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# Is Massage Therapy an Effective Treatment for Improving Sleep Quality in Women Age 50-80 Diagnosed With Cancer?

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# **Is Massage Therapy An Effective Treatment For Improving Sleep Quality In Women Age 50-80 Diagnosed With Cancer?**

Alexander M. Chase, PA-S

A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements For

The Degree of Master of Science

In

Health Sciences – Physician Assistant

Department of Physician Assistant Studies  
Philadelphia College of Osteopathic Medicine  
Philadelphia, Pennsylvania

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## **ABSTRACT**

**OBJECTIVE:** The objective of this selective EBM review is to determine whether or not massage therapy is an effective treatment in improving sleep quality among women age 50-80 diagnosed with cancer.

**STUDY DESIGN:** Review of two English language randomized control trials published in 2004 and 2011 and one English language quasiexperimental pretest-posttest comparison study published in 2002.

**DATA SOURCES:** Data sources were articles published in peer reviewed journals found using PubMed and EBSCOhost.

**OUTCOMES MEASURED:** Sleep quality was measured using the Verran and Snyder-Halpem Sleep Scale and the Richards-Campbell Sleep Questionnaire.

**RESULTS:** Soden et al and Jane et al found significant improvement in sleep scores pre- and post-intervention among the massage group but did not find significance between groups. In contrast, Smith et al did not find any within group significance pre- and post-intervention in the therapeutic massage group, but did find statistical significance between the two groups at post-intervention.

**CONCLUSIONS:** The results were inconclusive and conflicting. With contradicting studies and little significance between groups it is hard to draw conclusions as to whether massage therapy is effective in improving sleep quality among female cancer patients. Additional research is needed with larger sample sizes and stricter control to determine if massage therapy provides clinically significant improvement in sleep quality.

**KEY WORDS:** Massage therapy, cancer, sleep quality

## INTRODUCTION

Cancer is a life-threatening and life-changing diagnosis that affects a patient both physically and psychologically. By definition, cancer is a disease in which abnormal cells divide without control and are able to invade other tissues.<sup>1</sup> Cancer cells can spread to other parts of the body through the blood and lymphatic systems.<sup>1</sup> If the spread is uncontrolled it can result in death.

The incidence of new cancer among women in the United States is about 411 per 100,000 women with the median age of diagnosis at 66.<sup>2</sup> With the growing incidence as our population continues to age, cancer has put an increasing burden on our health care system, accounting for an estimated 29.2 million health care visits in 2010<sup>3</sup> and costing an estimated \$124.6 billion in direct costs<sup>4</sup> and \$201.5 billion in indirect costs<sup>5</sup>.

Symptoms of cancer can vary greatly depending on the type and site of cancer. General symptoms that are not necessarily specific include unexplained weight loss, fever, fatigue, pain, and skin changes.<sup>6</sup> More specific signs and symptoms for particular cancers include change in bowel habits or bladder function, sores that do not heal, white patches inside the mouth or on the tongue, unusual bleeding or discharge, lump in the breast or testicles, indigestion or trouble swallowing, and nagging cough or hoarseness.<sup>6</sup>

There are many types of cancer, however all come with a decreased quality of life due to constant worry, adverse effects of chemotherapy or radiation, pain and symptoms from the cancer, surgical procedures and complications, and numerous doctors' visits. Because of all the stress, anxiety, pain, and interruption in normal daily routines, quality of sleep is commonly decreased among cancer patients.<sup>7</sup>

Typically pharmacologic treatment is used in cancer patients who have difficulty sleeping. There are numerous drugs that will help patients fall asleep faster and stay asleep longer. These include zolpidem, eszopiclone, ramelteon, trazodone, mirtazapine, benzodiazepines, and over-the-counter products like antihistamines.<sup>8</sup> Medications such as these are effective, however not all patients can take them due to side effects, age, and interactions with other medications. Some patients simply don't want to take them due to the risk of dependence.

