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# Massage for Symptom Management in Adult Inpatients With Hematologic Malignancies

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## Abstract

**Background:** Patients undergoing hematopoietic stem cell transplant often suffer from a predictable constellation of side effects related to therapy. Nonpharmacologic treatments for these side effects are attractive adjuncts to therapy due to a low side-effect profile.

**Objective:** To develop, implement, and evaluate a pilot program of massage therapy for symptom management in adult patients with hematologic malignancies admitted to the bone marrow transplant (BMT) service at a large academic medical center.

**Methods:** A single-arm feasibility study of massage therapy was conducted. Pre- and postintervention surveys were collected to assess the usefulness in management of 7 symptoms.

**Results:** Over an 11.5-month period, 109 patients received 142 massage treatments. One in five patients received more than one massage. We received surveys on 134 massage treatments. Patients reported significant reductions in anxiety, distress, fatigue, pain, and tension ( $P < .01$ ) and improved sleep as a result of massage therapy.

**Conclusion:** Based on this pilot, massage therapy is a feasible and safe intervention to administer during BMT hospitalizations. It proved useful in managing a constellation of 5 side effects including, anxiety, distress, fatigue, pain, and tension.

## Keywords

bone marrow transplant, chemotherapy side effects, hematologic malignancy, massage therapy, pain relief, quality improvement

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## Introduction

Despite recent advances in pharmacologic care for side effects of chemotherapy for hematologic malignancies, patients frequently suffer from lengthy hospitalizations and multiple side effects including nausea, fatigue, anxiety, and poor sleep. In addition, patients often suffer from isolation while neutropenic and report symptoms of depressed mood and distress. Pharmacologic interventions for such symptoms are known to cause their own side effects. Nonsedating antiemetics such as ondansetron may cause constipation and QT-prolongation, while lorazepam and other antiemetics have anticholinergic effects which result in sedation and short-term memory loss. Antidepressants such as serotonin receptor antagonists have gastrointestinal and central nervous

system side effects, while opioids cause constipation and may potentiate physical dependence.

Nonpharmacologic therapies such as massage are attractive adjunct treatments due to a low side-effect profile and have in the past proven useful in targeting a constellation of side effects frequently encountered in

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oncology patients.<sup>1-11</sup> Although massage therapy often is used to treat musculoskeletal disorders, it also can be used to treat stress and anxiety, improve mood, induce relaxation, and control pain.<sup>5</sup>

Prior studies have reported benefits of massage therapy in the pediatric inpatient cancer population,<sup>1,10</sup> in patients with solid tumors,<sup>2-4</sup> in postoperative cancer patients,<sup>8</sup> in the outpatient oncology clinical setting,<sup>3,4,12</sup> and in patients actively undergoing bone marrow transplant (BMT) treatment.<sup>13</sup> In contrast, this study focuses on studying the effects of massage therapy on all adult BMT inpatients irrespective of the timing of their BMT therapy.

## Methods

### Design

We designed a single-arm observational feasibility study of massage therapy in adults admitted to the BMT service at the University of California, San Francisco (UCSF) Medical Center between June 2017 and May 2018. UCSF Medical Center is a tertiary care hospital with 800 beds. The adult BMT service has 66 beds occupying 2 floors. An order set was created in the electronic health record (EHR) to make the service fully automated (Figure 1). An electronic consult order was placed in the EHR for any patient either requesting or agreeing to massage therapy when offered by a physician or nurse practitioner. Patients were informed of the availability of the massage intervention via local fliers posted throughout the BMT floors or by their physician or nurse practitioner. Patients were (a) diagnosed with a hematologic malignancy, (b) adult inpatients, and (c) had received or were currently receiving chemotherapy for their diagnosis. Patients were consented by the massage therapist prior to the intervention. The UCSF Committee on Human Research approved the evaluation of this pilot study. Source of funding for the pilot (US\$10 000) was raised by a small-donation crowdfunding campaign the prior year.

An electronic consult order was placed in the EHR for any patient either requesting or agreeing to massage therapy when offered by a physician or nurse practitioner. Pre- and postintervention surveys were collected for perceived usefulness in symptom management.

