

Original Article

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What makes one respond to acupuncture for insomnia? Perspectives of cancer survivors

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Abstract

Objective. Like any therapy, acupuncture is effective for some patients, while not helpful for others. Understanding from a patients' perspective what makes one respond or not to acupuncture can help guide further intervention development. This study aimed to identify factors that influence the perception of acupuncture's therapeutic effect among cancer survivors with insomnia.

Method. We conducted post-treatment semi-structured interviews with cancer survivors who were randomized to the acupuncture group in a clinical trial for the treatment of insomnia. Survivors were categorized into Responders and Non-Responders to acupuncture treatment based on the change in the Insomnia Severity Index with a reduction of eight points or greater as the cut-off for the response. An integrated approach to data analysis was utilized by merging an *a priori* set of codes derived from the key ideas and a set of codes that emerged from the data through a grounded theory approach. Codes were examined for themes and patterns.

Results. Among 28 cancer survivors interviewed, 18 (64%) were classified as Responders. Participants perceived the ability to respond to acupuncture as dependent on treatment that effectively: (1) alleviated co-morbidities contributing to insomnia, (2) supported sleep hygiene practices, and (3) provided a durable therapeutic effect. Acupuncture treatment that did not address one of these themes often detracted from positive treatment outcomes and diminished perceived benefit from acupuncture.

Significance of results. We identified patient-perceived contributors to response to acupuncture, such as co-morbid medical conditions, adequate support for sleep hygiene practices, and temporary therapeutic relief. Addressing these factors may improve the overall effectiveness of acupuncture for insomnia.

Introduction

Insomnia is a distressing and chronic condition affecting 30–60% of all cancer survivors (Mao et al., 2007; Savard et al., 2011; Irwin, 2013; Davis and Goforth, 2014). It is characterized by difficulty falling asleep, maintaining sleep, or waking up too early that causes significant distress or impairment in daytime functioning (American Psychiatric Association, 2014). Among cancer survivors, insomnia has been associated with decreased quality of life as well as increased pain, fatigue, anxiety, and depression (Fleming et al., 2010; Nishiura et al., 2015). Sleep problems also frequently affect how survivors feel physically and hinder their ability to concentrate, cope with stress, and carry out daily activities (Davidson et al., 2002).

Treatment of cancer-related insomnia has proved difficult due to the limitations of conventional therapy. Pharmacologic treatment often includes medications that have been associated with bothersome side effects (e.g. daytime sedation and cognitive and psychomotor impairments) (Pagel and Parnes, 2001; Savard and Morin, 2001; Kvale and Shuster, 2006; Induru and Walsh, 2014). Furthermore, given the polypharmacy of cancer treatment, concerns exist regarding tolerance, dependency, and drug-to-drug interactions (Savard and Morin, 2001; Murphy et al., 2018). Among non-pharmacologic treatments, cognitive behavioral therapy for insomnia (CBT-I) has demonstrated the efficacy in improving sleep (Morgenthaler et al., 2006; Trauer et al., 2015; Johnson et al., 2016; Qaseem et al., 2016). However, access to CBT-I is not widely available due to the limited availability of CBT-I clinicians at medical centers as well as a lack of physician referrals for CBT-I treatment (National Institutes of Health, 2005; Pigeon et al., 2007; Conroy and Ebben, 2015).

Among complementary and integrative medicine modalities, acupuncture is widely used by cancer survivors at a higher rate than the general population (Mao et al., 2011) and is considered safe with few side effects (e.g. needling pain and bruising) (White, 2004). Of the 45

NCI-designated cancer centers, 89% currently endorse the use of acupuncture for symptom management (Yun *et al.*, 2017). Acupuncture has shown promise in the treatment of cancer-related insomnia and may be superior to conventional drug therapy, yet the methodology of acupuncture administration has varied greatly in these trials (Bokmand and Flyger, 2013; Haddad and Palesh, 2014; Choi *et al.*, 2017). In our recently completed randomized clinical trial of acupuncture vs. CBT-I for insomnia, we found that both acupuncture and CBT-I produced a clinically meaningful reduction in insomnia, and the therapeutic effects persisted 3 months after the end of intervention; however, CBT-I was more effective overall (Garland *et al.*, 2019).

Clearly, there is a room for continued acupuncture refinement to improve overall effectiveness. The primary objective of this qualitative study was to identify the factors that influence the perception of acupuncture's therapeutic effect among cancer survivors with insomnia who participated in our clinical trial. A better understanding of patients' perspectives regarding acupuncture response may contribute to design more effective treatment protocols or help to identify patients who are more likely to respond to the treatment.

