow-up visit. Physiologic monitoring using wrist actigraphy and hot flash monitoring occurred for 2 weeks prior to acupuncture as a determinant of baseline, as well as during the 2 weeks of acupuncture, and during two follow-up weeks (weeks 5, 8 of study). Additionally, self-reported symptom data were obtained using validated questionnaires at baseline, during treatment, and during each follow-up week.

Acupuncture sessions

The optimal acupuncture point regimen is unknown for either sleep disturbances or hot flashes. Acupuncture points used during treatment were dependent on the individual subjects' TCM diagnoses as determined by the licensed acupuncturists. However, each of the contracted licensed acupuncturists agreed to use the same tailored treatment regimen for all three treatments for each individual subject. The protocol gave subjects the option to have treatments from one of four licensed acupuncturists who were located at two separate clinics and held a National Certification Commission for Acupuncture and Oriental Medicine certification and who provided appropriate therapy based on their experience and Traditional Chinese Medicine (TCM) diagnosis. All of the acupuncturists were Caucasian-American, had at least 6 years of patient experience (M=11.33, SD=8.39), had a master's degree in Oriental Medicine from an accredited American school, and were members of the local and national professional organization for acupuncturists. None of the acupuncturists practiced under a different health care role such as nursing,

Measures

Measures are described below. Monitoring using wrist actigraphy and sternal skin conductance was performed as described below. Each of these devices required that data be downloaded every 7 days. Women were required to visit the onsite clinic each week to return study materials and have their monitors programmed for the subsequent week. Data were downloaded by trained study staff and stored in a secure, encrypted database in de-identified format on a secure server.

Demographic Questionnaire—A standard questionnaire previously used in research studies was used to record basic demographic and health information including age, race, ethnicity, marital status, employment status, socio-economic status, education, menopausal status, medication, height, weight, and number and type of co-morbid conditions. Medical comorbidity was assessed using a standardized checklist of categories of common medical disorders.[44] Frequencies were reported for individual co-morbid conditions.

Disease and treatment information—Disease and treatment information was abstracted from medical records. Information included date of diagnosis, stage of disease, and dates and types of treatments including surgery, chemotherapy, radiation, selective estrogen receptor modulators, and aromatase inhibitors.

Acupuncture session—The subject TCM assessments and acupuncture were recorded on lined treatment notes by each acupuncturist. These forms were not standardized questionnaires but open- ended notes commonly used in TCM evaluations. Details included the specific meridian point, location (left side, right side, both sides) of point placement, and side effects/tolerance of treatment session.

Outcome expectancy-credibility and acceptability of treatment—The 6-item Devilly and Borkovec Outcome Expectancy/Credibility Questionnaire was used to assess outcome expectancy and treatment credibility at the on-treatment assessment.[60] Three questions assess outcome expectancy and three assess treatment credibility. For outcome expectancy items participants are asked to indicate how much they think treatment will help improve symptoms using a 0% to 100% scale, how much they feel treatment helped improve symptoms using a 0% to 100% scale, and how much they feel treatment reduced symptoms using response options from 1 (*not at all*) to 5 (*somewhat*) to 9 (*very much*). For treatment credibility items, participants are asked to indicate how logical the treatment was, how successfully they think treatment reduced their symptoms, and how confident they are in recommending the treatment to a friend. Each question for treatment credibility is rated on a

1 to 9 scale. Responses to items on each subscale are standardized and summed to create a total subscale score. Higher scores indicate greater belief that the treatment would provide beneficial results (outcome expectancy) or greater belief in the credibility of the treatment (credibility). In studies of men and women, for expectancy Cronbach's alphas were .79 to .90 and one-week test-retest reliability was r=.82 (p < .001). Cronbach's alphas for credibility ranged from .81 to .86 with one-week test-retest reliability of r=.75 (p<.001).[60] For this study, Cronbach's alpha was 0.67 for the outcome expectancy subscale and .96 for the treatment credibility subscale.

The Acceptability Scale was administered at weeks 4 and 8 of follow-up. It is a 10-item investigator-designed questionnaire that contains 10 items taken from a questionnaire used in a prior study evaluating hot flash interventions.[59] Women are asked to read each of 10 statements and choose a response ranging from 5 (*strongly agree*) to 1 (*strongly disagree*) with 3 being neutral. For example, women rated their level of agreement or disagreement with statements such as "I enjoyed the acupuncture sessions" (see Table 3). Frequencies of individual item responses were reported in the analysis of this study; a total score was not calculated. Since frequency of individual items are reported psychometrics were not appropriate for this questionnaire.

