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A Hospital-based Intervention Using Massage to Reduce Distress Among Oncology Patients

KEY WORDS

Alternative medicine
Cancer therapy distress
Complementary medicine
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The objective of this study was to assess the impact of a Swedish massage intervention on oncology patients' perceived level of distress. Each patient's distress level was measured using 4 distinct dimensions: pain, physical discomfort, emotional discomfort, and fatigue. A total of 251 oncology patients volunteered to participate in this nonrandomized single-group pre- and post design study for over a 3-year period at a university hospital setting in southeastern Georgia. The analysis found a statistically significant reduction in patient-reported distress for all 4 measures: pain ($F = 638.208, P = .000$), physical discomfort ($F = 742.575, P = .000$), emotional discomfort ($F = 512.000, P = .000$), and fatigue ($F = 597.976, P = .000$). This reduction in patient distress was observed regardless of gender, age, ethnicity, or cancer type. These results lend support for the inclusion of a complementary massage therapy program for hospitalized oncology patients as a means of enhancing their course of treatment.

■ Background and Significance

Cancer is an illness that often impacts aspects of an individual's physical, emotional, and spiritual well-being. The disease may leave individuals experiencing a multitude of crises in their day-to-day functioning and ability to relate to their social environment. In a study of women who are newly diagnosed with cancer, Stanton and Snider¹ found that those with positive biopsies had associated depression, confusion, and anger. The most common physical symptoms include pain, fatigue, hair loss, nausea, and anorexia.

Many persons with cancer long for a sense of belongingness and a caring touch and love. They also long for a moment of peace and nurturance from their healthcare providers. Relaxation is another key component that very few individuals with cancer are able to afford themselves, due to the time spent either receiving medical care or worrying about the multitude of psychosocial factors associated with their illness and its treatment.

Many large hospitals and outpatient cancer centers have incorporated massage as a therapeutic touch intervention with their patients to address many of the physical, psychological, and spiritual symptoms that the patients experience. They

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use massage therapy in combination with many traditional medical interventions to ease the magnitude of psychosocial suffering that medications and operations cannot fully relieve. These institutions find that therapeutic massage can offer patients a physical intervention that touches both the physical and emotional realms.²

Although many institutions have incorporated massage into their routine care of patients, research as to the full impact and benefits of massage to cancer patients is still lacking. Research does not clearly address the best times and lengths of interventions, the best settings for massage, and the specific benefits for patients and institutions.

■ Cancer and Massage

Ancient medical applications and cultural folk remedies have sustained large populations over prolonged periods. As the system of western medicine developed, many of the healing wisdom of previous cultures were shadowed by modern medicine. There has been a resurgence of interest in the application of these nearly abandoned healing techniques in recent years. Today, these styles of therapy are often labeled “alternative medicine” and “complementary medicine.”

Complementary therapies have gained further acceptance in the culture at large and recently been found to be used in higher percentages in the United States. In a study by the Centers for Disease Control and Prevention, complementary therapy, excluding prayer, was used by 36% of adults at some point within 12 months before the study.³ American researchers are slowly releasing information on the extent to which cancer patients in the United States use complementary therapies. However, European literature suggests that more than 50% of all cancer patients have accessed some form of complementary medicine while undergoing cancer treatment.⁴⁻⁶

As with many forms of complementary therapy, the introduction of their practice into oncology care was held with much skepticism and concern about the potential negative impact such therapy may have on those with cancer. MacDonald⁷ reviewed the misconceptions commonly held about massage within the bodywork field and found that many bodywork therapists believed that the most common style of massage at that time—Swedish—often included deep, vigorous, forceful strokes. Many of the therapists believed that this rigorous style of massage caused the tumor cells to spread throughout the body.⁷ Within the bodywork and in oncology, recent theories about the benefits of massage therapy have revolved around the use of more noninvasive gentle touch techniques.

The study of massage therapy with cancer patients began as a result of the intense focus of healthcare institutions on the assessment and management of cancer pain. Many programs reviewed their patients' levels of pain and noticed that there was a need to address not only the physical pain but also many of the associated psychosocial sufferings that cancer patients experience. Therefore, in an attempt to improve patients' pain control, massage therapy was introduced as an adjunct to pharmacological interventions.

