


# Inpatient Acupuncture at a Major Cancer Center

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## Abstract

**Background:** Use of complementary and integrative therapies is increasing among cancer patients, but data regarding the impact treatments such as acupuncture have in an inpatient oncology setting are limited. **Methods:** Patients who received acupuncture in an inpatient hospital environment between December 2014 and December 2015 were asked to complete a modified Edmonton Symptom Assessment Scale (ESAS; 0-10 scale) before and after each visit. Pre- and post-treatment scores were examined for each symptom using paired *t* tests. **Results:** A total of 172 inpatients were treated with acupuncture in their hospital beds (257 visits). Thirty percent (*n* = 51) received at least one additional follow-up treatment (mean visits/patient = 1.5). Completion rate of the modified ESAS after acupuncture was 42%. The most common reasons for not completing the post-treatment ESAS were “patient too drowsy” or “patient fell asleep” (72%). For patients who reported a baseline symptom score  $\geq 1$ , the greatest improvements (mean change  $\pm$  SD) after acupuncture on the initial visit were found for pain ( $-1.8 \pm 2.2$ ; *n* = 69; *P* < .0001), nausea ( $-1.2 \pm 1.9$ ; *n* = 30; *P* < .001), anxiety ( $-0.8 \pm 1.8$ ; *n* = 36; *P* = .01), drowsiness ( $-0.6 \pm 1.8$ ; *n* = 57; *P* = .02), and fatigue ( $-0.4 \pm 1.1$ ; *n* = 67; *P* = .008). For patients who received at least one follow-up visit, significant improvement from baseline was found for sleep disturbance ( $-2.5 \pm 4.4$ ; *n* = 17; *P* = .03), anxiety ( $-2.4 \pm 1.7$ ; *n* = 9; *P* = .002), pain ( $-2.3 \pm 2.7$ ; *n* = 20; *P* = .001), and drowsiness ( $-2.0 \pm 2.6$ ; *n* = 16; *P* = .008). **Conclusions:** Patients who received inpatient acupuncture at a major cancer center experienced significant improvement after treatment for pain, sleep disturbance, anxiety, drowsiness, nausea, and fatigue.

## Keywords

cancer, oncology, integrative medicine, acupuncture, inpatient

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## Introduction

Many cancer patients use integrative therapies such as acupuncture, massage, and meditation as an adjunct to symptom management.<sup>1,2</sup> Therefore, in response to the growing utilization of integrative oncology services, the Integrative Medicine Center (IMC) at The University of Texas M.D. Anderson Cancer Center was established to provide guidance for comprehensive patient care. Following Engel’s model<sup>3,4</sup> of care that focuses on the physical, psychological, spiritual, and social aspects of well-being, the IMC offers medical oversight for clinical services such as acupuncture, oncology massage, nutritional counseling, psychological support, music therapy, meditation, and other mind-body practices such as yoga, *tai chi*, and *qi gong*. In order to improve quality of life and optimize treatment outcomes, health care planning takes place in a multidisciplinary environment from initial assessment and diagnosis to treatment,

survivorship, and end-of-life care. Using an evidence-based approach, recommendations are made for personalized symptom management through the integration of conventional and nonconventional therapies. Most services offered through the IMC are in the individual and group outpatient setting. Inpatient services include acupuncture, oncology massage, music therapy, and health psychology.

Acupuncture, defined as the insertion of small, thin, sterile, solid stainless steel needles into specific points on the body to treat or prevent symptoms, has been used in China

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and other parts of the world for thousands of years.<sup>5</sup> The advantages of using acupuncture in cancer patients are that it is a cost-effective, minimally invasive procedure with a very low incidence of adverse effects. Although the mechanisms of acupuncture effects are not clearly understood and vary depending on the symptom being treated, points used, type of needle stimulation, and other treatment parameters such as depth of needle insertion and retention time, there is a growing body of evidence suggesting a biologic effect above and beyond the placebo response.<sup>6</sup>

