Effects of back massage on chemotherapy-related fatigue and anxiety: Supportive care and therapeutic touch in cancer nursing

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ABSTRACT

This quasi-experimental and cross-sectional study was carried out to determine the efficacy of back massage, a nursing intervention, on the process of acute fatigue developing due to chemotherapy and on the anxiety level emerging in cancer patients receiving chemotherapy during this process. The study was conducted on 40 patients. To collect the data, the Personal Information Form, the State Anxiety part of Spielberger State-Trait Anxiety Inventory and the Brief Fatigue Inventory were used.

In our study, it was determined that mean anxiety scores decreased in the intervention group patients after chemotherapy. The level of fatigue in the intervention group decreased statistically significantly on the next day after chemotherapy (p = .020; effect size = 0.84). At the same time, the mean anxiety scores of the patients in the intervention group decreased right after the massage provided during chemotherapy (p = .109; effect size = 0.37) and after chemotherapy. In line with our study findings, it can be said that back massage given during chemotherapy affects anxiety and fatigue suffered during the chemotherapy process and that it significantly reduces state anxiety and acute fatigue. Therefore, the effective use of back massage in the process of chemotherapy by oncology nurses who have a key role in cancer treatment and care can make it more modulated.

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1. Introduction

Chemotherapy is a long-term treatment and leads to many side effects in individuals receiving it (Can, Erol, Aydiner, & Topuz, 2011; Cleeland et al., 2000; Kearney et al., 2008; Turgay, Khorshid, & Eser, 2008). One of the most common side effects of chemotherapy is fatigue (Ahberg, Ekman, Gaston-Johansson, & Mock, 2003; Barsevick et al., 2010; Breitbart & Alici, 2010; Gerber et al., 2011; Mitchell, 2010; Ream, 2013; Mitchell, 2010; Oh & Seo, 2011; Werner, 2009). Of the patients receiving chemotherapy, 80–96% suffer fatigue which increases over time (Cheville, 2009; Iop et al., 2004; Kearney et al., 2008; Kwakkelboom, Cherwin, Lee, & Wanta, 2010; Rotonda et al., 2011; Sood, Barton, Bauer, & Loprinzi, 2007; Stasi, Abriani, Beccaglia, Terzoli, & Amadori, 2003). Fatigue can be caused by either the disease itself, or by anemia, a decrease in hematocrit values, the accumulation of waste products resulting from the destruction of cells, interruptions in sleep, pain, anxiety, depression, immobility, anorexia, nausea and vomiting and malnutrition due to chemotherapy (Barsevick et al., 2010; Can, Durna, & Aydiner, 2004; Franklin & Packel, 2006; Harper & Littlewood, 2005; Lane, 2005; Mitchell, 2010; Mock et al., 2001; Oh & Seo, 2011; Rabbetts, 2010; Yavuzen & Kömürcü, 2008).

Acute and chronic fatigue should be distinguished from each other. Although acute fatigue is experienced by everyone, chronic fatigue is a serious condition which accompanies a disease or treatment, is not relieved by rest and affects a person’s quality of life and ability to do activities (Ahberg et al., 2003; Trendall, 2000; Yurtsever, 2000).

Fatigue is a universal, chronic problem suffered by cancer patients, and the severity of its symptoms often varies from time to time during the course of the disease (Finnegan-John, Molassiotis, Richardson, & Ream, 2013; Mitchell, 2010; Oh & Seo, 2011; Werner, 2009). Of the patients receiving chemotherapy, 80–96% suffer fatigue which increases over time (Cheville, 2009; Iop et al., 2004; Kearney et al., 2008; Kwakkelboom, Cherwin, Lee, & Wanta, 2010; Rotonda et al., 2011; Sood, Barton, Bauer, & Loprinzi, 2007; Stasi, Abriani, Beccaglia, Terzoli, & Amadori, 2003). Fatigue can be caused by either the disease itself, or by anemia, a decrease in hematocrit values, the accumulation of waste products resulting from the destruction of cells, interruptions in sleep, pain, anxiety, depression, immobility, anorexia, nausea and vomiting and malnutrition due to chemotherapy (Barsevick et al., 2010; Can, Durna, & Aydiner, 2004; Franklin & Packel, 2006; Harper & Littlewood, 2005; Lane, 2005; Mitchell, 2010; Mock et al., 2001; Oh & Seo, 2011; Rabbetts, 2010; Yavuzen & Kömürcü, 2008).