Methods

Participants

One hundred and sixty patients were enrolled in our randomized clinical trial for comparing the effectiveness of CBT-I and acupuncture for the treatment of insomnia in cancer survivors [Clinical trial registration: NCT02356575] (Garland *et al.*, 2016; Garland *et al.*, 2019). From these 160 participants, we recruited a subset ($N=63$) to participate in semi-structured interviews prior to randomization. Of these, 31 were randomized to the acupuncture group, and 28 participated in interviews following the completion of treatment. All participants were English speaking, age 18 or older, had a cancer diagnosis, and had completed active treatment (surgery, chemotherapy, and/or radiation therapy) at least 1 month prior to enrollment. Additionally, all participants underwent a clinical eligibility visit to confirm that they reported a score of greater than seven on the Insomnia Severity Index (ISI) (Savard *et al.*, 2005) and met the criteria for insomnia disorder as defined by the DSM-5 (American Psychiatric Association, 2014). All participants signed a written informed consent prior to study activities. All study activities were reviewed and approved by the University of Pennsylvania's Institutional Review Board.

Acupuncture intervention

The acupuncture treatment protocol has been previously described (Garland *et al.*, 2016, 2019). To briefly summarize, patients in the acupuncture group received two treatments per week in the first two weeks and one treatment during each subsequent week for a total of 10 treatments of acupuncture over eight weeks. Licensed acupuncturists followed the acupuncture treatment protocol and chose needling points based on the standardized points for insomnia symptoms and the customized points for individual patient-reported symptoms. Needles were manipulated to achieve the "De Qi" sensation and were retained for 30 min with brief manipulation at the beginning and at the end of the treatment. Patients were also given an information handout with tips for improving sleep hygiene, but no counseling regarding sleep behaviors was provided.

Questionnaire

Patients completed a study questionnaire at baseline that included demographic, cancer, and treatment characteristics. Additionally, patients completed the ISI at baseline and week 8 (post-treatment) to assess changes in insomnia symptoms. The ISI is a well-validated, self-report measure consisting of seven items in which subjects rate the intensity of their insomnia symptoms on a 5-point Likert scale ranging from 0 to 4 with higher scores indicating more severe symptoms (Savard *et al.*, 2005). Patients also completed the Consensus Sleep Diary to capture patient report of nightly insomnia symptoms throughout the eight-week treatment period (Carney *et al.*, 2012).

Qualitative interview and analysis

The interview guide and procedures for conducting, coding, and analyzing the interviews have been published previously (Garland *et al.*, 2018). Open-ended, semi-structured interviews were conducted to elicit expected and unexpected benefits and side effects of acupuncture treatment. A trained research assistant conducted the interviews after the completion of the intervention, with support from personnel at the Mixed Methods Research Lab at the University of Pennsylvania. We used an integrated approach for data analysis (Curry *et al.*, 2009), by merging an *a priori* set of codes derived from the key ideas we sought to understand and a set of codes that emerged from the data through a grounded theory approach (Chapman *et al.*, 2015). For the current analysis, we categorized interview transcripts into Responders and Non-Responders based on the change in the ISI with a reduction of eight points or greater as the cut-off for a marked clinical response (Morin *et al.*, 2011). We examined coded transcripts for themes and patterns contributing to response or non-response to acupuncture.

Results

As shown in Table 1, the mean age was 60.1 years (range: 27.5–83.6 years). Study participants were evenly divided between men and women. Twenty-two participants identified as White, five as Black, and one as Asian. The most common cancer types represented were breast (29%), prostate (21%), and hematological (11%) cancer; three participants reported having been diagnosed with more than one cancer. Based on a greater than or equal to an eight-point reduction in the ISI score, 18 (64%) participants had a significant response to acupuncture treatment, while 10 (36%) participants did not.

We identified three themes that impacted participants' perception of response to acupuncture treatment: (1) alleviation of co-morbidities contributing to insomnia, (2) support of sleep hygiene practices, and (3) durability of therapeutic effect. Quotations from participants to support these themes are included in Tables 2–4.