An alternative to pharmacologic treatment is massage therapy, the manual manipulation of soft body tissues to enhance an individual's health and well-being.<sup>9</sup> The value of massage therapy in reducing pain, anxiety, and symptom distress is well documented.<sup>10</sup> These factors all play a large role in the quality of sleep that cancer patients get. Massage therapy has also been shown to increase relaxation in patients with cancer.<sup>10</sup> A decrease in pain, anxiety, and symptom distress, and an increase in relaxation could help promote a better quality of sleep for patients suffering from cancer.

## OBJECTIVE

The objective of this selective EBM review is to determine whether or not massage therapy is an effective treatment for improving sleep quality in women age 50-80 diagnosed with cancer.

## METHODS

Specific selection criteria of three studies were used for this systematic review. The population included women age 50-80 diagnosed with cancer. The intervention used in each study was massage therapy. Comparisons were made between the treatment group receiving massage therapy to the experimental group receiving no therapy or only nurse interaction. There

was also a pretest-posttest comparison made. The studies consisted on two randomized control trials (RCTs) and one quasiexperimental pretest-posttest comparison study. All studies measured several outcomes, but for the purpose of this systematic review the outcome measured was sleep quality.

A detailed search using PubMed and EBSCOhost was completed by the author for this review using the key words “massage therapy,” “cancer” and “sleep quality.” All articles were published in peer-reviewed journals in the English language. Articles were selected based on their relevance to the clinical question and importance of their outcomes for patients (Patient Oriented Evidence that Matters – POEMs). Inclusion criteria included studies published after 1998 with POEMs and studies that used massage therapy as an intervention. Exclusion criteria included studies published before 1998, studies with participants mean age below 50, and studies where patients were on current treatment for poor sleep. The statistics used in these studies were mean scores of sleep quality scales and p-values. Table 1 displays the demographics and characteristics of these studies.

**Table 1: Demographics and characteristics of included studies**

Study	Type	# Pts	Age (yrs)	Inclusion Criteria	Exclusion Criteria	W/D	Interventions
Jane (2011)	RCT	72	50 (mean)	men and women age 18 years or older, orientated to person/place/time, radiologically diagnosed with evident bone metastases, bone pain with an intensity greater than 4 on a 0-10 scale	regularly receiving massage therapy, undergoing major surgeries or procedures	5	Massage therapy – full-body Sessions lasted 45 minutes and were performed on 3 consecutive days
Smith (2002)	Quasiexperimental pre-post comparison	41	64 (mean)	undergoing chemotherapy or radiation treatment for cancer at a large veteran's	patients with a platelet count below 10,000, unstable spinal cord	18	Massage therapy – Swedish techniques 15-30 minutes, 3 massages over

				Administration Medical Center in a Midwestern American city	compression, projected length of stay of less than 7 days		a 1 week hospitalization
Soden (2004)	RCT	42	73 (mean)	men and women with a diagnosis of cancer and able to complete the assessment scales	patients who had received aromatherapy, massage, chemotherapy or radiotherapy within the previous month	6	Massage therapy – 30 minute back massage weekly for 4 weeks

## OUTCOMES MEASURED

The outcomes measured in each study were POEMs, however this review is only focusing on the POEM of sleep quality. The studies by Soden et al and Smith et al both utilized the Verran and Snyder-Halpern Sleep Scale, which is a visual analog scale scored from 0 (best) to 800 (worst) looking eight dimensions of sleep (number of awakenings, amount of movement during sleep, total time of sleep, time to fall asleep, depth of sleep, feeling on awakening, and satisfaction of sleep). The study by Jane et al utilized the Richards-Campbell Sleep Questionnaire, which is a visual analog scale scored from 0 (worst) to 500 (best) looking at five dimensions of sleep (depth of sleep, sleep onset latency, number of awakenings, time spent awake, and overall sleep quality).

## RESULTS

The three studies used in this review examined the effect of massage therapy on sleep quality among cancer patients. All data from the studies contained continuous data that could not be converted to dichotomous data. Therefore, the analysis of risk reduction (RRR), absolute risk reduction (ARR), and number needed to treat (NNT) could not be calculated. In all studies, there were no adverse effects or harm to the patient from massage therapy.