Cancer treatment, which takes a long time and has a great many side effects, shatters an individual’s family, work and social life and thus leads to the loss of role and status, hopelessness, helplessness, anxiety about the future, social isolation and exhaustion. Therefore,
the disease, treatment and uncertainties about the future can lead to
anxiety and depression (Arslan & Bölükbaş, 2003; Bşer & Öz, 2003;
Nagel, 2004; Şener, 2001). In cancer patients, there is a strong
association between depression and fatigue (Dimeo et al., 2004;
Kwekkeboom et al., 2010; Winell & Roth, 2004) and between anxiety
and fatigue (Brown & Kroenke, 2009; Li & Yuan, 2011; Mansky &
Wallerstedt, 2006; Oh & Seo, 2011; Reddick, Nanda, Campbell, Ryma,
& Gaston-Johansson, 2005; Redeker, Lev, & Ruggiero, 2000). Although
it is common in patients with cancer, fatigue, which is often neglected,
implies psychological stress on the patient and is assumed to be the
most important cause of non-compliance to treatment (Glaus, Crow, &
Hammond, 1996). Nursing interventions aiming to reduce distress
and anxiety in cancer patients are of great importance in ensuring the
patient's compliance to treatment and enhancing the quality of life
(Schreier & Williams, 2004; Smith, Gomm, & Dickens, 2003).

Nurses who directly observe the inconveniences due to unwanted
effects of chemotherapy in patients receiving chemotherapy are the
professionals who have a key role in dealing with problems experienced in patient care (Aghabati, Mohammadi, & Pour Esmaili,
2010; Aslan, Vural, & Kömürçü, 2006; Berger, 2001). Nursing interventions performed to control symptoms in cancer patients
receiving chemotherapy help them relieve and regain their confi-
tidence. Today, given that the fact providing cancer treatment and care in outpatient care centers is becoming widespread, it is obvious that nurses’ increasingly expanding roles will come to the fore even more.

Complementary therapies, palliative and supportive care have an
important place in the control of fatigue and anxiety suffered by patients receiving chemotherapy (Ernst, 2001; Fontaine, 2004;
Henricson, Berglund, Matta, & Segesten, 2006; Kwekkeboom et
al., 2010; Mitchell, Beck, Hood, Moore, & Tanner, 2007; Parkman,
2001; Walters, 2010). Complementary therapies are not curative applications, but they aim to alleviate the symptoms of the disease
or to reduce the adverse effects of traditional therapy, and improve
the individual’s general well-being and quality of life (Ernst, Filshie,
& Hardy, 2003; Finneghan-John et al., 2013; Fox et al., 2013;
Harrington, Baker, & Hoffman, 2012; Henricson et al., 2006). Back
massage, a nursing intervention, is one of the complementary
treatment approaches.

Massage is a way of communication performed not by using
words but by touching the individual (Currin & Meister, 2008;
Fontaine, 2004; Gleeson & Timmins, 2005; Henricson et al., 2006;
Jane, Wilkie, Gallucci, & Beaton, 2008; Toth et al., 2013). Massage is a
cheap and easy-to-perform application with no side effects and,
unlike stress response, leads to relaxation in the muscles by reducing
tension (Field, 1998; Jane et al., 2008; Menefee & Monti, 2005; Mok
& Woo, 2004; Myers, Walton, & Small, 2008; Smith, Yamashita,
Bryant, Hepmhill, & Kutton, 2009). Massage can be defined as the
systemic stimulation of the body’s soft tissues manually or
mechanically for therapeutic purposes in order to maintain blood
and lymph circulation, relax muscles, relieve pain, reduce fatigue and
ensure sleep (Ernst, 2009; Fontaine, 2004; Menefee & Monti, 2005;
Monti & Yang, 2005; Thompson, Sherman, Dixon, & Cherkin, 2006;
Wolsko, Eisenberg, Davis, & Phillips, 2004). The application area of
classical massage is the skin and the muscles under the skin. The
effects of massage applied can be seen either locally or in the other
parts of the body as a result of stimuli transmitted through the
nervous system. Manual massage techniques provide both physical
and mental relaxation (Beck, 2006; Collinge, Macdonald, & Walton,
2012; Ernst, 2009; Fernández-Lao et al., 2012; Jane et al., 2008;
O’Mathúna, 2009; Quattrin et al., 2006; Thompson et al., 2006;
Timby, 2009; Werner, 2009).