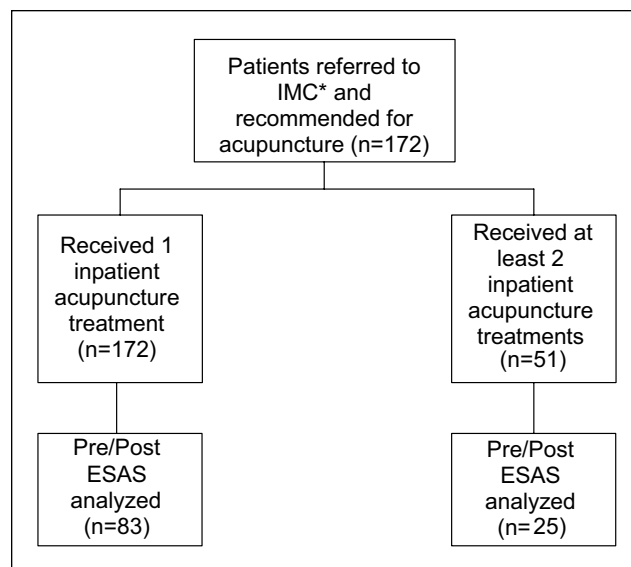
In an effort to synthesize evidence related to the use of acupuncture for symptom management in cancer patients, we have conducted multiple systematic reviews.<sup>7-9</sup> Symptoms for which acupuncture was found to be used most commonly include nausea/vomiting, pain, xerostomia (dry mouth), prolonged postoperative ileus, hot flashes, fatigue, sleep disturbances, mood changes, and peripheral neuropathy. Other symptoms of interest in patients treated in the IMC include shortness of breath and loss of appetite. Although some studies<sup>10-12</sup> have described the integration of acupuncture into outpatient clinics, few have focused on the inpatient environment. In the current study, we evaluated changes in symptoms before and after acupuncture treatment among cancer patients during a course of hospitalization.

## Methods

The study flowchart is provided in Figure 1. As part of an institutional review board–approved registry protocol, data were collected and analyzed prospectively from inpatients referred to the IMC for symptom management from December 2014 through December 2015 were evaluated by an advanced practice provider (APP) (ie, a nurse practitioner or physician’s assistant). Based on the APP’s assessment, a recommendation was made as to which integrative therapy or therapies would be most beneficial. Medical and demographic information were extracted from the patients’ electronic medical records, and those referred by the APP for acupuncture were scheduled for treatment.

### Acupuncture Treatments

All treatments were provided in the patient’s room by licensed, experienced (8 years minimum) staff acupuncturists credentialed through the institution’s Medical Staff Office. After a review of the patient’s electronic medical record, the acupuncturist visited the patient in his or her hospital room to explain the risks and benefits of acupuncture, answer all related questions, and obtain the patient’s consent for treatment. After the patient’s status and symptoms were evaluated, an individualized treatment plan was devised, and acupuncture was given while the patient rested quietly in the hospital bed. Following skin preparation with 70% alcohol, needles were inserted according to the



**Figure 1.** Patient flow diagram. This diagram depicts patient flow throughout the study.

\*IMC – Integrative Medicine Clinic.

outlined treatment plan and stimulated either manually or by adding a mild electrical current (2-100 Hz) directly to the needles. The acupuncturist decided whether or not to add electrical stimulation on the basis of the chief complaint. Based on the patient’s status and the acupuncturist’s discretion, needles were left in place for 20 to 30 minutes and then removed. The needles were counted at the time of insertion, on removal, and again as they were placed into the bedside sharps container.

### Measures

Before and after each treatment, patients were asked to complete a modified Edmonton Symptom Assessment Scale (ESAS)<sup>13</sup> where symptoms were rated on a scale of 0 to 10, with 10 signifying “worst possible.” Symptoms included in the modified ESAS were pain, nausea, fatigue, sleep disturbance, drowsiness, shortness of breath, appetite, depression, anxiety, and general well-being. Changes of 1 point or greater were interpreted as clinically significant.<sup>14</sup>

### Statistical Analyses

Basic descriptive statistics were utilized to describe participant characteristics, and baseline mean scores were evaluated by symptom for all patients. For those who reported a symptom score  $\geq 1$  and completed both baseline and posttreatment ESAS assessments, the percentage of symptom improvement and mean change scores were calculated for the initial visit and first follow-up visit. *P* values were derived using paired *t* tests.