The early 1990s marked the beginning of research on the impact of combining massage therapy with standard pain medications in the management of cancer pain. Several early studies on the use of massage therapy introduced interesting research questions but failed to reach results which are of significance in part due to the small sample size and lack of a control group. In a study of 6 females undergoing radiation therapy for breast cancer, Sims⁸ looked at the impact of 10-minute massages for women receiving radiation therapy for breast cancer. Her study addressed the effects of massage on nausea, fatigue, pain, appetite, bowel pattern, concentration, appearance, breathing, cough, and outlook. Her study failed to produce significant results due in part to the small sample size and a multitude of study variables; however, it did produce interesting research questions about the beneficial effects of massage on cancer patients.⁸

The early studies indicated that massage decreased the cancer patients' perceptions of pain by a range of 30% to 60%.^{9,10} Studies also noted a decrease from baseline for heart rate, respiratory rate, and blood pressure.⁹ Meeks¹¹ found that cancer patients who received a slow-stroke back massage demonstrated a reduction in heart rate and blood pressure and an increase in skin temperature.

In their study measuring the effects of 10-minute massages in the reduction of cancer pain, Weinrich and Weinrich¹² randomized 28 individuals with cancer to either a massage intervention or a similarly timed social visit with the study coordinator. They found that only the males in the study who received massage experienced a statistically significant reduction in their level of pain immediately after the massage. The study focus included follow-up after massage assessments at 1-hour and 2-hour intervals, which indicated that the level of benefit from massage became less significant as time passed.¹²

Grealish et al¹³ performed a nursing study to assess the benefit of foot massages in the subjective statements of pain and nausea of 87 hospitalized cancer patients. The study took place during 3 consecutive evenings. On the first 2 nights of the study, each patient received a 10-minute foot massage from their nurse. On the third consecutive night, the patients were asked to stay in bed and perform a quiet, relaxing activity. The study found that the massage interventions performed by the nurses provided significant reduction in the symptoms of pain and nausea while providing improved sense of relaxation.¹³ The presence of the caring professional can be vital to consider when interpreting the results, as presence alone can provide increased benefit for those in hospital setting.

Of cancer patients undergoing treatment, those who receive bone marrow transplantation (BMT) often experience the most significant distress. In a study involving BMT patients (n = 33), Jenkins et al¹⁴ found that a high prevalence of depression (40%) was shown to be associated with impaired function. Tope et al¹⁵ studied the effects of 2 or more massages on individuals with cancer who underwent autologous BMT over a 4-year period, with a total of 104 patients for her study. The study focused on relaxation and mood state and found that 99% of the patients experienced relaxation as a result of their massage.¹⁵ Furthermore, 15%

felt a decrease in their sense of isolation; 22% noted a benefit in their management of symptoms such as pain and nausea; and 35% experienced an improved mood or sense of well-being.¹⁵

In their study of the BMT population, Ahles et al¹⁶ looked at the effect of multiple massages in individuals hospitalized over the course of several weeks. Their study demonstrated a reduction in diastolic blood pressure, nausea, distress, and anxiety immediately after massage.¹⁶ However, when looking at the long-term effects of massage, they found it difficult to differentiate whether it was the effect of the massage intervention that caused the decrease in symptom distress or the improved state was due to the fact that the levels of distress for BMT patients naturally improve over the course of time.¹⁶

Massage has also demonstrated significant results for individuals who have advanced stages of cancer. A study of those with advanced breast, lung, gynecologic, and head and neck cancers found that 33% reported a reduction in pain and 20% reported other physical benefits such as increased mobility and improved skin condition.¹⁵ Many of these patients also commented on the added benefits of having extra attention placed specifically on them and the diversion from thinking about their illness that massage brought.

As medical care focuses more attention on assisting dying individuals in having a better quality of life (QOL) in their final days, massage and other complementary medicine treatments are becoming more prevalent. Wilkinson et al¹⁷ found that the use of aromatherapy massage in a palliative care patient setting provided patients with a reduction in psychological distress for 1 week after a course of 3 massages. Soden et al¹⁸ found that massage provided patients in the hospice setting with an enhanced sleep quality and a significant reduction in pain. Kite et al⁶ found that the addition of aromatherapy oils for palliative care patients during massage produced a compounded benefit. The levels of stress, anxiety/fear, and tension demonstrated the most significant changes.⁶

Wilkie et al¹⁹ completed a randomized clinical trial (RCT) with cancer patients to assess the impact of massages on their intensity of pain, use of analgesics, and QOL during the final stages of their lives. Their study included the administration of 4 massages held twice weekly to determine the impact of massage on the following variables: pain, morphine use, admissions to the hospital, vital signs, and QOL. Of the 55 patients who participated, those who participated in the treatment arm exhibited a favorable decline in pain during the first and third massages and a decrease in pulse rate after each massage. The study failed to find a statistically significant decrease in emotional distress but did show a stable or reduced dose of analgesics for 50% of the massage therapy participants. Importantly, the study demonstrated small improvements in the QOL of those who are in the terminal state of their lives.