Massage is used as a supportive treatment method in cancer
patients (Cassileth & Vickers, 2004; Collinge et al., 2012; Finneghan-
John et al., 2013; Fontaine, 2004; Gross, Cromwell, Fonteyn,
Matulonis, & Hayman, 2013; Sagar, Dryden, & Wong, 2007; Walters,
2010; Wilkinson, Barnes, & Storey, 2008). In the literature, there are
many studies demonstrating the benefits of massage applications in
cancer patients. However, there are no studies demonstrating the
effects of back massage provided during chemotherapy on acute
chemotherapy-induced fatigue and the level of anxiety developing
during this process. In our country too, the number of experimental
studies specific to complementary treatment approaches aiming to
control the side effects occurring in patients receiving chemotherapy is quite inadequate.

1.1. Purpose and hypothesis

This quasi-experimental and cross-sectional study was carried out
to determine the efficacy of back massage, a nursing intervention, on
the process of acute fatigue developing due to chemotherapy and on
the anxiety level emerging during this process in cancer patients
receiving the third and fourth day chemotherapy cycles of one-day
chemotherapy.

The hypotheses to be tested in the study are as follows:

H1: Back massage provided during chemotherapy reduces
chemotherapy-related fatigue.

H2: Back massage provided during chemotherapy reduces
chemotherapy-related anxiety.

1.2. Ethical considerations

During the planning stage of the study, written permission was
received from the chief physician and the Presidency of the Radiation
Oncology Department of the hospital where the study was carried out.
Then, Ethics Committee Decision (decision no. 2007/10-03) was
obtained from the Presidency of the Ethics Committee of Cumhuriyet
University Faculty of Medicine. The study was conducted in
accordance with the principles of the Helsinki Declaration.

All patients were informed about the study and provided time
to ask questions, prior to providing their oral-written consent to
participate. All the participants of this study gave their verbal and
written informed consents. The patients were assured that the data
to be obtained in the study would be used only in the scope of the
study and would not be shared with any other person, institution
or organization.

2. Methods

2.1. Setting and sample

The study was carried out at the Chemotherapy Unit of the
Radiation Oncology Center of a university hospital. In this unit which
started to offer service in March 2007, patients having lung, breast,
stomach, rectum, and colon, ovarian or cervical cancer receive
outpatient chemotherapy service. The unit has two separate sections
furnished with recliners in which patients comfortably sit during
chemotherapy. In each section, three patients can receive chemo-
therapy at the same time. In the unit, approximately 1–10 patients per
day receive chemotherapy between 8 a.m. and 5 p.m.

The chemotherapy nurse admits patients presenting to the unit to
have chemotherapy, and then prepares and implements the treat-
ment according to the chemotherapy cure protocol determined
previously. The chemotherapy nurse provides education for patients
on chemotherapy and side effects of chemotherapy. In addition,
patients having undergone chemotherapy are given an appointment
by the chemotherapy nurse for the subsequent cycle of chemother-
apy. Within the first 30 minutes after the patient’s admittance to the
chemotherapy unit, chemotherapeutic medicines are prepared for
administration in a special pharmaceutical preparation cabin. For the
preparation of antineoplastic drugs, class II biological safety cabin,
which is placed in the unit where entering is limited, only drug
Two groups: (a) satisForm, patients were asked an open-ended question whether they were likely to affect the level of chemotherapy-related fatigue and anxiety. In several studies, Cronbach’s alpha coefficient was found to be between 0.83 and 0.92 and was stated that the scale had high validity. In our study, Cronbach’s alpha coefficient of the scale was found to be 0.78 for pre-chemotherapy and 0.80 for post-chemotherapy.