## Results

Demographic patient characteristics are presented in Table 1. Patients were admitted for symptom control as well as management of disease. Between December 2014 and December 2015, 172 inpatients were treated with acupuncture in their hospital beds (257 total visits). Fifty-eight percent (n = 100) of patients were female and 42% (n = 72) were male. Patient ages ranged from 17 to 90 years. The most common types of cancer were gastrointestinal (26%), genitourinary (12%), breast (13%), and gynecologic (9%). Twenty percent (n = 35) of patients suffered from multiple types of cancer, 34% (n = 58) had distant disease, and 19% (n = 33) had direct lymph node extension. Approximately 95% of patients consented to treatment on the acupuncturist's first visit, and 30% (n = 51) had at least one follow-up session after the initial treatment (mean visits/patient = 1.5). All patients completed the ESAS prior to treatment. The post-treatment completion rate of the ESAS was 42%. The most common reason for an incomplete post-ESAS assessment was "patient too drowsy" or "patient fell asleep" (72%). Other reasons for not providing a post-assessment ESAS were related to scheduled tests or visitors being present. There were no differences in medical or demographic characteristics or baseline ESAS scores between those with and without a post-ESAS assessment. The most common symptom complaints at baseline were pain (85%), fatigue (81%), and sleep disturbance (78%). The proportions of patients who reported loss of appetite and nausea were 76% and 40%, respectively.

ESAS symptom scores at baseline were compared with post-treatment scores at the initial visit and the first follow-up visit. *P* values were calculated using paired *t* tests (Table 2). For patients who reported a baseline symptom score  $\geq 1$ , significant improvement (mean  $\pm$  SD) after acupuncture on the initial visit was found for pain ( $-1.8 \pm 2.2$ ; n = 69; *P* < .0001), nausea ( $-1.2 \pm 1.9$ ; n = 30; *P* < .001), anxiety ( $-0.8 \pm 1.8$ ; n = 36; *P* = .01), drowsiness ( $-0.6 \pm 1.8$ ; n = 57; *P* = .02), and fatigue ( $-0.4 \pm 1.1$ ; n = 67; *P* = .008). For patients who received at least one follow-up visit, significant improvement from baseline was found for sleep disturbance ( $-2.5 \pm 4.4$ ; n = 17; *P* = .03), anxiety ( $-2.4 \pm 1.7$ ; n = 9; *P* = .002), pain ( $-2.3 \pm 2.7$ ; n = 20; *P* = .001), and drowsiness ( $-2.0 \pm 2.6$ ; n = 16; *P* = .008). A marginal improvement was also found for nausea on the first follow-up visit ( $-2.3 \pm 2.8$ ; n = 8; *P* = .058).

The percentages of patients with clinically significant symptom improvement are provided in Figure 2. Across visits, the greatest improvement was found for pain, with 74% of patients showing clinical improvement on the initial visit: 57% (n = 39) of patients experienced a change score of  $-1$  to  $-3$  and an additional 17% (n = 12) experienced a change score of  $-4$  or higher. Improvements in pain scores were also seen on the first follow-up visit (68%; n = 13).

**Table 1.** Patient Characteristics.

Characteristic	n (%)
Age in years (range, 17-90 years)	
<30	13 (8)
30-59	87 (50)
60-79	67 (39)
$\geq 80$	5 (3)
Sex	
Female	100 (58)
Male	72 (42)
Race/Ethnicity	
Asian	3 (2)
Black	14 (8)
Hispanic	14 (8)
Pacific Islander	1 (0.5)
White	124 (72)
Unknown	16 (9)
Marital status	
Married	125 (73)
Single	27 (16)
Divorced	14 (8)
Widowed	4 (2)
Unknown	2 (1)
Type of cancer <sup>a</sup>	
Breast	23 (13)
Endocrine	6 (4)
Gastrointestinal	45 (26)
Genitourinary	21 (12)
Gynecologic	15 (9)
Head/Neck	7 (4)
Leukemia	10 (6)
Lymphoma/Myeloma	5 (3)
Neurologic	12 (7)
Sarcoma	3 (2)
Skin	12 (7)
Thoracic	11 (6)
Other	2 (1)
SEER stage	
Local	13 (8)
Distant	58 (34)
Direct extension-lymph node	33 (19)
Post-treatment, NED	10 (6)
Not available	58 (34)

Abbreviations: SEER, Surveillance, Epidemiology, and End Results Staging Program; NED, no evidence of disease at time of study entry.

