

The effect of massage therapy on the quality of sleep in breast cancer patients

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ABSTRACT

Background: Annually, about 6000 new cases are diagnosed with breast cancer in Iran. In Iran, more women are affected with breast cancer than a decade earlier in comparison with other countries, and 70% of them are diagnosed at an advanced phase. Insomnia is the most common disorder following breast cancer, and interference in sleep quality and rest causes changes in physiological functions and reduces the body's daily performance. The objective of this study was to determine the effect of massage therapy on the quality of sleep in patients with breast cancer.

Materials and Methods: This clinical trial was conducted for about 1 month in a referral chemotherapy clinic of a teaching hospital in Isfahan, Iran. The participants consisted of 57 women with breast cancer who were selected by simple random sampling. They were randomly assigned to two groups of control and experimental. The control group was treated only by usual medical therapy, whereas the case group was treated by combined medical-massage therapy. Data collection tools were the validated Pittsburgh Sleep Quality Index and a demographic questionnaire. Data were analyzed by SPSS using descriptive statistics, Chi-square test, paired *t*-test, and Student's *t*-test.

Results: The results showed significant differences in the mean scores of quality of sleep before and after the intervention in the case group, while no significant differences were observed in the mean scores of quality of sleep before and after the intervention in the control group. In addition, no significant differences were observed in the mean scores of quality of sleep before the intervention between case and control groups. However, significant differences were observed in the mean scores of quality of sleep after the intervention between case and control groups.

Conclusion: According to the results of this study, learning and applying massage techniques by medical staff causes health promotion and improves the quality of sleep in cancer patients. Furthermore, massage therapy is suggested as a non-pharmacologic method to improve sleep quality in these patients.

Key words: Breast cancer, Iran, massage therapy, nursing, quality of sleep

INTRODUCTION

Breast cancer, or malignant breast cells, constitutes 18% of female cancers, and is the most common cancer among women of Western countries.^[1,2] In developed countries, 12% of women aged 20-34 are diagnosed with breast cancer.^[2,3] The World Health Organization predicts of the incidence of cancer in South East Asia to increase from 1.3 million to 2.1 million from 2002 to 2020, i.e. a jump of 60% will occur.^[2,4] The prevalence of breast cancer in most Middle Eastern countries is between 15% and 25% of all the cancers. Iran and Pakistan have the lowest prevalence among the countries of this region. Breast cancer

continues to be ranked first in Iran, with age-specific rate of 27.15 years and with 6976 more cases reported than skin cancer.^[2] Breast cancer is the most common cancer and has the most casualties, and affects women more emotionally and mentally than other cancers.^[5]

Although sleep disorders are associated with medical conditions such as cardiovascular disease, and respiratory and musculoskeletal problems, some of these disorders are recognized in cancer patients. It seems that the mental and physical discomforts from cancer can be associated with sleep disorders; in fact, difficulty in sleeping is one of the most prominent concerns of cancer patients.^[6] This disorder is the most prevalent symptom among women with cancer.^[7-10] A high percentage of women with breast cancer experience sleep disorders due to the effects of cancer, stress, recent surgery, or emotional disorders such as anxiety related to the start of chemotherapy.^[11] In addition, flushing caused by chemotherapy, hormone therapy, length of time elapsed since diagnosis, recurrence of cancer, cancer stage, kind of treatment, mental reaction during