State-Trait Anxiety Inventory includes two 20-item scales. It is a psychological assessment tool used to determine the levels of state anxiety and trait anxiety. The former perceived by individuals as a result of stresses they face in their daily lives reflects transitory, situational circumstances. The latter is independent of conditions, and reflects personality characteristics. It was especially developed for use in research (Oner & Le Compte, 1998). State Anxiety Inventory was configured to measure what is felt at the time of measurement. On this scale, the answer options are as follows: (1) not at all, (2) somewhat, (3) moderately so and (4) very much so. Theoretically, scores obtained from the inventory range between 20 and 80. The higher the score is, the greater the anxiety is (Oner & Le Compte, 1998). 2.3.3. Brief Fatigue Inventory/BFI

In the study, in order to assess fatigue levels of patients who received chemotherapy, the Brief Fatigue Inventory, consisting of 10 questions, was used. Çınar, Sezerli, Sarsmaz and Menteş (2000) performed the validity and reliability study of the Turkish version of Brief Fatigue Inventory/BFI, which was developed by Mendoza et al. (1999) at MD Anderson Cancer Center, and the internal consistency of the scale was determined to be 0.98. In our study, the Cronbach alpha reliability coefficient of the scale was determined to be 0.93 for pre-chemotherapy and 0.96 for post-chemotherapy. BFI includes items assessing general fatigue levels of individuals (fatigue felt at the time of the interview, fatigue in general and the worst fatigue suffered in the past 24 hours) and the interference of fatigue with daily activities (general activity, mood, walking ability, work life, relationships with other people, the joy of life) in the past 24 hours. Scoring ranges between “0” and “10”, “0” indicating no impact at all and “10” indicating the highest level of impact. In the assessment of fatigue levels, “0” referred to no fatigue at all, “1–2” to the very low level of fatigue, “3–4” to the low level of fatigue, “5–6” to the moderate level of fatigue, “7–8” to the high level of fatigue and “9–10” to the very high level of fatigue. Each item in the BFI can be evaluated singly, or the overall fatigue level and the level of interference on activities can be determined by calculating the total score. The point value of each item is no more than 10, the overall fatigue level (containing 10 items) is maximum 100, and the level of impact on activities (including 6 items) is maximum 60 points. 2.4. Procedures

During the implementation process of the research, one researcher stayed in the unit full time and applied the back massage exactly as planned. In order to maintain the integrity of the data collection process and massage treatment, no more than one patient a day was included in the sample. In order to create a study mechanism, six patients (three from the intervention group and three from the control group) having chemotherapy in the unit underwent a pre-implementation process after verbal or written permissions were received. After the pre-intervention process, the study process was initiated. Before chemotherapy was started, Personal Information Form, STAI and BFI were filled in through face-to-face interviews with all the patients participating in the study. During the chemotherapy process, the patients in the intervention group had repetitive back massage for 15 minutes before the infusion, between 25th and 40th minutes of each 1-hour period during the treatment and for 15 minutes at the end of the treatment in accordance with the duration of chemotherapy. Chemotherapy cycles administered to the patients included in the study were minimum 2-hour and maximum 3-hour cycles. Thus, patients had a 60-minute back massage during the 2-hour cycle (Table 1) and a 75-minute back massage during the preparation process is conducted and there is no in-room air turbulence, is used. In the cabin, there is downward airflow and HEPA (high-efficiency particulate air) filter is available in the cabin. While the applications in the cabin are performed, gloves are worn. While preparing antineoplastic drugs, the nurses wear chemotherapy gloves, gown, mask, and goggles as personal protective equipment.