<sup>a</sup>Twenty percent (n = 35) of patients suffered from multiple types of cancer.

## Discussion

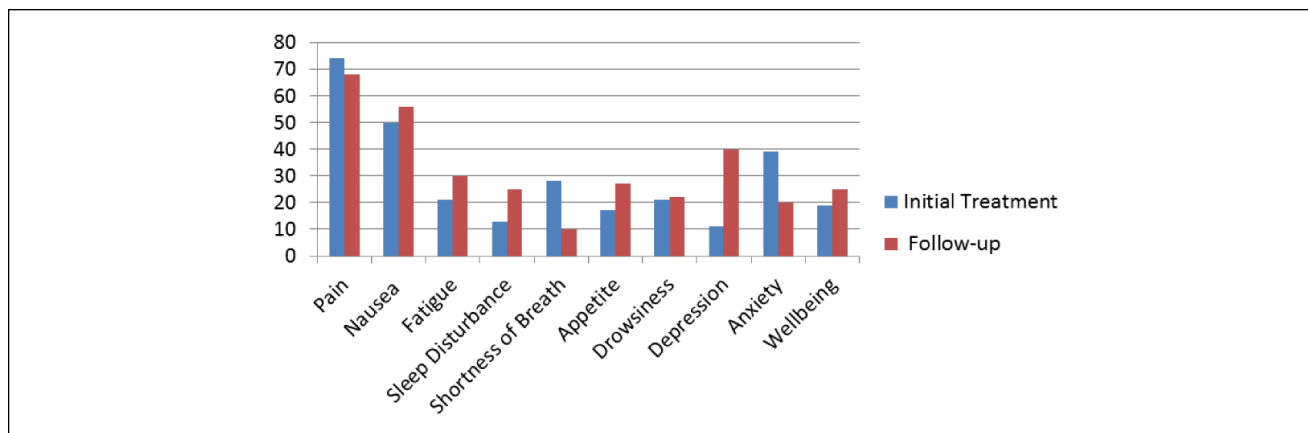
Research that is conducted in a "real-world" practice setting is needed to guide clinical decision-making and achieve optimal outcomes. Provision of acupuncture services in an inpatient oncology setting in this study was well-received

**Table 2.** Edmonton Symptom Assessment Change Scores From Baseline to Post-treatment for Patients Who Reported a Symptom Score  $\geq 1$ .

Symptom	Baseline		Initial Treatment			Follow-up		
	n	Mean (SD)	n	Mean (SD)	<i>P</i> <sup>a</sup>	n	Mean (SD)	<i>P</i> <sup>b</sup>
Pain	166	4.9 (3.0)	69	-1.8 (2.2)	<.0001	20	-2.3 (2.7)	.001
Nausea	164	1.6 (2.5)	30	-1.2 (1.9)	<.001	8	-2.3 (2.8)	.058
Fatigue	157	5.7 (3.1)	67	-0.4 (1.1)	.008	19	-1.2 (3.1)	.12
Sleep disturbance	152	5.0 (3.3)	61	-0.3 (1.5)	.12	17	-2.5 (4.4)	.03
Shortness of breath	160	1.9 (2.7)	25	-0.04 (1.1)	.85	10	-1.7 (3.4)	.15
Appetite	152	5.1 (3.5)	58	-0.3 (1.5)	.16	13	-0.2 (3.7)	.83
Drowsiness	151	4.8 (3.4)	57	-0.6 (1.8)	.02	16	-2.0 (2.6)	.008
Depression	136	2.1 (2.8)	28	-0.1 (0.9)	.69	5	-2.6 (2.6)	.09
Anxiety	141	2.9 (3.1)	36	-0.8 (1.8)	.01	9	-2.4 (1.7)	.002
Well-being	132	4.5 (3.2)	48	-0.15 (1.5)	.50	12	-1.2 (2.2)	.10

<sup>a</sup>Mean change in score between baseline and initial treatment post-assessment.

<sup>b</sup>Mean change in score between baseline and follow-up post-assessment. *P* values derived using paired *t* tests.