Alleviation of co-morbidities contributing to insomnia

Among all participants, sleep was often impacted by co-morbid conditions, including anxiety, pain, and hot flashes (see Table 2). Many Responders reported improvements in their insomnia when these co-morbidities were alleviated by acupuncture treatment. Some Responders reflected that acupuncture promoted a state of relaxation that helped them to manage tension or cope with anxious thoughts that made falling asleep difficult. Other

Table 1. Demographic and clinical characteristics (N = 28)

Characteristic	N (%)	Responders (N = 18) N (%)	Non-Responders (N = 10) N (%)
Age in years, mean (range)	60.1 (27.3–83.6)	60.0 (27.5–76.2)	67.5 (45.5–83.6)
Gender			
Male	14 (50%)	9 (50%)	5 (50%)
Female	14 (50%)	9 (50%)	5 (50%)
Race			
White	22 (79%)	14 (78%)	8 (80%)
Non-white	6 (21%)	4 (22%)	2 (20%)
Education			
High school or less	1 (4%)	1 (6%)	0 (0%)
College or above	27 (96%)	17 (94%)	10 (100%)
Marital status			
Not married	13 (46%)	9 (50%)	4 (40%)
Married/cohabitating	15 (54%)	9 (50%)	6 (60%)
Cancer type			
Breast	8 (29%)	6 (33%)	2 (20%)
Prostate	6 (21%)	4 (22%)	2 (20%)
Colon/rectal	0 (0%)	0 (0%)	0 (0%)
Head/neck	2 (7%)	1 (6%)	1 (10%)
Hematological	3 (11%)	2 (11%)	1 (10%)
Gynecological	2 (7%)	2 (11%)	0 (0%)
Other cancer ^a	4 (14%)	1 (6%)	3 (30%)
More than one cancer	3 (11%)	2 (11%)	1 (10%)

^aOther cancer includes skin, lung, other gastrointestinal, other genitourinary, etc.

Table 2. Quotes from participants regarding alleviation of co-morbidities contributing to insomnia

Responder	Non-Responder
<i>I'm a very high-strung tense person normally and I think that contributes to why I have issues with sleep. And it was – doing the treatments definitely gave me a level of relaxation. It wasn't in my normal repertoire.</i> – Female, 33, Gynecological cancer	<i>Well, it didn't alleviate my hot flashes. It just alleviated when I woke up.</i> – Male, 64, Prostate cancer
<i>Whether my body is able to just kind of shut down the noise in the background or all the anxieties I have, whether that's attributed to the acupuncture, I have – I don't know. But I know that I haven't had the same level of anxiety...That have been keeping me up at night.</i> – Female, 52, Gynecological cancer	<i>And it's a complicated thing for me because I have other things that stopped me from sleeping well. ...I have a painful shoulder from arthritis or a previous operation. And I also have sciatica and musc – some muscle pain here in my leg. And also because it gives me cramps a lot of times.</i> – Male, 83, More than 1 cancer
<i>I usually have to sleep on my left side. Of course, that's where my good lung is...But I've been – the last week or ten days, I've been waking up in those dangerous positions, and it doesn't hurt. And I lay there for five minutes, and it's like, wow this is cool. So that was – that's a real plus.</i> – Male, 76, More than 1 cancer	<i>But I was realizing maybe there were other things I could address in acupuncture that I weren't – wasn't able to because we stayed within the protocol. Like the pain. I think I started to understand that the pain was a big issue, and she – that's just not what she's treating me for.</i> – Female, 52, Breast cancer

Responders noted that acupuncture relieved pain that contributed to sleep disruptions. In contrast, hot flashes or pain not addressed by treatment made it difficult for a few Non-Responders to distinguish improvements in their sleep. While some symptoms did not respond to treatment, uncertainty about what symptoms could be addressed within the treatment protocol presented an additional barrier for at least one Non-Responder who felt that the acupuncture did not address the pain that contributed to her insomnia.

Supporting sleep hygiene practices

Many participants believed that sleep behavior contributed to poor sleep and were interested in the potential benefit of incorporating sleep hygiene practices into their insomnia treatment (see Table 3). Responders found aspects of the trial that increased awareness of maladaptive sleep practices, such as the sleep diary and sleep hygiene handout, to be helpful. Additionally,