Massage therapy continues to demonstrate great promise in cancer care. However, there is currently a paucity of studies that address the long-term effects of massage on cancer patients. In a study of 41 patients with cancer, Smith et al²⁰ researched the effects of massage on patients' perceptions of

pain, sleep quality, anxiety, and symptom distress. The participants in the intervention group received at least 3 massages during their hospital stay, which lasted at least 1 week. The control group received routine nursing care with a similarly timed nursing intervention. Smith et al²⁰ were able to show that patients receiving massage had a greater decrease in pain and symptom distress than those who were in the nursing intervention control group. The results also showed that patients experienced both an immediate effect after massage and a longer lasting benefit if they received a minimum of 2 to 3 massages. This study provided a beginning look into the long-term benefits of massage but failed to pull these results from a broad-population perspective, as 95% of the participants were males and 90% were white.

To further research the long-term benefits of massage, measures of particular biomarkers such as hormone levels, natural killer cell activity, and lymphocyte response were included in the research. The hypothesis was that the long-term benefits of massage may be revealed in a person's biophysiology. The researchers found that massage provided the anticipated immediate benefits by reducing the oncology patients' state of depression and reported pain levels.^{21,22} In addition, the following long-term biochemical indices were improved: dopamine, serotonin, natural killer cells, and lymphocytes.^{21,22} Interestingly, both long-term anxiety and latent anger levels declined after massage, and this was also the case for patients trained in progressive relaxation.

Massage may not be proven to have long-term benefits, yet this does not diminish its clinical value. It simply means that due to the body's transitory response to tactile manipulation, one will require the ongoing use of massage rather than a single intervention for lasting benefits.

■ Purpose of Study

The purpose of this study was to assess whether 15 minutes of therapeutic massage on cancer inpatients effected a reduction in their expressed levels of distress. Perceived personal distress was assessed along 4 key dimensions: pain, fatigue, emotional distress, and physical distress.

■ Methods

This research used a single-group repeated-measures design with a premassage and postmassage assessment of perceived patient distress. Thus, participants served as their own controls for comparative purposes. Patients were recruited over a 3-year period, commencing December 2002, at a major university hospital in southeastern Georgia. Each patient gave verbal informed consent to participate in the study, and this was recorded in their medical record. The study comprised of 70% women and 30% males. The study coordinator estimated that overall consenting rate was 55%, and it was slightly higher among the males. Anecdotal evidence indicated that the 45% refusal rate was because of several patient issues; for some,

a massage was simply too painful to undertake, and for others who had never received a massage, they were hesitant to give consent based on misconceptions about massage therapy. The patients in the study were hospitalized on a medical surgical inpatient oncology unit. To garner a substantial sample size, the study protocol was offered to both the surgical and non-surgical oncology patients.

Some patients had multiple massages over time, yet for the purposes of the analysis, only the results from the initial massage were used to make all comparisons uniform.

■ Instruments

Self-reported distress was measured using a modified version of MacDonald's⁷ patient evaluation of massage experience scale that measured the following 4 distinct distress dimensions: pain, physical discomfort, emotional discomfort, and fatigue. Premassage and postmassage ratings for pain were scored on a 0 to 10 scale; ratings for physical and emotional discomfort and fatigue were on a 1 to 5 Likert scale. Each patient was asked the same questions by the same social worker before and after their massage. Patients were not able to view their responses from the pretest when completing the posttest. Scale reliability was assessed for internal consistency through Cronbach α . The results of the study demonstrated an overall Cronbach α of .850, indicating a fairly good reliability.

■ Massage Intervention

Standardization of massage intervention was carried out to the greatest extent possible by using only 2 massage therapists who received the same specialized training in massage therapy for cancer patients. In addition, they used the same relaxation music and hospital-issued scentless lotion. Each patient was initially identified by their primary nurse for a massage intervention. They were determined as appropriate candidates by their health status and interest in massage intervention. Patients excluded from the study were those who have thrombocytopenia, neutropenia, thromboses, or spinal cord compression or are pregnant. Once the patients were identified, the oncology social worker received their names and met with patients to perform a baseline assessment of distress and review the massage protocol.