Of the patients who underwent one-day chemotherapy, those who received the third and fourth chemotherapy treatments in this unit comprised the population of the study. The data were collected by the researchers between August 1, 2007 and May 30, 2008, until the number of the patients reached 40. In this study, it was decided to include 20 people in each group when \( \alpha = 0.05, \beta = 0.20 \) and \( 1 - \beta = 0.80 \), and the power of the test was determined as \( p = .80482 \). Of the patients included in the study, 20 were in the intervention group and the other 20 were in the control group. The first three patients were assigned to the intervention group and the second three patients to the control group and so on until the number of the patients reached 40.

2.2. Eligibility criteria

The following patients were included in the study: (1) those who had no speech and hearing problem so that the data collection forms could be clearly filled in through face to face talks with the patient or on the telephone, (2) those who received the third and fourth chemotherapy cycles because during these cycles, the side effects of chemotherapy are heavily observed, (3) those who had one-day chemotherapy so that all the patients could get back massage on the same day for the same length of time, (4) those who had chemotherapy for less than 8 hours in order that all the patients could have back massage for the same length of time, (5) those who did not have open wounds, fractures and/or luxation in the back, neck, shoulders and arms likely to cause them to suffer problems in addition to the problems caused by the disease itself and chemotherapy. During the chemotherapy process, none of the patients who participated in the study had an active working life which might cause fatigue and insomnia.

2.3. Instruments

To collect the data, the Personal Information Form, the State Anxiety part of Spielberger State-Trait Anxiety Inventory/STAI and the Brief Fatigue Inventory/BFI were used.

2.3.1. Personal Information Form

The Personal Information Form based on the literature included nine questions: patient’s age, gender, diagnosis, starting date of chemotherapy, chemotherapy and other medicines taken, feelings and thoughts about the disease and treatment, support resources, chemotherapy, thoughts and feelings about the environment where chemotherapy is provided, how satisfied with nursing services and the factors likely to affect the level of chemotherapy-related fatigue and anxiety. The list of chemotherapeutic or other drugs administered to the patients was obtained from the medical records. In the Personal Information Form, patients were asked an open-ended question whether they were satisfied with nursing care, and the answers received were evaluated in two groups: (a) satisfied and (b) not satisfied.

2.3.2. Spielberger State-Trait Anxiety Inventory/STAI

In the study, State-Trait Anxiety Inventory/STAI was used to measure the level of anxiety before and after chemotherapy. STAI, which was developed by Spielberger et al. in 1964 in order to determine the state and trait anxiety levels separately, is a self-report questionnaire consisting of short statements. It was adapted into Turkish by Öner and Le Compte (1998) and its validity-reliability studies were conducted by them as well. In several studies, Cronbach’s alpha coefficient was found to be between 0.83 and 0.92 and was stated that the scale had high validity. In our study, Cronbach’s alpha coefficient of the scale was found to be 0.78 for pre-chemotherapy and 0.80 for post-chemotherapy.

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3-hour cycle (Table 2). STAI and BFI were re-applied after chemotherapy. To determine the effects of back massage on acute fatigue, patients were phoned to determine the level of fatigue experienced at home after the first 24 hours following chemotherapy, and the BFI was filled in again by the researcher during this interview. Each form was filled in question by question or after the participant provided all of the responses. After the forms are read to the patients, the researcher filled in the forms based on the patients’ responses. The patients in the control group underwent all the processes in the same way except that they did not receive back massage during chemotherapy. The control group had no other intervention. Both the intervention group and the control group were treated similarly during the research, and the communication and interaction with the groups were carried out at the same level.