Table 3. Quotes from participants related to supporting sleep hygiene practices

Responder	Non-Responder
<p>So I'm able to – now I know, looking at my sleep logs and recognizing my patterns, I see that at 9:00 is the time for me to start to slow down – 9:30, take my medication, ideally my sleep medication. And if I'm in bed at 10:30, completely done everything, then I should be able to lay down with a documentary or something which I listen to, and within 15 to 20 minutes, half hour, I'm asleep, which is good. So it's a working system. – Male, 58, Hematological cancer</p>	<p>What it did not seem to help was that I have some bad sleep patterns and they're consistent. Now even in the study and filling out the feedback every day focuses my attention on where my problems are. – Male, 72, Other cancer</p>
<p>But I think that – keeping the sleep diary was really a good process as well, because it got me thinking about going to bed, and I don't – I used to stay in bed even when I – in the morning if I hadn't slept well, I would just stay in the bed. And I decided no, let's get in the pattern where you use the bed just for sleeping and not – so that was good. I found that to be extremely helpful. – Male, 63, Other cancer</p>	<p>Now the problem, which I don't think that acupuncture was supposed to address or should address is, I have to make the decision to go to bed. Now just this week I was reviewing the folder that you gave me, the literature. And there's a very nice sleep tip flyer. I don't remember reading it the first time ... I saw that and I re-read it and it was far more meaningful. – Female, 67, Head/Neck cancer</p>
<p>I guess I don't know if it would interfere with the study but there really wasn't a discussion or counseling in any formal way about preparing to go to sleep and that kind of thing...I just felt like I was on my own to try and help myself if I was going to do – reading those tips in the back of the folder. – Female, 57, Breast cancer</p>	<p>I don't know that it [sleep diary] did anything for my insomnia. In fact, I think that it became worse, because of the awareness of the time that I had to then record. – Female, 78, Hematological cancer</p>

Table 4. Quotes from participants on durability of therapeutic effect

Responder	Non-Responder
<p>...my fear is am I going to go back into a pattern unless I continue with acupuncture. ...I'm just not clear yet on what the expect – long-term expectation is in terms of the ongoing therapy that's necessary to maintain this sleep pattern. – Male, 63, Other cancer</p>	<p>...it's like this would help, it really helps, but then it starts to fade between sessions and then if I don't have a session then I feel like I go back to square one again. – Female, 72, Breast cancer</p>
<p>...it might be worth having a post-session visit with [Acupuncturist] about – I mean, we've been talking along the way, but it might also be a nice segue into talking about long-term continuations ... you can talk about may be maintenance once every four to six weeks, and I just – I want to sort of understand that process better – about how that would benefit. – Female, 33, Gynecological cancer</p>	<p>And it seemed like the improvement I was noticing was in the two, three, four days after the treatment, and then it would tail off some until the next treatment. – Male, 45, Other cancer</p>
<p>I really didn't get a chance to discuss with [Acupuncturist], and I wanted to know on a maintenance program how often it should – you should consider doing it, not as a study, but as a personal healthcare. – Female, 66, Breast cancer</p>	<p>I'm raising that because it tells me that for certain things, acupuncture takes a certain amount of time...you say wow, ten sessions is really good. Maybe you may think, maybe 12 would have been better. – Female, 67, Head/Neck cancer</p>

Responders felt empowered to change the aspects of their daily routine toward promoting better sleep.

While several Non-Responders also noted greater awareness of maladaptive sleep behavior, they were generally less proactive in improving sleep hygiene practices. These participants did not expect acupuncture to directly affect sleep behaviors but still believed that these issues needed to be addressed in treating the underlying causes of their insomnia. A few participants noted that treatment could benefit from greater emphasis on the sleep hygiene handout with a Non-Responder not discovering this handout until the end of treatment and a Responder desiring additional support through counseling or discussion of the sleep hygiene information.

Durability of therapeutic effect

The durability of acupuncture's therapeutic effect was a major concern for both Responders and Non-Responders (see Table 4). Responders generally experienced durable therapeutic effects during treatment and, as a result, tended to be more concerned with the sustainability of insomnia relief after the completion of acupuncture. Several participants desired additional education on

an appropriate regimen of acupuncture treatments after the study to maintain the benefits they experienced. One Responder commented on experiencing greater symptom relief during weeks with two treatment sessions and wondered if treatment frequency influenced acupuncture's efficacy.

Some Non-Responders observed promising sleep improvements in the period immediately after needling but felt disappointed when the effects would fade between treatment sessions. All participants who experienced only a temporary relief of their insomnia stated that they did not derive an overall benefit from acupuncture. However, a few of these Non-Responders expressed a belief that acupuncture might have been more helpful if more treatment sessions had been received.

Discussion

Insomnia is a debilitating condition experienced by up to 60% of cancer survivors (Irwin, 2013). In this qualitative study, three themes were identified as influencing patients' perception of their ability to respond to acupuncture: (1) alleviation of co-morbid conditions contributing to insomnia, (2) support of sleep hygiene practices, and (3) durability of therapeutic effect. Acupuncture

treatment that was perceived by patients do not address one of these three factors often detracted from perceived positive outcomes and diminished perceived benefit from the treatment. Our study contributes to a limited body of research and, to our knowledge, is the first qualitative investigation that focuses specifically on examining patient-perceived factors that contribute to response to acupuncture treatment for insomnia.