The massage therapist initiated each visit to the oncology floor by meeting with the social worker to learn about each patient's medical history and specific massage precautions. The massage therapist went to patients' rooms carrying a CD player with a relaxation music CD and special health notes about each patient. The therapist confirmed with the patients that they were still interested in receiving a massage.

The massage therapist discussed the massage intervention process with the patients, asking which parts of their body they would like massaged. The therapist would suggest a comfortable position for the patients to assume: on their back, side, or sitting up on the bed or chair. The therapist would

adjust the bed or chair to adapt to his or her own height for the purpose of proper body mechanics.

Before beginning the massage, the therapist washed thoroughly and lathered his or her hands with hospital-issued lotion. He or she provided each patient with a 10- to 15-minute massage, using Swedish massage, which entails light to mild pressure. The style of stroke was that of effleurage with long gliding strokes toward the heart. The 2 most common areas for massage chosen by patients were the feet and leg or the back, neck, and shoulder areas.

At the end of the session, the therapist returned everything to its original position. This included lowering the bed, re-adjusting side rails, and turning lights off or on. Shortly after the conclusion of their massage intervention, the oncology social worker met with the patients to assess their distress after the massage intervention, using a modified version of MacDonald's⁷ scale.

■ Data Analysis

To test for statistical significance, a general linear model with repeated-measures analysis of variance was used. This was undertaken because all patients' distress measures were done twice—before and after the massage—and thus provided a measure of effect size. The within-group comparisons would be appropriate to assess potential differences along with the effect size assessment obtained by the partial η^2 (η_p^2). The effect size is a construct that establishes the level of effect attributable to the intervention. The η_p^2 is the proportion of the effect + error variance attributable to the effect, calculated as $\eta_p^2 = SS_{\text{effect}} / (SS_{\text{effect}} + SS_{\text{error}})$. All data were initially entered into an Excel spreadsheet and then transferred to SPSS version 14.0. To make comparisons across all 4 dimensions of perceived distress, a simple scale conversion algorithm was used to get all scales on a 0 to 100 scale (ie, raw score minus lowest possible score, divided by the scales range, and then multiplied by 100). An α Type 1 error rate of .05 was a predetermined value for all tests of statistical significance.

■ Results

A total of 251 patients over approximately 3 years participated in the study. The mean age was 54.96 years: 54.65 years for women and 55.68 years for men. Whites comprised most participants (68.9%); blacks comprised the second most common ethnicity (29.1%), reflecting the ethnic makeup of this region of the United States (Table 1). Frequencies of each cancer type were as follows: gynecologic, 62 (25%); gastrointestinal, 36 (14%); lung, 28 (11%); leukemia, 24 (10%); colorectal, 23 (9%); breast, 23 (9%); lymphoma, 18 (7%); head and neck, 14 (6%); and others, 6 (2%). The age group proportions were as follows: 20 to 29 years, 11 (4%); 30 to 39 years, 19 (8%); 40 to 49 years, 56 (22%); 50 to 59 years, 75 (30%); 60 to 69 years, 45 (18%); 70 to 79 years, 35 (14%); and 80 years and above, 10 (4%).

Table 1 • Oncology Patient Characteristics

	Mean Age (SD)	Counts, n (%)
Gender		
Women	54.65 (13.66)	175 (69.7)
Men	55.68 (14.68)	76 (30.3)
Ethnicity		
White	56.45 (14.97)	173 (68.90)
Black	51.30 (13.75)	73 (29.10)
Asian	54.67 (3.21)	3 (1.20)
Hispanic	55 (NA)	1 (0.40)
Indian	67 (NA)	1 (0.40)

NA indicates not applicable.