Wrist actigraphy—Sleep was assessed using the Actiwatch® (Mini Mitter, Bend, OR) device. The wrist Actiwatch® contains an accelerometer that measures sleep and wake activity through motion of the wrist. The device is worn on the non-dominant wrist and resembles a regular wristwatch. The unit measures 1" × 1" × 0.25" and weighs 0.75 ounces. At the end of each recording session, the device is downloaded into a personal computer and customized software is used to quantify sleep efficiency calculated as a percentage [time spent asleep/time in bed] x 100) and total rest in minutes calculated as total number of minutes asleep ([minutes of day naps + minutes of night sleep] - minutes awake after sleep onset). This measure has been widely used among cancer patients as a valid, objective measure of sleep. [13,45] Although wrist actigraphy is not as accurate as polysomnography, the gold standard for measurement of sleep onset, sleep latency (the number of minutes it takes to fall asleep once in bed), number of nighttime awakenings, and total sleep time,[46] actigraphy is more accurate than self-completed sleep logs.[47]

Sleep diary—A 7- night sleep diary was completed by participants to facilitate wrist actigraph data analysis. This record measures time to bed, time out of bed, and naps. Information was entered into the Actiwatch® software for interruption of total sleep time (TST), wakefulness after sleep onset (WASO), sleep efficiency (ratio of time spent asleep to total time in bed), and number of nighttime awakenings.

Subjective sleep quality and disturbance—The Pittsburgh Sleep Quality Index (PSQI) measures sleep quality and disturbance retrospectively over the previous two weeks or month using self-report.[48,49] The PSQI consists of 19 items that produce a global sleep quality score as well as the following seven component scores: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medications, and daytime dysfunction. Global sleep scores greater than 5 are considered to indicate poor sleepers. The items use varying response categories including Likert-type responses (0=*not in the past month* to 3=*3 or more times per week*). A sample item is, *How often in the past month did you wake up and have to use the bathroom*? Psychometric properties of the PSQI such as internal consistency reliability have been widely supported in a variety of populations[50–52] including BCS (n=102; α=0.80.)[53]

Sternal Skin Conductance Monitoring—Physiological hot flash frequency was assessed using sternal skin conductance monitoring Biolog® model 3991 (UFI, Morro Bay,

CA).[54] The Biolog® is powered by a standard 9-volt battery and is programmed to sample 12-bit skin conductance data at 1 Hz (once per second). It is placed in a bag and worn around the waist or across the shoulders. An event marker on the monitor can be depressed by participants to signal the subjective perception of a hot flash. This event marker timestamps the sternal skin conductance data and was used to help interpret the skin conductance data during data analysis. At the end of each monitoring session, the monitor is connected to a personal computer through the Biolog Interface Box® (UFI, Morro Bay, CA) and data can be downloaded. Sternal skin conductance monitoring is more specific to detecting hot flashes than measures of core or peripheral temperature,[55] and it is highly correlated with self-reported hot flashes under controlled conditions.[56] Laboratory studies indicate 95% to 98% of subjective hot flashes correspond to objective hot flashes among midlife women.[56,57]

Perceived hot flash interference—The Hot Flash Related Daily Interference Scale (HFRDIS) is a 10-item scale measuring the degree to which hot flashes interfere with nine daily activities as well as overall quality of life using Likert-type responses (0=*does not interfere* to 10=*completely interferes*).[58] For example, women rate how hot flashes interfere with work, social life, and mood. Psychometric analysis supports validity and reliability of the HFRDIS for use with BCS (n= 69 BCS; Cronbach's alpha=0.96), with strong correlations with other hot flash variables and demonstrated sensitivity to change over time.[58]

Statistical Analysis

Due to the feasibility nature of this study, we planned to accrue 12 subjects to generate hypotheses for further study. According to Julious,[61] 12 subjects is roughly the minimum sample size needed for a pilot study using continuous outcomes (e.g., number of hot flashes and sleep disturbance measures).

Demographic and breast cancer treatment information was analyzed with descriptive statistics and frequencies using SPSS 17.0 (Chicago, IL). Questionnaires and objective measures were evaluated for missing data points. There were no missing questionnaire data. The two baseline assessments were averaged for all outcome variables to facilitate statistical analyses.