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diagnosis and treatment of cancer, fatigue, environment, age, education, marital status, and menstruation can cause sleep disorders.^[12,13] More than 60% of patients with metastatic breast cancer have been reported to have more than one type of sleep disorder. Increased depression and adverse changes in sleeping patterns, compared to other predictions (pain and stress), have been associated with this disease. Fatigue, pain, psychological disorders, and sleep problems are predicted in heterogeneous samples of patients with advanced cancer.^[14-16] Sleep disorders not only cause discomfort to patients and interfere with their daily activities, but also affect their desire and willingness to receive treatment, and the treatment outcomes.^[12,13] Kuo quotes from Piper that among sleep disorders in patients undergoing chemotherapy, short duration of sleep, difficulty in falling asleep, frequent interruptions of sleep, and insomnia can be mentioned.^[13] Koopman *et al.* reported that in 63% of samples with metastatic breast cancer, one or more types of sleep disorders were observed.^[17] Furthermore, in the study by Fortner *et al.*, in 61% of a sample of 72 people with breast cancer, sleep disorder was significantly observed.^[18] Sleep disorder itself is a significant problem associated with breast cancer. Therefore, with knowledge of the nature and prevalence of sleep disorders among cancer patients and based on new approaches, this process can be reduced through supportive care, because many sleep disorders can be effectively treated.^[6] Given that many factors are effective in causing sleep disorders, use of combined treatments including medications (e.g. benzodiazepines or melatonin receptor agonists) and non-pharmacological treatments is also effective.^[19] The use of sedatives and hypnotics may cause reduced or lack of consciousness during the day, and lead to severe muscle pain and fatigue in cancer patients. It also seems that the use of drugs alone cannot be effective in reducing and controlling pain, fatigue, and sleep disorders.^[10] In fact, sedatives have many mental and physical side effects. In addition to the risk of addiction and medication dependency, sedatives may cause hypotension, weakening of vital functions, drowsiness, nausea, vomiting, and even shock. They are also time consuming since they waste the nurses' time and impose high costs on the healthcare system.^[20]

Lack of medication is another problem associated with economic issues. According to the statistics of the World Health Organization, 80% of the populations of third-world countries do not have access to even their basic medicines, or due to the high price of drugs, they cannot buy and use them.^[21] Complementary and alternative medicine is a topic of discussion between patients and medical professionals as non-pharmacological treatments which are rapidly developing.^[22] Some of these methods are in

the range of a nurse's job and can be a part of the care program.^[23] Imagery, hypnosis, training coping skills, cognitive-behavioral treatment, relaxation, music therapy medication, and mind and body interventions are among the interventions that improve pain, fatigue, and sleep disorders in patients with cancer.^[10] Massage therapy is one of the most popular complementary therapies among cancer patients. Contrary to the complementary therapies mentioned above, it does not require active collaboration of the patient during the technique. When the patient finds someone who pays attention to their problems and communicates with them in an appropriate way in the stressful hospital environment, they can adapt better to the environment and their disease. Touch, like talking, is a way of communication in care and can have treatment effects.^[22] In fact, this method can make the patient independent and can be performed by the patient and their families with simple tools. Moreover, the patients easily accept and collaborate well in this method. It also does not have the side effects and negative consequences of the pharmacological interventions.^[22] The benefits of complementary therapies can be considered in two parts. Firstly, it is used as the cause of psychological healing in order to create a degree of comfort and peace in stressful situations. The second part is that these treatments can be used to facilitate the therapeutic relationship between the nurse and patient by improving trust and communication.^[24]

Previous researches have shown that massage therapy has positive impact on variables of pain, anxiety, fatigue, and quality of sleep in different patients.^[25-27] In contrast, Williams showed that massage therapy was not effective in reducing the mentioned symptoms.^[28] Therefore, this study was performed based on previous investigations and keeping in mind the high prevalence of sleep disorders and their problems, lack of adequate medical care for the patients' sleep disorders, cultural differences of Iranians compared to people of other countries, and lack of sufficient and specific studies in this field. This study was conducted with an aim to examine and provide solutions for decreasing this disorder and improving physical and mental health by investigating the effects of massage therapy on the quality of sleep of patients with breast cancer.