Back massage was implemented in nine stages in the intervention group by the researchers who previously had training on this topic (Clay & Pounds, 2008; Fritz, 2004; Fritz & Grosenbach, 2004; MacDonald, 2007; Salvo, 2007; Timby, 2009):

1. The environment where the massage was implemented was appropriately arranged by checking whether the door and windows were closed in order that the ambient temperature in the chemotherapy unit should be maintained.
2. The patient was informed about the purpose and duration of the massage before the massage was started.
3. The patient’s privacy was protected by separating him/her from others with a folding screen, and the patient’s back was exposed while he/she was sitting in the recliner.
4. After warming his/her hands by rubbing, the researcher put some Vaseline to make them slippery.
5. The massage was started from the waist with long-slow effleurage and continued to the neck with circular movements. Effleurage is a soothing, stroking movement used at the beginning and the end of the body massage. Effleurage is the application of unbroken gliding movements that are repeated and follow the contour of the client’s body. These movements may be linear or circular. Over the scapulae, the hands were separated from each other and stroking was continued and repeated several times in larger circular movements. Effleurage was implemented during the first 5 and last 4 minutes of the 15-minute back massage.

6. After completing the effleurage phase of the massage, starting around the waist, the researcher maintained the back massage with petrissage by grasping the subcutaneous tissues and muscles with the thumb and other fingers. Petrissage is the application of cycles of rhythmic lifting, squeezing, and releasing of tissue, often working parallel to the muscle fibers. Several variations of petrissage are one handed, two hand, alternate hand, and skin rolling. Kneading movements were started from the waist and continued to shoulders and arms, and then back to the waist again and then the petrissage phase was over. Petrissage was implemented for 3 minutes between the sixth and ninth minutes of the 15-minute back massage.

7. After petrissage, back massage was continued through friction movements, another phase of the massage. The thumb tips were placed one on the other and the massage was started from the sacroiliac junction, and circular friction movements applied with fingertips continued along the vertebrae to the occipital region. Friction movements from the sacroiliac junction to the occipital region were repeated several times. Friction was applied for 3 minutes between the 9th and 12th minutes of the 15-minute back massage.

8. Before the massage was over, effleurage was applied again for 4 minutes.

9. Finally, after the back massage was over, the researcher removed the Vaseline on the back of the patient with a towel and helped the patient to wear his/her clothes. The application was finalized after placing the patient in a comfortable position.

2.5. Data analysis

The data obtained were analyzed using SPSS 14.0 package program. The data are normally distributed. For the data analysis, frequency distribution, chi-square, means, Friedman test, Wilcoxon test and Man-Whitney U test were used.

According to demographic characteristics, the difference between intervention and control groups was evaluated with chi-square test. Mann–Whitney U test was used to evaluate BFI and STAI scores difference between the intervention and control group patients. Friedman test was performed to compare the fatigue level of the patients before and after chemotherapy. Wilcoxon test was used to compare anxiety level of the patients before and after chemotherapy. Values were considered statistically significant when \( p < .05 \). In order to investigate whether the difference between the mean scores of fatigue and anxiety assessed before, immediately after and 1 day after chemotherapy in the study and control groups was significant not only statistically but also in practice, the effect size was calculated with the Cohen’s \( d \) method. For Cohen’s \( d \), the effect size of 0.2–0.4 was considered as small, of 0.5–0.7 as medium and of > 0.8 as large (Cohen, 1988; Cohen, 1992).

3. Results

Of the patients, 55.0% (11) in the intervention group and 50.0% (10) in the control group were female. The mean age of the patients in the study was 49.97 ± 11.31. Of them, 75.0% (15) in the intervention group and 60.0% (12) in the control group were in the 41–60 age group. In our research, 40.0% (8) of the patients in the intervention group and 50.0% (10) in the control group had breast cancer. Of the patients, 55.0% (11) in the intervention group and 50.0% (10) in the control group underwent the third session of the chemotherapy (Table 3). No statistically significant difference was determined