As indicated in Table 2, there were statistically significant differences found for each of the 4 dependent measures of patient distress before and after massage as follows: mean scores for pain declined significantly, $F(1,240) = 638.208$, $P = .000$, $\eta_p^2 = 0.7270$, representing a large effect size.²³ Physical mean scores declined significantly, $F(1,240) = 742.575$, $P = .000$, $\eta_p^2 = 0.756$, representing a large effect size. Emotional mean scores declined significantly, $F(1,240) = 512.00$, $P = .000$, $\eta_p^2 = 0.6810$, representing a large effect size. Lastly, fatigue mean scores declined significantly, $F(1,240) = 597.976$, $P = .000$, $\eta_p^2 = 0.714$, representing a large effect size. Distress scores by type were converted to a 0 to 100 scale to make an overall comparison possible. Post hoc analysis revealed no significant interactions for the main effect for any of the potential covariates. The observed reduction in patient-reported distress was evident regardless of the patient's age group (see Figure 1), ethnic group, gender, or type of cancer (see Figure 2).

Discussion

This massage study, which used a prestudy/poststudy design, found significant reduction in the oncology patients' perceived distress measured along the 4 dimensions: pain, physical discomfort, emotional discomfort, and fatigue. These results may also indicate clinical usefulness since the measure of effect, as determined by η_p^2 , was found to be substantial across all dimensions of distress. Unlike the previous research by Weinrich and Weinrich,¹² we found no difference in reduction of expressed pain based on a patient's sex. The reduction in patients' perceived distress was also consistently evident regardless of their age, ethnic group, or type of malignancy. Hence, these findings may diminish concerns over the efficacy of massage among patients with differing cancer types and different groups.

Previously, Cassileath and Vickers² had found a small improvement after massage for patient-reported fatigue. Our results found the opposite; the largest reduction of distress was in the dimension of fatigue, albeit the reduction was not statistically different from the other 3 measures.

This study has certain distinct limitations. The study was not an RCT, with participants randomly assigned to an

experimental group and a control group. Hence, the study had no neutral comparison group to test for baseline similarity or postintervention changes between groups. The RCT is considered the gold standard for addressing issues of internal validity.²⁴ Given the body of existing research on this particular intervention which evidenced positive results, we thought it best to provide the intervention to as many patients as possible. The study did use a single-group pre-intervention and postintervention design, where each patient served as his or her own control, which allowed a comparison between baseline assessments and follow-up. Another major concern is that the study had a substantially high proportion of patient refusals to receive a massage, particularly among the male sex. This may be related to certain preconceptions about what constitutes a massage and certain privacy concerns regarding human touch. Thus, the study may have a selection-bias limitation in that those particular patients that volunteered for the protocol may have some favorable predisposition toward the massage experience. The preexisting favorable perspective on massage could cause the patients to provide postintervention assessments much higher or more positive than those patients that are new to massage. There have been discussions among staff about changing the nomenclature from *massage* to *back rub*, which might make the intervention more broadly acceptable, and this change should be considered in future investigations.

This study did not have a longitudinal component to determine how long the perceived benefits lasted. Many patients received multiple interventions, and by comparing initial with subsequent baselines and initial postintervention assessments, one could potentially uncover some residual effects of the massage. However, in our study, those with return visits received the interventions at different time intervals and were therefore deemed inappropriate for analysis. A longitudinal component to assess the long-term impact of massage was challenging, given the time differences in subsequent clinic or hospital visits and the differences in therapeutic and disease trajectories that each patient experiences.

Table 2 • Premassage and Postmassage Mean Distress Scores

Distress Measure	Mean (SD)	P^a	Partial η^2
Pain score			
Premassage	5.05 (2.02)		
Postmassage	2.87 (1.45)	.000	0.74
Physical discomfort			
Premassage	3.35 (1.16)		
Postmassage	1.76 (0.82)	.000	0.76
Emotional discomfort			
Premassage	2.90 (1.22)		
Postmassage	1.50 (0.75)	.000	0.69
Fatigue score			
Premassage	3.09 (1.14)		
Postmassage	1.53 (0.79)	.000	0.88

^aGeneral linear model with repeated-measures analysis of variance tests of statistical significance.