We found that persistent co-morbid conditions, such as pain and hot flashes, often detracted from acupuncture treatment and made it difficult for Non-Responders to discern improvements in sleep. Similarly, Witt et al. (2011) found that among patients with chronic pain, baseline pain and co-morbid medical conditions predicted treatment outcomes to patients randomized to either acupuncture or usual care. In Traditional Chinese Medicine, acupuncture is usually adapted to each patient's unique symptoms, and previous research has shown that patients value this type of individualized care (MacPherson et al., 2006; Haddad and Palesh, 2014). However, this aspect of acupuncture is often excluded from clinical trials, which focus on treating illnesses/symptoms in isolation. While the main trial's acupuncture protocol allowed some flexibility in needling to accommodate patient's co-morbid complaints such as pain and anxiety, the protocol primarily focused on treating insomnia (Garland et al., 2016; Garland et al., 2019). Our findings suggest that future insomnia acupuncture treatment protocols will need to incorporate a structured approach to allow adequate treatment of co-morbid symptoms such as hot flashes and pain contributing to insomnia.

Participants also perceived poor sleep hygiene practices to influence their response to acupuncture. Cancer treatment can disrupt daily routines and lead to the development of behavioral patterns that perpetuate poor sleep (Fleming et al., 2010). While there is compelling evidence for behavioral therapy that targets these causes of insomnia (Morgenthaler et al., 2006; Trauer et al., 2015), behavioral therapy was limited in the main trial to provide a better comparison between acupuncture and CBT-I (Garland et al., 2016; Garland et al., 2019). Although all participants in the acupuncture group were given a handout with sleep hygiene tips, this resource was insufficient to effectively change the sleep behaviors due to the individualized nature of people. Some participants were more likely to take initiative in altering their sleep behaviors and found that these changes contributed to treatment response.

In contrast, a few participants expressed a desire for additional support and guidance from the acupuncturist regarding their sleep hygiene practices. In clinical practice, acupuncture practitioners often interweave conversations about self-care into successive treatment sessions to facilitate the active engagement of patients in their own recovery. Previous qualitative research suggests that practitioners and patients both believe these self-care discussions are beneficial for treatment response (MacPherson et al., 2006; Paterson, 2007; Evans et al., 2011; Price et al., 2014). Future hybrid interventions, which incorporate both counseling on sleep hygiene practices during self-care discussions and acupuncture treatment, should be developed and tested for the treatment of insomnia in cancer populations.

Regardless of response to the treatment, Responders and Non-Responders were concerned about the durability of therapeutic outcome. Insomnia relief that faded between treatment sessions detracted from treatment benefit and contributed to non-response for several individuals. Some Non-Responders, who observed greater symptom relief following the weeks with two acupuncture sessions, felt that acupuncture's efficacy would have been improved with more acupuncture sessions per week.

This aligns with another qualitative acupuncture study where patients were also dissatisfied with temporary symptom relief and concerned about receiving appropriate treatment dosage (Paterson, 2007). Further, previous research supports a possible association between acupuncture efficacy and treatment frequency (Hao et al., 2013; MacPherson et al., 2013).

While Non-Responders were concerned with outcome durability between treatment sessions, Responders were more focused on the durability of symptom relief after the completion of acupuncture treatment. For the main trial, we found that the therapeutic effect of acupuncture for insomnia was durable up to 3 months after treatment ended (Garland et al., 2019). Additionally, in trials of acupuncture for chronic pain and hot flashes, therapeutic effects were found to be durable up to 6 months after the completion of treatment (Mao et al., 2015; Lesi et al., 2016; MacPherson et al., 2017). Future research should focus on examining the short- and long-term efficacy of acupuncture treatment for insomnia as well as incorporating booster acupuncture sessions to treatment protocols.

Some limitations to the study should be acknowledged. First, our study sample volunteered to participate in a clinical trial of acupuncture for the treatment of insomnia. Thus, the patients' perspectives reported in this paper are captured from a clinical trial experience vs. from a real-world acupuncture experience. Hence, the interpretation of the findings is limited to clinical trial settings. Second, our sample consisted of patients with cancer who were primarily college-educated, English speaking, and expressed an interest in acupuncture; therefore, the results may not be generalizable to the larger cancer population. Despite these limitations, our study included an equal sample of males and females and a diverse group of patients in terms of cancer type.

Conclusions

In our study, we identified patient-perceived contributors to response to acupuncture, such as co-morbid medical conditions, adequate support for sleep hygiene practices, and temporary therapeutic relief. Future acupuncture interventions for insomnia should address these factors in order to improve the overall effectiveness of acupuncture among individuals with cancer.

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