MATERIALS AND METHODS

This was a single-blind clinical trial, with random sampling in two groups of control and case. Pretest and posttest were conducted on 57 female patients with breast cancer in the referral chemotherapy clinic of Seyed-al-Shohada Hospital in Isfahan, Iran, during May-June 2011. The inclusion criteria included no existence of any stressful events during the past 6 months (divorce, relative's death, being

unemployed, major changes in life), no use of psychiatric drugs during the week before the study (analgesic narcotics, antiemetic, or steroids), no use of anticoagulant drugs, lack of any confirmed metastatic disease no use of any alternative treatment methods during the past year, patients who received chemotherapy and hormonal therapy, being in the 1st-3rd stages of breast cancer, patients who underwent a unilateral modified radical mastectomy, age range of 23-63 years, and the patients who underwent mastectomy from 1 to a maximum of 6 months before Exclusion criteria included patients unwilling to continue the study, existence of any edema, wound, fresh petechiae, purpura, bleeding during the intervention, and absence for more than two consecutive sessions of the massage therapy.

Data were gathered by a two-part questionnaire in 1 month. The first part of the questionnaire included demographic and illness information and the second part consisted of Pittsburgh Sleep Quality Index (PSQI), which is a standard self-report tool designed by Buysse *et al.* in 1989 in order to evaluate the quality of sleep.^[29] This questionnaire consisted of 19 questions on seven aspects of quality of sleep, which were mental quality of sleep, duration of being awake, sleep period, adequacy of sleep, sleep disturbances, use of hypnotics, and disorders in daily functions. Each part is scored from 0 (no problem) to 3 (serious problem). The overall score of PSQI is obtained by adding the scores of all the seven aspects, and it ranges from 0 to 21. Higher scores show lower quality of sleep. Score of 5 and more indicates poor quality of sleep. This questionnaire is a valid tool, and its reliability and validity have been investigated in various studies. In Iran, Hossein Abadi *et al.*^[30] and Soleimany *et al.*^[31] have also determined its reliability through retesting as $r = 0.88$ and $r = 0.84$, respectively.

In each group, 30 patients (females) were enrolled. From the 30 patients in the experimental group, 2 patients were excluded from the study due to unwillingness to continue the intervention and 1 patient was excluded due to being absent for more than two sessions of the massage therapy. After obtaining informed consents, patients were assigned randomly to one of the two groups as follows: 27 patients in the experimental group and 30 patients in the control group. At first, the researcher interviewed the patients on the PSQI and completed it for the patients in both groups. Patients received information about the aim of the study at the beginning of the research. In the experimental group, massage therapy, by maintaining patient's privacy and ethics, was performed by a researcher who had a massage therapy certificate. The massage was performed using Effleurage massage technique with fingers and palms of both hands in the form of superficial and with corrosive and sweeping movements of forward and backward. The patient was made to lie in a comfortable position (supine)

on a bed, and massage was performed on the following parts in order:

- A. Massage started from the inner surface of the hands until the shoulders of the patient and then came cascading down (3 min)
- B. Massage started from the spine from the 12th vertebra of the thoracic and moved upward to the shoulders and ended with at least three spiral moves along the sides (6 min)
- C. Shoulders massaged from 7th and 8th thoracic vertebra with two or three figures along the spine (3 min)
- D. Spine massage: Rotating massage with the researcher's thumb from the 7th cervical vertebra along the sides of the spine (2 min)
- E. Legs massage: Hands moved from the inner surface of the legs upward and downward on the back of the leg muscles (3 min)
- F. Thighs: Hands moved from the knees to the groins, and moved down from the side of the thighs (3 min).

This massage therapy was performed for 20 min, from 14:00 to 17:00 hours, 3 times a week, for 4 weeks in a room with adequate light and heat in the chemotherapy clinic. Baby lotion from the Firoz brand was used for better and easier massage movements. During the massage therapy, the patients wore gowns, and the body parts that were not massaged were covered by them.^[22] After 1 month of the intervention, the PSQI was completed and recorded again by the researcher for all the participants (experimental and control groups). Descriptive and inferential statistics, Student's independent *t*-test, and Chi-square were used for data analysis.