**Figure 2.** Percentage of patients with clinically significant improvement from baseline.

\*Clinical significance is defined as  $\geq 1$  point reduction on the Edmonton Symptom Assessment Scale (ESAS).<sup>14</sup>

by patients, caregivers, and hospital personnel. A significant improvement between baseline and after treatment on the first visit was demonstrated for pain, nausea, fatigue, drowsiness, and anxiety. For patients who received at least one follow-up visit, a significant improvement between baseline and post-treatment was found for pain, sleep disturbance, drowsiness, and anxiety. Acupuncture was found to be especially useful across all visits for pain relief, with 74% of patients showing clinically significant improvement after just one treatment. While high-quality prospective randomized controlled trials are still needed to establish treatment efficacy, information gleaned from this pragmatic trial helped provide a more complete answer as to whether or not patients benefit from low-cost services such as acupuncture, and such information helps generate hypotheses for future clinical research.

Interest in integrative oncology has substantially increased over the past decade,<sup>15,16</sup> yet available data on the impact these services have in an inpatient setting is extremely limited, and as is often the case in human subjects research, identifying clinically meaningful (as opposed

to statistically significant) change can be challenging and patient specific. A one point reduction on the ESAS is considered clinically significant.<sup>14</sup> The current findings suggest that, after 1 or 2 treatments, patients had both clinically and statistically significant improvements in multiple symptoms (pain, sleep disturbance, anxiety, drowsiness, nausea, and fatigue). In a retrospective analysis of electronic medical records, Johnson et al<sup>17</sup> reported similar findings. In that study, patients averaged a 46.9% (95% CI = 45.1% to 48.6%, *P* < .001) reduction in pain and a 56.1% (95% CI = 54.3% to 58.0%, *P* < .001) reduction in anxiety after receiving treatment with integrative therapies such as acupuncture and massage (n = 1833 visits).

While inpatient services are less common, many institutions are now delivering acupuncture in an outpatient setting. Thompson et al<sup>12</sup> reported findings from a retrospective study of clinic data involving 90 cancer patients in an outpatient oncology setting. Similar to our inpatient findings, paired *t* tests showed a significant reduction in the severity of pain, nausea, fatigue, anxiety, physical distress,

emotional distress and an improvement in quality of life after undergoing at least two acupuncture sessions ( $P < .05$ ). Nausea was significantly reduced after the first session, but not the last session; however, only 21% of patients reported nausea as a chief complaint. The reductions in symptom severity were clinically meaningful in 33% to 41% of patients after the first session and in 41% to 53% of patients after the last session for all symptoms except nausea.

Some limitations should be considered when interpreting our current study results. First, the post-treatment ESAS completion rate was only 42%, although we did not find any systematic differences between completers and noncompleters. The most common reason patients did not provide a post-treatment assessment was because they fell asleep, which implies a positive relaxation response and presumably alleviation of symptoms while asleep. Importantly, this was not a randomized controlled trial, and the specific efficacy of acupuncture needling cannot be determined. Furthermore, these findings show the acute effects of acupuncture treatment, as data were collected immediately after treatment by the acupuncturist, and the durability of symptom relief was not determined. Also, other medical interventions administered for symptom management between the initial and follow-up visit could be responsible for measured improvements. Finally, these analyses were likely underpowered due to the small sample size, as is noted by detecting clinically significant changes on a number of outcomes without statistically significant findings.

As a safe,<sup>18</sup> relatively low-cost treatment with few side effects, many patients benefit from acupuncture, and it is an important therapy to consider as an adjunctive approach to symptom management in cancer patients. The information obtained here provides insight into benefits patients may receive from therapies such as acupuncture in an inpatient setting. Approximately 95% of patients consented to treatment on the acupuncturist's initial visit, and based on informal feedback from patients, caregivers, and hospital personnel, provision of the service was feasible and well received. That being said, these findings may not be generalizable to other populations or environments.

## Conclusions

Although confirmation in large, randomized controlled trials is needed, hospitalized cancer patients with multiple symptom complaints experienced improvement after acupuncture for pain, nausea, fatigue, sleep disturbance, drowsiness, and anxiety. Future studies incorporating cost-benefit analyses are also needed.

## Declaration of Conflicting Interests

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