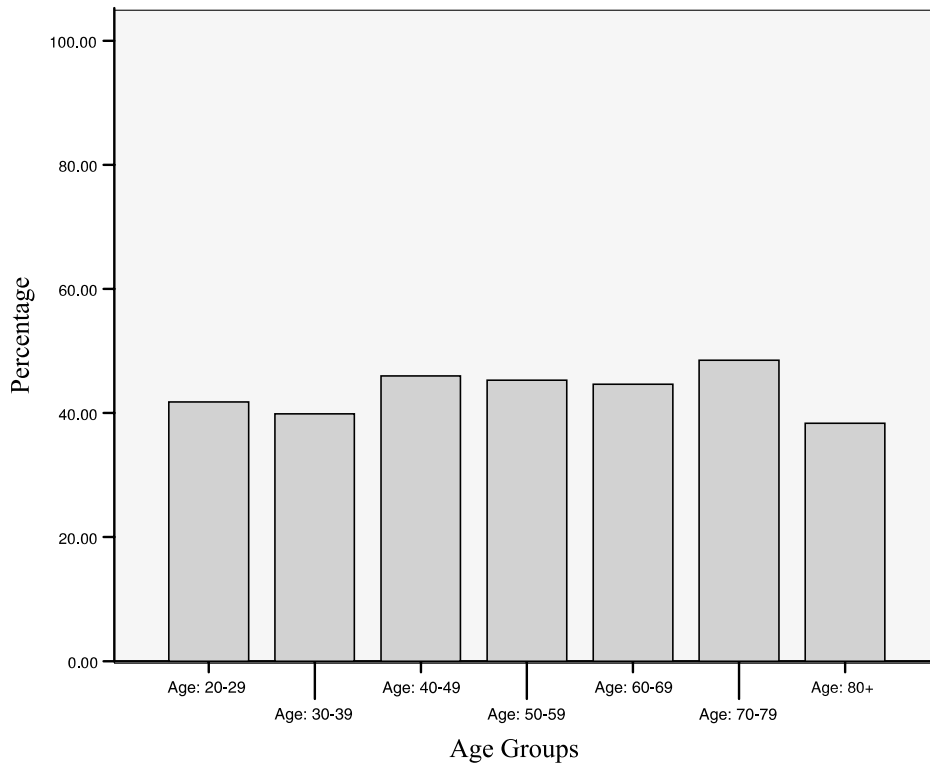


Figure 1 ■ Mean percentage decrease in distress by age groups.

Finally, this study did not have any independent biomarker for patient distress and relied on self-reported assessment. Initially, we did consider the use of salivary cortisol as a biomarker of distress, yet a systematic literature review by the

Cochrane collaboration concluded that there was insufficient evidence for an association between self-reported mental distress and salivary cortisol as a biomarker.²⁵ Similar results were reported in a study on working parents which found

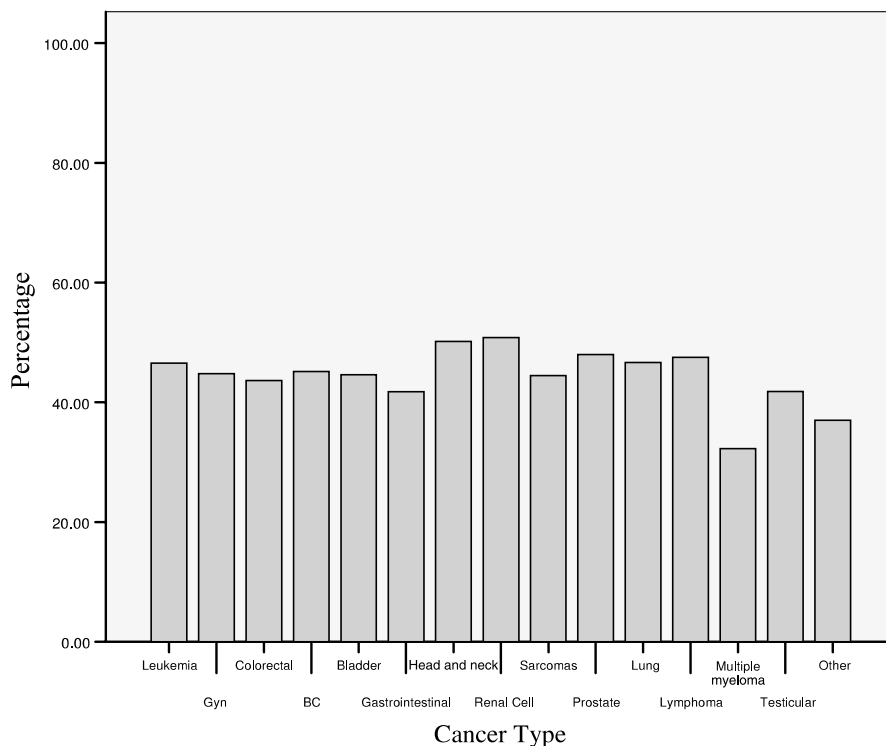


Figure 2 ■ Mean percentage decrease by cancer type. Gyn indicates gynecologic; BC, breast cancer.