### Intervention

An experienced (>10 years) therapist with over 500 hours of inpatient massage training provided a 20- to 30-minute session of gentle Swedish massage on 1 day per week to patients whom had a consult request. No other personnel were required as the service order was electronic. Massage treatments which were requested on the same day the masseuse was present were honored and did not require a consult request (0 = elected for a massage on same day), while patients who were discharged and readmitted often requested a repeat massage consultation, which resulted in 2+ orders being placed for the same patient (1 for each admission). The therapist printed the list of consult requests and then proceeded to round on patients. Massage sessions were conducted in patient's rooms at the bedside, with patients most often lying supine on their hospital bed. Areas of focus often included back and neck as well as legs. Patients with platelet counts below  $50 \times 10^9/L$  received gentle foot massage with light pressure. A questionnaire for patients to fill out was left at the bedside postintervention and collected the following morning. The postintervention survey was voluntary and not all patients with a preassessment returned a postintervention survey, while others returned partially completed surveys. Some patients received >1 massage and thus contributed multiple assessments. Questionnaires were collected by the bedside nurse and placed in a unique folder in each floor. Patients with severe thrombocytopenia (platelet count less than  $5 \times 10^9/L$ ) were excluded. Patients on isolation precautions due to infectious diseases were included; however, patients with enteric precautions for *Clostridium difficile* were excluded according to BMT infection control policy.

The screenshot shows an EHR interface for an inpatient consult to massage services for a BMT adult. The title bar reads 'Inpatient Consult to Massage Services - BMT Adult' with an 'Accept' button on the right. Below the title, there are several sections: 'Priority' with 'Routine' and 'STAT' buttons; 'Reason for Consult' with a red exclamation mark icon and buttons for 'Pain', 'Nausea', 'Anxiety', 'Insomnia', and 'Depression'; 'Restrictions' with buttons for 'Platelets < 10', 'INR > 1.5', 'Skin / wound areas to be avoided', and 'Other (specify)'; a question 'Will the patient consent to filling out a survey of services?' with 'Yes', 'No', and 'Unknown' buttons; and a 'Comments' field with a 'Click to add text (F6)' link.

**Figure 1.** Massage Consult Order Set. BMT, bone marrow transplant; INR, international normalized ratio.

## Assessments

We evaluated the impact of the program using the pre- and postmassage surveys which assessed 7 symptoms: anxiety, distress, fatigue, nausea, pain, tension, and sleep quality. Postmassage surveys were administered immediately after the massage and collected by the bedside nurse the following day, to allow the patient to assess sleep quality. The first 6 symptoms were assessed using a Wong-Baker 0- to 10-point rating scale. Sleep was assessed on a 4-point Likert-type scale *worse, same, better, and much better*. Diagnosis on admission was collected as a marker of severity of illness. A free-text comment section in the survey allowed patients to provide hand-written feedback on the experiences of massage during their hospitalization.

## Data Analysis

We collected surveys for 142 massage treatments. Surveys we collected before and after the same massage treatment were matched together in a “paired” analysis, while each unmatched survey was included and treated as an “unpaired” survey, either pre- or postmassage. All surveys were included in the data analysis, and a  $\chi^2$  test was used to look for differences between the paired and unpaired surveys by patient demographics and characteristics, including sex, ethnicity, race, insurance status, principal diagnosis, age at admission, length of stay, and the number of Massage Consult Orders received.

The composite outcome for the analysis was defined as the mean for the 4 reported symptoms of anxiety, distress, fatigue, and nausea. These 4 symptoms were chosen because they were rated on every survey administered. An adjusted logistic regression was performed to examine the association between reporting sleep quality and patient demographics and characteristics. An unadjusted, ordered logistic regression was performed on all returned surveys to look at the 6 reported patient symptoms on the Wong-Baker scale (anxiety, distress, fatigue, nausea, pain, and tension), and a linear regression was used to examine the composite outcome. A fully adjusted analysis including all patient demographics from above was performed for the composite and individual outcomes. As sleep was only assessed after the massage as a change in sleep quality, this measure was analyzed separately from the other 6 symptoms. We used an adjusted logistic regression to examine the association between reported changes to sleep quality and patient demographics and characteristics.