In the study by Soden et al 42 patients were randomly assigned to either the massage group (n=13), aromatherapy plus massage group (n=16), or control group of no massage (n=13) and participated over the course of 4 weeks. For the purpose of this review, the aromatherapy plus massage group will be excluded. Six patients did not finish the study due to other illness or death. Researchers recording and analyzing the data were blinded to the interventions. The massage group received a standardized 30-minute back massage weekly for four weeks and the control group did not receive any massage. Both groups completed a baseline sleep scale the week before the first treatment. The massage group completed the sleep scale before the weekly massage session and upon waking the next morning. The control group completed the sleep scale weekly.

To test significance of changes for each patient a paired t-test was used and to assess differences between groups an ANOVA was used. There were no significant changes in the mean sleep score from baseline to final assessment in either group. When a comparison between groups was made from baseline to final assessment, there again was no statistically significant difference. When comparing pre- and post-massage among the massage group, however, there was a statistically significant improvement in sleep scores ( $p=0.02$ ). Table 2 summarizes the results.

**Table 2: Mean change in sleep scores**

<b>Treatment Group</b>	<b>From baseline to final assessment (P)</b>	<b>Pre- and post-massage (P)</b>
Massage (n=13)	59.75 (0.2)	42.55 (0.02)
Control (n=13)	-80.67 (0.2)	N/A

In the study by Jane et al 72 patients were randomly assigned to either the massage therapy group (n=36) or social attention group (n=36), which served as the control, and participated over the course of five days. Five patients, two from the massage therapy group and



three from the social attention group, did not finish the study due to physical distress or progression of disease. Researchers recording and analyzing the data were blinded. On day one initial baseline sleep scale assessments were completed by both groups. On days two through four, the massage therapy group received a daily 45-minute full body massage, while the control group received a 45-minute social attention intervention without any direct physical contact. The massages were given by registered nurses who completed a 3-month massage training program, while the social attention was given by a trained registered nurse. During the intervention, a pre- and post-test sleep score was obtained from both groups with a 16-18 hour interval. On day five, both groups completed a final sleep scale assessment.

Paired t-tests were run comparing mean pre- to post-intervention sleep scores within groups and found statistical significance on days two ( $p=0.03$ ) and three ( $p=0.02$ ) but not on day four ( $p=0.22$ ) among the massage therapy group. There was no statistical significance found among the social attention group at any time. Using independent t-tests to look at between group effects on sleep scores at post-intervention, there was no significant group differences at any session of intervention. Table 3 summarizes the results.

**Table 3: Within and between groups comparison of sleep scores during intervention days**

	Day 2				Day 3				Day 4			
	Within groups (pre/post-intervention)		Between groups (post-intervention)		Within groups (pre/post-intervention)		Between groups (post-intervention)		Within groups (pre/post-intervention)		Between groups (post-intervention)	
	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>	<i>t</i>	<i>p</i>
Massage Therapy	2.2	0.03	0.3	0.75	2.4	0.02	1.1	0.30	1.2	0.22	0.8	0.39
Social Attention	1.4	0.16			0.6	0.54			1.9	0.85		

In the study by Smith et al 41 patients were assigned to either a therapeutic massage group ( $n=20$ ) or a nurse interaction groups ( $n=21$ ), which acted as the control. Random assignment was not performed because staff of the oncology unit believed patients would

perceive care inequities. Therefore, therapeutic massage was given over the first eight months of the study and nurse interaction was given over the last 8 months of the study. During the study 18 patients, eight from the therapeutic massage group and 10 from the nurse interaction group, were withdrawn because of hospital discharge before they had completed the one week block of therapy, or because of death. All participants in both groups completed a baseline (pre-test) and final (post-test) assessment sleep scale. In the first eight months, the therapeutic massage group received a 15-30 minute massage by the same nurse who was certified in hospital-based massage therapy. During the one week hospital stay each massage patient received three massages that were at least 24 hours apart. In the last eight months, the control group received 20-minutes of nurse interaction three times during their one week hospitalization that consisted of deliberate focused communication.