Because of the number and complexity of acupuncture points used for treatments, descriptive statistics were used to determine the mean number of points administered per treatment per participant and reported side effects. Frequencies were used to determine the number of different acupuncture points and placement location. Paired *t* tests were used to determine if the mean number of acupuncture points received per treatment per participant changed over time. The data was reviewed and the assumptions of paired *t* tests were met. Alpha was set at $p<0.05$ for all analyses. With conducting multiple *t* tests, the overall probability of a Type I error is typically > 5%. The authors' note that this inherent risk for a Type I error did not justify an adjustment in alpha given the exploratory nature of study, limited power due to the small sample size, and need for confirmation in future studies. This should be considered by the reader when interpreting the findings of the study.

Descriptive statistics and frequencies were used to evaluate outcome expectancy, treatment credibility, and acceptability of treatment. Chi square tests of independence were used to compare individual treatment acceptability questionnaire responses between the two follow-up time points.

Descriptive statistics were used to report mean global sleep and mean hot flash interference scores over time. For objective measures, sleep disturbances were evaluated using the

average of common sleep variables: 1) wake after sleep onset (WASO) in minutes, 2) total sleep time (TST) in minutes, 3) sleep efficiency (range from 0% to 100%), and 4) number of nighttime awakenings. Due to missing data for sleep monitoring, three consecutive days were used for analysis. The 3-day time frame could not include the first day of recording and had to have all hours of the day represented with a complete sleep log. Averages were then calculated based on the software output with additional visual inspection to ensure accuracy. Physiologic hot flash frequency was calculated as the total number of hot flashes per 24-hour day.

Lastly, to determine patterns of change in sleep disturbances and hot flashes across the 8 time points, continuous outcome variables were evaluated using paired *t* tests (SPSS 17.0). This test was selected since it is more powerful than other non-parametric tests for small sample sizes.

Results

Subjects

Ten women were enrolled to participate in the 8-week study. Of the 10 BCS that completed baseline, 2 withdrew after the last baseline assessment due to time commitments that prohibited them from completing weekly study visits. The remaining 8 BCS completed all time points. The BCS averaged 53 years (SD=10.07), all were Caucasian (100%), and most were college educated (63%), married or partnered (88%), working full or part-time (88%), and not Hispanic or Latino (88%). The majority (63%) did not have non-cancer related co-morbidities. Mean time from diagnosis was 6.75 years (SD=2.60), and mean body mass index was 23.32 (SD=4.37). Most had stage 0–1 breast cancer (57%) and all had received some type of cancer treatment such as surgery, chemotherapy, or radiotherapy (100%). The majority of BCS were not taking a hormone modulator at the time of this study (38%).

Patterns of acupuncture point use

A total of 38 different acupoints was used for treatment. The mean number of treatment points administered per subject per treatment was not significantly different among the three treatments (t= −0.42 to −0.55; p=0.60–0.69) or among the four different therapists. The majority of treatment points were located on the Lu (lung) meridian. The second and third most common points were the Sp (spleen) and Li (large intestine) meridians. Lastly, Ki (kidney), HT (heart), and Ren vessel meridians had similar patterns of usage. The most common acupoints used are listed in Table 2. The location and number of acupuncture points per participant remained constant over the 3 treatments (treatment 1- M=10.13, SD=2.03; treatment 2- M=10.50; SD=2.93; treatment 3- M=10.38, SD=2.39). There were no reported side effects for any subjects. The sessions were mainly conducted at one clinic (n=6).

Outcome expectancy, credibility, and acceptability of treatment

BCS reported high outcome expectancy, that is, they believed that acupuncture would help improve their symptoms (M=21.37, SD=4.07). BCS also rated that acupuncture treatment as having high credibility (M=21.00, SD=3.42). BCS reported that acupuncture was acceptable and helped with symptoms of sleep disturbances and hot flashes, and that the sessions were enjoyable, not painful, and comfortable (Table 3). Women did not think the treatment sessions took too much time out of the day. They found it easy to make treatment appointments, stated that the acupuncturists seemed to want to help diminish symptoms, and would not have preferred to have a different acupuncturist perform the treatments. Overall, the women would recommend acupuncture to a friend and would not have preferred a different treatment to help with symptoms.

Patterns of symptom change

As shown in Table 4, at baseline women reported poor global sleep scores (M=9.25, SD=4.10) and, as objectively measured, had less than the recommended total sleep time of 7–9 hours of sleep per night[62] (M=6.84, SD=0.73), took almost 18 minutes to fall asleep, and experienced nearly 47 minutes of wakefulness after sleep onset. The average number of nighttime awakenings was 32 (SD=10.22), with an average sleep efficiency of 83%. The mean number of objective hot flashes was 12.58 (SD=13.41) per 24 hours, and on average hot flash daily interference was mild (M=3.60, SD=2.69).