## Results

Over an 11.5-month period, 109 patients received 142 massage treatments. One in five patients received more than one massage. We received surveys on 134

treatments. Five surveys without patient identification were excluded from the adjusted analysis and demographic data. Of the 134 treatments, 71 (53%) were paired with both pre- and postmassage surveys completed. In total, 59 men and 75 women returned a survey. Their average age was 58.6 years, and length of stay was 21.6 days (Table 1).

We performed both an adjusted and an unadjusted analysis of patient-reported symptoms and our anxiety–distress–fatigue–nausea composite outcome. Patients reported a statistically significant reduction in the composite outcome premassage versus postmassage ( $-1.16$ ; 95% confidence interval [CI]:  $-1.55$  to  $-0.76$ ;  $P < .001$ ) in the analysis adjusted for patient demographics characteristics. This reduction in the composite scores seems primarily to be driven by reductions in anxiety (pre:  $2.2 \pm 3.2$  vs post:  $0.8 \pm 1.6$ ), fatigue (pre:  $4.5 \pm 3.1$  vs post:  $2.3 \pm 2.9$ ), and distress (pre:  $2.1 \pm 3.1$  vs post:  $0.6 \pm 1.0$ ) from the pre-massage to postmassage patients. Separately, patients also reported reductions in pain (pre:  $2.3 \pm 2.6$  vs post:  $0.8 \pm 1.7$ ) and tension (pre:  $2.8 \pm 2.9$  vs post:  $0.9 \pm 2.0$ ) in postmassage versus premassage patients. Nausea improvement was not statistically significant in this patient cohort (Table 2).

Postmassage patients reported an average change of  $-1.16$  (95% CI:  $-1.55$  to  $-0.76$ ;  $P < .001$ ) in the composite symptoms as compared to premassage patients. Males on average reported a lower composite outcome of  $-1.14$  (95% CI:  $-1.79$  to  $-0.48$ ;  $P = .001$ ) in their symptom score as compared to females.

In the paired survey subanalysis ( $n = 71$ ), these results were largely unchanged, with patients reporting a reduction in the composite outcome ( $-0.96$  95% CI:  $-1.30$  to  $-0.62$ ;  $P < .001$ ).

Overall, there was a 64%, 49%, and 63% reduction in the reported symptom scores for anxiety, fatigue, and pain, respectively (Figure 2), and 73% of patients reported “better” or “much better” sleep the following night based on 22 surveys which commented on sleep quality. Free-text comments were highly supportive of the massage program. Patients felt massage helped them relax, reduced their anxiety, improved their mood, and helped them manage their illness. No adverse effects were reported despite including patients with severe thrombocytopenia.

## Discussion and Limitations

The purpose of this pilot was to examine the feasibility and perceived usefulness of massage therapy in managing side effects encountered by inpatients with hematologic malignancies undergoing chemotherapy.

These data suggest the potential for clinical improvement by reduction in a constellation of symptoms

**Table 1.** Patient Demographics (N = 134) and Patient Characteristic for All Patients, and Separately for Patients With Paired and Unpaired Pre- and Postsurveys.