little evidence of a useful association between stress and cortisol patterns.²⁶

Oncology patients all share a unique dual burden of the adverse effects of the malignancy and the therapy to cure their disease. The goal is always to maximize a therapeutic dose that is tolerable by the patient. A massage intervention may serve to better assist the patients in managing the dual nature of their distress. Considerable work has been accomplished over the past few years in identifying the benefits of including some form of massage therapy in the care of oncology patients.^{9,13,19,27-29} The use of massage has also been found to have a beneficial impact on the caregivers of oncology patients. Rexilius et al,²⁸ studying the caregivers of patients undergoing autologous hematopoietic stem cell transplantation, found a significant reduction in general and emotional fatigue after a massage intervention. In the study by Goodfellow,³⁰ therapeutic back rubs enhanced the mood and reduced the perceived stress among spouses of cancer patients.

Complementary therapies have gained great acceptance in cancer care and have expanded beyond massage to healing touch, acupuncture, and reflexology. Research has indicated an additional benefit of incorporating multimodalities in the care of cancer patients. In their study on massage, healing touch, and presence versus standard care, Post-White et al³¹ discovered immediate effects such as decreases in respirations, blood pressure, pain intensity, and heart rate, as well as total mood disturbances through massage and healing touch. Massage therapy had a stronger impact on these indices over healing touch. They also found that a combination of massage therapy and healing touch had the greatest level of benefit for measures of relaxation, improved mood state, and diminished fatigue. Other studies have combined the use of acupuncture, foot soak, and reflexology with massage therapy and shown greater benefit than massage therapy alone.^{32,33}

Research involving interventions such as massage are part of the broader agenda of investigating adjuncts to cancer therapy that address patients' QOL. This trend was in part due to the National Initiative on Cancer Care Quality promoted by the American Society of Clinical Oncology which commenced in 2000.³⁴ Surgery, radiation, and chemotherapy remain to be the primary tools of the oncology treatment community, yet cancer care has expanded in recent years to systematically assess and evaluate patient's QOL status. The goal of QOL assessment is to enhance the delivery of comfort care, which helps the patients throughout their treatment and recovery phases. Thus, in the foreseeable future, there will be a growing emphasis to augment oncology clinical care with interventions such as massage that help serve the needs of the patient. Our study seeks to support to ongoing endeavors to assess and improve the QOL of cancer patients by the inclusion of massage therapy as a complementary adjunct to clinical practice to achieve the best possible patient care.