Three significant patterns of symptom change were noted. First, average sleep latency significantly increased after the acupuncture treatment stopped from study week 4 to week 8 (t=−2.57, p=0.04). Second, although marginally significant, there was a decrease in time spent awake after sleep onset from baseline to time 8 (t=2.53, p=0.05). Lastly, the average number of hot flashes recorded by the sternal monitor significantly decreased from baseline to time 4 (t=2.95, p=0.02). No other significant changes over time were found (Table 4).

Discussion

The novel mechanism of letting several different acupuncturists provide therapy based on their particular experience and diagnoses has not been previously studied in BCS with both symptoms of sleep disturbances and hot flashes. Previous research typically used set acupuncture points with no deviation allowed. This practice is not in line with the traditional use of acupuncture, which prescribes a more individualized or tailored approach to treatment.

Expectancy, creditability, and acceptability of treatment were high. The acceptability responses were comparable to a previous behavioral intervention for hot flashes in BCS.[64] Individual responses on five items for the acceptability scale improved from week 4 to week 8 of the follow-up assessment. This suggests that select, highly-motivated BCS were willing to undergo this type of treatment for sleep disturbances and hot flashes, supporting the feasibility of future studies.

Acupuncture has the potential to improve problems with sleep and hot flashes over time. However, the significant increase in sleep latency from week 4 to week 8 indicates that in this study, after acupuncture was completed there was some loss of treatment benefit. This suggests that short-term acupuncture treatment may provide immediate but not long-term benefits for sleep latency (number of minutes to fall asleep at night) since this increased or got worse at week 8 compared to baseline. On the other hand, the significant decrease in wake after sleep onset from baseline to week 8 suggests there was a sustained effect of acupuncture over time for this variable. These results are comparable to non-cancer studies using acupuncture for insomnia that found significant increases in self-reported hours of sleep, sleep efficiency, and ability to fall asleep and stay asleep.[27,30,31] Last, the significant decrease in hot flashes from baseline to week 4 reflects an immediate treatment effect for this variable, but the benefit of acupuncture for hot flashes was short-term. Although there were fewer baseline objective hot flashes in this study compared to a cognitive behavioral intervention for hot flashes in BCS,[64] there was a more significant change over time using acupuncture compared to the cognitive intervention.[64] These are similar findings to non-cancer studies that have used acupuncture for hot flashes.[23,35]

Women entered the study with mild to moderate hot flash interference noted by mean scores less than 4 (total scores can range 0–10). This could be due to the small sample of BCS in this study. However, there was a non-significant downward trend from baseline to week 4 indicating slightly less hot flash interference over time. A larger sample could provide more

variability in mean scores showing more treatment effect. Although perceptions of hot flash interference did not significantly change over time, a previous study showed that hot flash interference may be the most appropriate single measure to include in treatment studies.[65] Measuring and improving patients' perceptions of hot flashes' interference with life activities and subjective sleep quality may be the most direct routes to improving quality of life. More acupuncture treatments may be needed to significantly decrease hot flash interference. Previous randomized, controlled, longitudinal studies have typically used treatment schemas with sessions occurring two or more times per week over 5–10 weeks.[23,25]

Limitations

There were several limitations of this study. First, the small sample size limited our ability to determine a meaningful effect size. Second, the number of treatments per subject was limited to 3 over 2 weeks, which is fewer than most acupuncture studies. Third, there is a need to assess treatment fidelity in a larger study. Fourth, the sessions were mainly conducted at one clinic with one acupuncturist limiting our understanding of treatment patterns. Finally, this was a homogeneous, highly-motivated sample of BCS therefore the generalizability of results is limited. These limitations should be considered when interpreting the findings of this study.

Implications for Clinical Nurse Specialists

The use of complementary therapy provides non-pharmacological treatment options for symptom management in cancer patients. Serving as patient advocates, Clinical Nurse Specialists (CNS) integrate existing evidence into clinical practice and provide cost-effective treatment for both inpatients and outpatients who have sleep disturbances and hot flashes. One study showed that nurses' personal knowledge, experience, and attitudes relative to complementary therapy can influence their use of such treatments in critically ill patients.[66] Communication between nurses and other caregivers is important to ensure the appropriate use of acupuncture for symptom management. CNSs should work in tandem with acupuncturists by being sure the latter are informed at every point about relevant patient status variables so they can select the most appropriate points and length of treatment for individual patients. The CNS also needs to identify any barriers to this type of treatment in partnership with the patient, other health care providers, and family members but recognize that this might not be a desirable treatment option for all patients.[67] The current study has added to our knowledge about the role of acupuncture as an option for highly motivated patients seeking symptom management and suggests how the CNS could conduct future studies.