When comparing within groups, the mean sleep score from pre- to post-intervention remained the same (mean change = 0.0) among the therapeutic massage group and increased (worsened) among the nurse interaction group (mean change = 92.1,  $p < 0.10$ ). An ANOVA was run to look at post-intervention sleep score differences between groups. It showed statistically significant changes in sleep scores ( $F=2.95$ ,  $t=1.90$ ,  $p < 0.10$ ). Note that for this study statistical significance was set at a p-value less than 0.10 instead of 0.05. Table 4 summarizes the results.

**Table 4: Mean sleep scale scores pre- and post-intervention**

	<b>Pre-intervention mean (SD)</b>	<b>Post-intervention mean (SD)</b>	<b>Change from baseline</b>
Therapeutic Massage	344.9 (106.9)	344.9 (140.6)	0.0
Nurse Interaction	341.1 (154.0)	433.2 (141.3)	92.1*

\*pre- to post-intervention  $p < 0.10$

Note: higher score = worse sleep quality

## DISCUSSION

The benefit of massage therapy on sleep quality among women cancer patients is not well understood. The findings in this review are inconclusive and conflicting, however, all three studies did show a statistically significant improvement in sleep quality either within the massage therapy group or between the massage therapy group and control group. These differences are most likely due to the variable nature of different types of cancer, with some disrupting sleep more than others, and the varying designs of the studies in this review.

Soden et al and Jane et al found significant improvement in sleep scores pre- and post-intervention among the massage group but did not find significance between the massage group and control group. In contrast, Smith et al did not find any within group significance pre- and post-intervention in the therapeutic massage group, but did find statistical significance between the two groups at post-intervention. The massage patients in the Smith et al study did not have any change in sleep scores pre- and post-intervention, indicating their sleep was steady, while the scores from the control group significantly deteriorated. That study occurred in a hospital setting where sleep typically deteriorates and the results indicate therapeutic massage may be beneficial for women cancer patients to maintain sleep quality while in the hospital.

There were several limitations to the studies examined in this systematic review. Sample size was a limiting factor for both Smith et al and Soden et al. These studies only had 41 and 42 participants respectively, which may not be sufficient to accurately represent the wide variety of female cancer patients and translate the results to larger populations. Accounting for a 25% withdrawal rate, the sample size of the Jane et al study was also limited by a relatively small sample size at 54 participants. Because of the controlled nature of all reviewed massage interventions, it was not possible to give personalized therapy designed for the patient's type of

cancer or symptoms. This may have decreased the effectiveness of massage intervention. Another limitation among all the studies reviewed was that severity of illness was not specified. The severity of illness could have a positive or negative effect on baseline sleep quality and response to treatment, with more severe cases being refractory to intervention. Finally, none of the studies used licensed massage therapists to deliver treatment. Jane et al and Smith et al used either trained or certified nurses to administer the massages, however, this still brings into question training, technique, and experience.

## CONCLUSION

This systematic review showed inconclusive and conflicting evidence to support the idea that massage therapy is effective in improving sleep quality among female cancer patients ages 50-80. Two studies, Jane et al and Soden et al, showed benefits pre- and post-massage, however, Smith et al was conflicting and did not find any significant improvement. All of the studies showed positive results in certain areas but most were not significant enough to draw firm conclusions and therefore inconclusive.

Due to inconclusive and conflicting results from the reviewed studies, future studies are needed focusing on massage therapy and its potential to improve sleep quality among female cancer patients and decrease the need for medications for sleep. To truly determine if therapeutic massage has a significant benefit, additional research needs to have tighter control, larger sample sizes, and examine which types of cancer and cancer related symptoms respond best. This might produce more reliable, significant results that could be translated to a larger population and bring massage therapy into the cancer treatment regimen for improving sleep quality.

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