RESULTS

Mean and standard deviation of patients' age in experimental and control groups were 43.23 (7.46) and 43.92 (8.12) years, respectively. Moreover, Chi-square test showed that 52.26% of the participants in the experimental group had an education of diploma or less and 33.5% of the participants in the control group were illiterate. Also, 64% of the participants in both groups were married, 15% were single, 12% divorced, 9% widowed, and 58% in the experimental group and 72% in the control group were housewives. Mean and standard deviation of time after surgery in the experimental and control groups were 3.25 (1.13) and 3.95 (1.43) months, respectively. 68% of the subjects in both groups had the history of being hospitalized. 43.35% in the experimental group and 39.78% in the control group were suffering from sleep disorders. 26.43% of all the patients (12.68% in the experimental group and 13.75% in the control group) were using 10 mg oxazepam or its equivalents. 34.72% of the patients did not use any method for their sleep disorders. Mean and

standard deviation of the overall score of the quality of sleep before the intervention, out of 21, was 31.69 (5.34) in the experimental group and 13.15 (6.38) in the control group. After the intervention, it was 8.24 (5.57) in the experimental group and 13.5 (6.5) in the control group. Paired t-test also showed significant difference between the scores of quality of sleep before and after intervention in the experimental group ($P < 0.001$). However, it did not show any significant difference between the mean scores of quality of sleep before and after the intervention in the control group ($P > 0.05$). Massage therapy with Effleurage method for 20 min decreased the quality of sleep in patients of the experimental group. Results from the aspects of PSQI before and after intervention in the experimental group showed that all the aspects of this index, except using hypnotics, were significant. All of these aspects showed significant decrease after intervention compared with before the intervention, but regarding the use of hypnotics, it was not significant. In the control group, neither of the Sleep Quality Index scales was significant. Before the intervention, Student's t-test showed no significant difference in the mean scores of quality of life of the two groups ($P > 0.05$). However, it showed a significant difference after 4 weeks of massage therapy in the mean scores of quality of sleep of control and experimental groups ($P < 0.001$) [Table 1].

DISCUSSION

Evidence suggesting that there is an association between sleep and natural killer cells raises the possibility of increase in the quality of sleep being effective on the body's defense system and immunity against tumor cells.^[6] Circulating cytokine levels play an important role in regulating sleep by interacting with hypothalamic-pituitary-adrenal axis. Cytokines can lead to abnormal cortisol fluctuations. Abnormal discharge of cortisol also shortens the duration of sleep and increases sleep disorder. Consequently, ultimately, cancer and its treatment causes disturbance in the secretion of cytokines and leads to disorders in sleep duration,

waking, and functioning of immune system.^[7] Improvement in sleep has numerous benefits for cancer patients; among them are emotion and mood improvement, and cognitive and physical function improvement.^[6] In addition, touch accelerates blood circulation, helps the digestive system and its function, stimulates the lymphatic system, has a profound effect on the nervous system, relieves stress, and reduces heart rate and blood pressure. On the other hand, by causing the secretion of endorphins, it reduces pain and provides relaxation for the patient and is a very safe and effective method.^[22,24] According to the results of the present study, a significant percentage of patients with breast cancer were suffering from sleep disorders before the intervention. After 4 weeks of the intervention, there was a significant difference in the mean scores of the components and the total score of quality of sleep index between the control and experimental groups. There was also a significant difference before and after the intervention in the scores of some of the sleep aspects, such as mental quality of sleep, sleep duration, and sleep disorder, and the total score in the experimental group. Mean scores of the quality of life before the intervention did not show a significant difference between the two groups, which indicates that the two groups are identical. The results of this study indicate the effectiveness of massage in the management of sleep disorders in cancer patients. In this regard, Smith *et al.* found that three sessions of Swedish massage (Effleurage and petrissage) for 1 week (15-30 min) is effective in reducing pain, stress, and sleep disorders in 20 cancer patients.^[25] In a similar study by Field *et al.*, 30 min of superficial and deep massage on 14 patients with back pain and sleep disorder, 2 times a week for 5 weeks, was performed. The results showed decrease in pain and sleep disorder in the experimental group.^[26] Sandhya *et al.* reported in a study that 20 min of neck and shoulder massage on a chair on 63 patients with breast cancer resulted in decrease of fatigue, increased sense of well-being, and improved quality of sleep.^[27] Soddan *et al.* also reported that 30 min of back massage, once a week for 4 weeks,