Future research

Our goal is to build on these study results by conducting a large-scale randomized controlled clinical trial using a larger number of community acupuncturists. Future studies should allow the treating acupuncturists to continue to select appropriate points for the patient to provide a more holistic approach that adheres to the traditional Chinese approach to treatment. Studies should 1) continue to evaluate specific points used to determine patterns of effective treatment points, 2) use fewer assessment visits to reduce the need for weekly travel to the study site and possibly increase interest in participation, and 3) increase the number of treatment sessions to allow for possible greater treatment efficacy over time.

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Biographies

Dr. Julie L. Otte is an Assistant Professor at the Indiana University School of Nursing. She was a doctoral student and post-doctoral fellow at the time this project was implemented.

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Table 1

Study Schema

Week	Study Day	Acupuncture	Assessment
1	1 to 7		Baseline weeks (average of days 1–14)
2	8 to 14		
3	15 to 21	3 treatments within the 2 weeks	Treatment week 1
4	22 to 28		Treatment week 2
5	29 to 35		Follow-up week 1
6	36 to 42		
7	43 to 49		
8	50 to 57		Follow-up week 2

Table 2

Description of Most Commonly Used Acupuncture points

		# ACU Points Per Location			
Name of point	**% use for all treatments (N=24)**	**Left**	**Right**	**Bilateral**	**Center**
LU7	83	17	3		
SP6	79		12	7	
Li11	75		11	7	
KD6	63		12	3	
KD3	58		9	5	
HT6	54	12		1	
KD7	54		12	1	
Ren4	54				13
Li4	50		9	3	
ST36	38	6		3	
GB34	25	6			
GB41	25	6			
HT7	25			6	
Si3	25		6		

Abbreviations: ACU acupuncture; %, percentage; N, number of subjects. LU = lung, SP = spleen, Li =liver, KD = kidney, HT = heart, Ren = Ren vessel, ST = stomach, GB = gallbladder, Si=small intestine.

Table 3

Acceptability Scale Results

Items	% (N) Follow-up week 1	% (N) Follow-up week 2
Acupuncture helped	38 (3)	50 (4)
Did not take much time	50 (4)	100 (8)
Enjoyed sessions	100 (8)	100 (8)
Liked therapist	75 (6)	100 (8)
Treatment not painful	100 (8)	100 (8)
Would recommend to friend	100 (8)	75 (6)
Therapist wanted to help	100 (8)	100 (8)
Easy to get appointment	100 (8)	100 (8)
Comfortable sessions	88 (7)	100 (8)
Would not prefer other treatment	75 (6)	100 (8)

Abbreviations: %, percentage; N, number of subjects

Table 4

Patterns of Symptom Change Over Time

	Study weeks 1–2	Study week 3	Study week 4	Study week 5	Study week 8
	Baseline weeks M(SD)	**Treatment week 1 M(SD)**	**Treatment week 2 M(SD)**	**Follow-up week 1 M(SD)**	**Follow-up Week 2 M(SD)**
Objective sleep disturbance					
Total sleep time[1]	6.84(0.73)	6.69(1.31)	7.71(1.39)	6.98(040)	6.57(1.33)
Sleep latency[2]	17.89(6.12)	15.26(14.19)	14.73(14.80)	**10.21(8.09)**[a]	**24.08(17.37)**[b]
Sleep efficiency[3]	82.49(5.11)	83.80(9.14)	87.64(5.32)	82.03(7.86)	82.27(5.70)
Wake after sleep onset[4]	**46.83(20.31)**[a]	37.50(16.83)	38.24(15.66)	43.83(18.10)	**38.31(14.56)**[b]
Nighttime awakenings	31.81(10.22)	27.86(8.94)	28.76(9.48)	30.38(13.34)	27.33(11.35)
PSQI global score	9.25(4.10)	--	6.29(3.65)	--	6.00(4.47)
Objective hot flash frequency	**12.58(13.41)**[a]	11.37(11.19)	13.22(14.32)	**8.95(11.65)**[b]	13.06(11.53)
Hot Flash Interference Scale	3.60(2.69)	--	3.25(2.21)	--	3.32(2.50)

Abbreviations: wk, week; #, number; M, mean; SD, standard deviation; PSQI, Pittsburgh Sleep Quality Index;

[1]=in hours

[2]=in minutes

[3]=percentage

[4]=in minutes

[a,b]=significant difference