	N (%)—All	N (%) Unpaired	N (%) Paired	P Value Unadjusted Assoc. ( $\chi^2$ )
Sex				.430
Male	59 (44.0)	30 (47.6)	29 (40.9)	
Female	75 (56.0)	33 (52.4)	42 (59.2)	
Ethnicity				.344
Non-Hispanic	108 (81.8)	52 (85.3)	56 (78.9)	
Hispanic/Latino	24 (18.2)	9 (14.8)	15 (21.1)	
Race				.056
White/Caucasian	85 (64.4)	32 (52.5)	53 (74.7)	
Asian	6 (4.6)	4 (6.6)	2 (2.8)	
Black/African-American	10 (7.6)	7 (11.5)	3 (4.2)	
Other	31 (23.5)	18 (29.5)	13 (18.3)	
IP massage consult order				.522
0	3 (2.2)	1 (1.2)	2 (2.8)	
1	116 (86.6)	55 (87.3)	61 (85.9)	
2+	15 (11.2)	7 (11.1)	8 (11.3)	
Insurance				.235
Commercial	24 (17.9)	12 (19.1)	12 (16.9)	
HMO	26 (19.4)	14 (22.2)	12 (16.9)	
Medicaid	28 (20.9)	17 (27.0)	11 (15.5)	
Medicare	35 (26.1)	13 (20.6)	22 (31.0)	
Self-pay/other	21 (15.7)	7 (11.1)	14 (19.7)	
Diagnosis				.269
AML	16 (11.9)	9 (14.2)	7 (9.9)	
B-cell	13 (9.7)	2 (3.2)	11 (15.5)	
Infection/sepsis	5 (3.7)	2 (3.2)	3 (4.2)	
Leukemia, other	13 (9.7)	7 (11.1)	6 (8.4)	
MM	24 (17.9)	12 (19.1)	12 (16.9)	
Cancer, other	54 (40.3)	25 (39.7)	29 (40.9)	
Other	9 (6.7)	6 (9.5)	3 (4.2)	
	All (n = 134) Mean (SD)	Unpaired (n = 63) Mean (SD)	Paired (n = 71) Mean (SD)	P (t test)
Age at admission (years)	56.8 (13.9)	52.9 (15.1)	60.2 (11.9)	.002
Length of stay (days)	21.3 (13.5)	18.3 (10.2)	23.9 (15.4)	.016

Abbreviation: SD, standard deviation.

The values of *P* for unadjusted associations between patient characteristics and having a paired pre- and postsurvey are given.

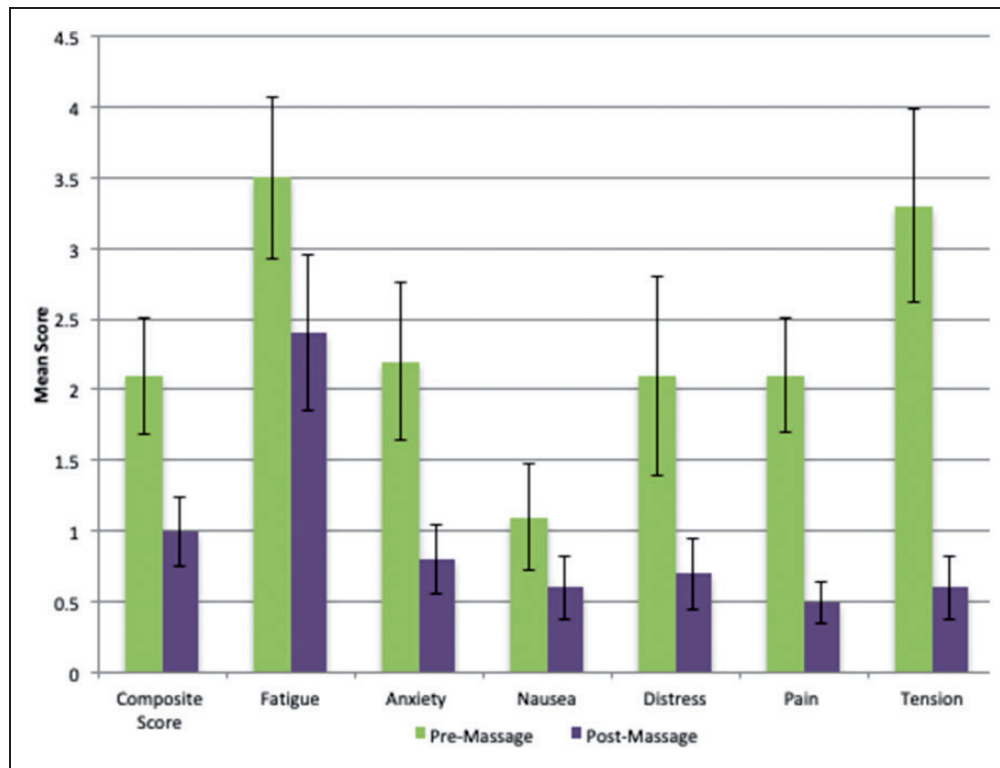
**Table 2.** Fully Adjusted Ordered Logistic Regression Comparing All (Paired and Unpaired) Reported Pre- and Postoutcome Measures, Clustering by Patient for Repeated Observations.