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References

1. Stanton A, Snyder P. Coping with breast cancer diagnosis: a prospective study. *Health Psychol.* 1993;2:16-23.
2. Cassileath BR, Vickers AJ. Massage therapy for symptom control: outcome study at a major cancer center. *J Pain Symptom Manage.* 2004;28:244-249.
3. Centers for Disease Control and Prevention's (CDC) National Center for Health Statistics (NCHS). 2002 National Health Interview Study (NHIS). Advance data from vital and health statistics. Number 343, May 27, 2004. <http://www.mbcrc.med.ucla.edu/PDFs/camsurvey2.pdf>.
4. Downer SM, Cody MM, McClusky P, et al. Pursuit and practice of complementary therapies by cancer patients receiving conventional treatment. *BMJ.* 1994;309:671-672.
5. Wilkinson S, Aldridge J, Salmon I, Cain E, Wilson B. An evaluation of aromatherapy massage in palliative care. *Palliat Med.* 1999;13:409-417.
6. kite SM, Maher EJ, Anderson K, et al. Development of an aromatherapy service at a cancer centre. *Palliat Med.* 1998;12:171-180.
7. MacDonald G. *Medicine Hands: Massage Therapy for People With Cancer.* Tallahassee, FL: Findhorn Press; 1999.
8. Sims S. Slow stroke back massage for cancer patients. *Nurs Times.* 1986;82:47-50.
9. Ferrell-Torry AT, Glick OJ. The use of therapeutic massage as a nursing intervention to modify anxiety and the perception of cancer pain. *Cancer Nurs.* 1993;16:93-101.
10. Wilkinson S. Get the massage. *Nurs Times.* 1996;92:61-64.
11. Meek SS. Effects of slow stroke back massage on relaxation in hospice clients. *Image J Nurs Scholarsh.* 1993;25:17-21.
12. Weinrich S, Weinrich M. The effect of massage on pain in cancer patients. *Appl Nurs Res.* 1990;3:140-145.
13. Grealish L, Lomasney A, Whiteman B. Foot massage: a nursing intervention to modify distressing symptoms of pain and nausea in patients hospitalized with cancer. *Cancer Nurs.* 2000;23:237-243.
14. Jenkins PL, Livingston A, Whitaker IA. A retrospective study of psychosocial morbidity in bone marrow transplant recipients. *Psychosomatics.* 1991;32:65-71.
15. Tope D, Hann D, Pinkson B. Massage therapy: an old intervention comes of age. *Qual Life Nurs Chall.* 1994;3:14-18.
16. Ahles TA, Tope DM, Pinkson B, et al. Massage therapy for patients undergoing autologous bone marrow transplantation. *J Pain Symptom Manage.* 1999;18:157-163.
17. Wilkinson S, Aldridge J, Salmon I, Cain E, Wilson B. An evaluation of aromatherapy massage in palliative care. *Palliat Med.* 1999;13:409-417.
18. Soden K, Vincent K, Craske S, Lucas C, Ashley S. A randomized controlled trial of aromatherapy massage in a hospice setting. *Palliat Med.* 2004;18:87-92.
19. Wilkie DJ, Campbell J, Cutshall S, et al. Effects of massage on pain intensity, analgesics and quality of life: a pilot study of a randomized clinical trial conducted within hospice care delivery. *Hosp J.* 2000;15:31-53.
20. Smith MC, Kemp J, Hemphill L, Vojir C. Outcomes of therapeutic massage for hospitalized cancer patients. *Image J Nurs Scholarsh.* 2002;34:257-262.
21. Hernandez-Reif M, Ironson G, Field T, et al. Breast cancer patients have improved immune and neuroendocrine functions following massage therapy. *J Psychosom Res.* 2004;57:45-52.
22. Hernandez-Reif M, Field T, Ironson G, et al. Natural killer cells and lymphocytes increase in women with breast cancer following massage therapy. *Int J Neurosci.* 2005;115:495-510.
23. Witte RS, Witte JS. *Statistics.* 7th ed. Hoboken, NJ: John Wiley & Sons, Inc; 2004.
24. Portney LG, Watkins MP. *Foundations of Clinical Research: Applications to Practice.* 2nd ed. Upper Saddle River, NJ: Prentice Hall Health; 2000.

25. Hjortskov N, Garde AH, Orbaek P, Hansen AM. Evaluation of salivary cortisol as a biomarker of self-reported mental stress in field studies. *Stress Health*. 2004;20:91–98.
26. Kurina LM, Schneider B, Waite LJ. Stress, symptoms of depression and anxiety, and cortisol patterns in working parents. *Stress Health*. 2004;20:53–63.
27. Billhut A, Dahlbert K. A meaningful relief from suffering: experiences of massage in cancer care. *Cancer Nurs*. 2001;24:180–54.
28. Rexilius SJ, Mundt CA, Megel ME, Agrawal S. Therapeutic effects of massage therapy and healing touch on caregivers of patients undergoing autologous hematopoietic stem cell transplant. *Oncol Nurs Forum*. 2002;29:E35–E44.
29. Billhult A, Stener-Vitorin E, Bergbom I. The experience of massage during chemotherapy treatment in breast cancer patients. *Clin Nurs Res*. 2007;16:85–103.
30. Goodfellow LM. The effects of therapeutic back massage on psychophysiological variables and immune function in spouses of patients with cancer. *Nurs Res*. 2003;52:318–328.
31. Post-White J, Kinney ME, Savik K, Gau JB, Wilcox C, Lerner I. Therapeutic massage and healing touch improve symptoms in cancer. *Integr Cancer Ther*. 2003;2:332–344.
32. Mehling W, Jacobs B, Acree M, et al. Symptom management with massage and acupuncture in postoperative cancer patients: a randomized controlled trial. *J Pain Symptom Manage*. 2007;33:258–266.
33. Kohara H, Myuauchi T, Suehiro Y, Ueoka H, Takeyama H, Morita T. Combine modality treatment of aromatherapy, footsoak, and reflexology relieves fatigue in patients with cancer. *J Palliat Med*. 2004;7:791–796.
34. Schneidere EC, Epstein AM. Developing a system to assess the quality of cancer care: ASCO's national initiative on cancer care quality. *J Clin Oncol*. 2004;22:2985–2991.