Table 1: Mean (SD) scores of pittsburgh sleep quality index among the participants before and after the intervention

Components of the pittsburgh sleep quality index	Experimental group					Control group				
	Before		After		P value	Before		After		P value
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
Subjective quality of sleep	1.58	0.73	0.92	0.37	>0.001	1.47	0.72	1.17	0.42	>0.05
Sleep latency	2.75	0.82	1.73	0.91	<0.001	2.47	0.63	2.39	0.53	>0.05
Sleep time	2.57	0.81	1.53	0.94	<0.001	2.27	0.83	2.34	0.73	>0.05
Adequate sleep	2.78	0.72	1.43	1.37	<0.001	2.17	0.63	2.92	1.46	<0.05
Sleep disorders	1.57	0.43	0.82	0.52	<0.001	1.48	0.47	1.42	0.51	<0.05
Use of hypnotics	0.68	1.10	0.43	1.04	>0.001	1.61	1.41	1.52	1.47	<0.05
Daily performance	1.76	0.73	1.38	0.42	>0.001	1.68	1.69	1.75	1.38	<0.05
Total score	13.69	5.34	8.24	5.57	<0.001	13.15	6.38	13.5	6.5	<0.05

significantly improved sleep in the experimental group.^[32] Marlaine *et al.* noted the effectiveness of three sessions of Swedish massage (Effleurage) for 15-30 min during 1 week of hospitalization in reducing pain, stress, and sleep improvement in 20 patients of the experimental group.^[33] Ejindu also studied the effects of 10 min of foot massage and 20 min of facial massage on sleep, blood pressure, respiration rate, and pulse. He stated that massage has a hypnotic and sedative property, and some samples were quite asleep during the massage and some were feeling sleepy.^[34]

The results of the present study are consistent with the results of most of the previous studies. They also show the fact that massage therapy creates different levels of relaxation in one's body and can improve the sleeping habits.^[25,27,30,33] The present study specifically examined the effect of massage therapy on the quality of sleep, while in the previous studies, the foundation was on the effect of massage therapy on mental and physical disorders. They suggested that improvement in sleep resulted from the sedative effects of massage and it improved the physical and mental disorders. In the majority of the mentioned studies, to assess the patients' quality of sleep, no scale was used; only Field *et al.*^[26] and Marlaine *et al.*^[33] studied the quality of sleep by Verran and Snyder-Halpern (VSH) sleep scale. In the present study, PSQI was used. Factors influencing the results of this study are the initial descriptions of the study program to the patients, different perceptions of the patients on these descriptions, and presence of the researcher as the clinician and his face-to-face communication with the patients. Family factors and psychological conditions of the study subjects during answering the questions before and after the intervention might have influenced the results. In general, even if the patients mentally felt that their sleep conditions had improved, the results cannot be worthless.

CONCLUSION

Due to the high prevalence of sleep disorders among cancer patients, introducing complementary medicine practices to the patients is important and the medical staff should pay attention to it. Furthermore, since this treatment is generally safe, it should be used as a complementary therapeutic method alongside medical treatments. Thus, this treatment technique can be used as a non-pharmacological and simple method for cancer patients in all aspects (physical and mental). It promotes the patient's physical and mental health, and encourages the healthcare providers to use alternative medicine in different diseases and disorders. The skills of the treatment team can be increased by using non-pharmacological treatments that have no side effects and a lower cost.^[22]

The short duration of the intervention (1 month) and cultural and personal differences among the patients limit the generalizability of the study results. Therefore, studies with larger sample sizes, with longer durations (3, 6, 9, and 12 months), and on different types of cancer are suggested.

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