Measure	N—Before	Mean—Before (SD)	N—After	Mean—After (SD)	Odds Ratio	95% CI	P
Fatigue	131	4.47 (3.08)	74	2.31 (2.88)	0.23	0.13–0.41	<.001
Anxiety	129	2.17 (3.19)	76	0.82 (1.56)	0.31	0.16–0.59	<.001
Nausea	131	0.87 (1.88)	75	0.69 (1.38)	0.97	0.48–1.97	.930
Distress	61	2.08 (3.14)	31	0.55 (1.03)	0.25	0.10–0.61	.002
Pain	134	2.34 (2.57)	79	0.80 (1.72)	0.23	0.12–0.43	<.001
Tension	51	2.75 (2.86)	28	0.93 (2.00)	0.14	0.03–0.60	.008

Abbreviations: CI, confidence interval; SD, standard deviation.

immediately after massage therapy. Participants written comments also reported an improved sense of wellness. The intervention reduced anxiety, distress, fatigue, pain, tension, and improved sleep quality.

Strengths of this study include its automated model which made use of the EHR to create an efficient, seamless intervention which required no additional staffing and thus reduced costs. Funds were used entirely to



**Figure 2.** Mean Reduction in Symptoms Scores Including Composite Scores.

employ an experienced massage therapist, and we were able to offer nearly a year's worth of therapy despite limited funding. This model could be applied to other chronically ill populations to manage symptoms frequently observed in the inpatient setting.

The implementation experience of this pilot will inform future efforts to maintain such as service and can inform efforts to develop massage programs at other centers. Despite the unpredictable nature of hospital care, aligning therapist and patient availability did not present a challenge, given that the workflow was flexible and limited to 1 hospital unit. While the massage surveys and consents were printed in both Spanish and English, use of a telephone interpreter was routinely used for patients whom did not speak English as a primary language, as per hospital policy. Bedside nurses were instrumental in promoting awareness of the service and were supportive in providing limited patient education. However, our therapist spent time with patients prior to all treatments and answered all questions, obtained consent, and discussed areas of focus.

There were several limitations to this study. This is an uncontrolled pilot study thus results are preliminary and could be affected by numerous biases. In addition, there was attrition in number of returned surveys after the intervention. This was partially due to the unpredictable nature of hospital care, as patients were sometimes discharged, or not in their rooms at the time of survey

collection by nurses. There was a broad range of disease severity in this patient population, including some patients who were transitioned to comfort care. We collected and controlled for admission diagnosis as a marker of severity of illness and found no correlation between admission diagnosis and either having a paired survey response or with reported change in symptoms after the massage. However, it is still possible that patients who were critically ill, septic, or transitioned to comfort care were less likely to return surveys, likely due to fatigue and changes in mental status, leaving an unmeasured bias in survey responses. Lastly, the decision to leave surveys overnight to assess sleep quality increased the chance of misplacement of blank surveys by staff and patients. For this reason, the surveys were modified to exclude the sleep quality assessment. Although critically ill patients were anticipated to have lower survey return rates, none were excluded from receiving services. We made a decision to allocate all funds towards patient care; however, it is clear that having a study coordinator would have helped in yielding increased data collection. As a result, our findings may not be generalized to all patients and may potentially reflect some responder bias.

Despite the above limitations, the significant positive change in self-reported symptom scores indicates that a larger and more rigorous study is warranted. Future studies could assess cost feasibility by tracking reduction

in medication use in the massage cohort, assess patient satisfaction scores, and provide randomization. It would be interesting to capture more markers of disease severity and assess any correlation to self-reported effect in future studies. This study was not designed to measure the long-term impact of massage therapy on symptoms, though prior studies have reported some long-term benefits of the intervention.<sup>1,3</sup>

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