<table>
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<tr>
<th>Table 1</th>
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<tr>
<td>Massage treatment schedule in 2-hour chemotherapy protocols.</td>
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<tr>
<td>Prior to chemotherapy</td>
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<tr>
<td>The first hour of chemotherapy</td>
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<tr>
<td>Onset of chemotherapy</td>
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<tr>
<td>25–40 minutes of chemotherapy</td>
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<tr>
<td>40–60 minutes of chemotherapy</td>
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<tr>
<td>The second hour of chemotherapy</td>
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<tr>
<td>60–85 minutes of chemotherapy</td>
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<tr>
<td>85–100 minutes of chemotherapy</td>
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<tr>
<td>100–120 minutes of chemotherapy</td>
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<tr>
<td>After chemotherapy</td>
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<tr>
<th>Table 2</th>
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<tr>
<td>Massage treatment schedule in 3-hour chemotherapy protocols.</td>
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<td>Prior to chemotherapy</td>
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<td>The first hour of chemotherapy</td>
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<td>Onset of chemotherapy</td>
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<td>40–60 minutes of chemotherapy</td>
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<td>The second hour of chemotherapy</td>
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<td>60–85 minutes of chemotherapy</td>
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<td>85–100 minutes of chemotherapy</td>
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<td>100–120 minutes of chemotherapy</td>
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<td>The third hour of chemotherapy</td>
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<td>120–145 minutes of chemotherapy</td>
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<td>145–160 minutes of chemotherapy</td>
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<tr>
<td>160–180 minutes of chemotherapy</td>
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<tr>
<td>After chemotherapy</td>
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</tbody>
</table>
between the participants' gender, diagnosis and treatment, and the chemotherapy cycles received by the participants in the study and control groups: (gender: $p = .752$; diagnosis: $p = .524$; treatment: $p = .141$; the number of chemotherapy treatments received: $p = .752$). Thus, the subjects in both groups had similar characteristics.

Of the patients, 80.0% (16) in the intervention group and 95.0% (19) in the control group expressed their satisfaction with the environment where they received chemotherapy. When the patients were asked about their perception of comfort and discomfort during chemotherapy, 75.0% (15) in the intervention group and 80.0% (16) in the control group said that they were comfortable.

When the BFI mean scores of the study and control group patients were compared, there was a statistically significant difference between the two groups in terms of the level of fatigue observed before chemotherapy ($Z = 2.516; p = .012$; effect size = 0.81) and on the next day after chemotherapy ($Z = 2.315; p = .020$; effect size = 0.84). It was higher in the control group on the next day after chemotherapy ($48.05 \pm 22.90$). However, intra-group comparisons revealed that, though statistically was not significant ($Z = 1.602$; $p = .109$; effect size = 0.37), the mean anxiety scores of the patients in the control group raised up to 29.50 ± 7.68 after chemotherapy, whereas the mean anxiety scores of the patients in the intervention group decreased statistically significantly ($Z = 3.703; p = .000$) down to 26.70 ± 7.35 after chemotherapy which was 33.35 ± 11.89 before chemotherapy (Table 5).

When the chemotherapy sessions of the patients who participated in study were compared, anxiety and fatigue levels in the third and fourth chemotherapy treatments were close to each other, but the difference was not statistically significant ($p > .05$).

### 4. Discussion

Complementary and alternative approaches are the practices which help individuals to lead a healthy life and to improve their quality of life, and these approaches are a unique opportunity for nurses so that they can provide holistic care. In the literature, it is reported that massage, one of the complementary and alternative approaches, is effective in relieving overall symptoms and side effects cancer patients suffer due to the disease and treatment. Although there are several studies evaluating the efficacy of massage applied to cancer patients on the quality of life (Sturgeon, Wetla-Hall, Hart, Good, & Dakhil, 2009; Toth et al., 2013; Wyatt, Sikorski, Siddiqi, &

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### Table 3

Distribution of the intervention and control groups according to their personal characteristics ($N = 40$).

<table>
<thead>
<tr>
<th>Personal characteristics</th>
<th>Intervention group ($n = 20$)</th>
<th>Control group ($n = 20$)</th>
<th>Significance test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number %</td>
<td>Number %</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
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<td></td>
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</tr>
<tr>
<td>Male</td>
<td>9 45.0</td>
<td>10 50.0</td>
<td>$\chi^2 = 0.100$</td>
</tr>
<tr>
<td>Female</td>
<td>11 55.0</td>
<td>10 50.0</td>
<td>$\chi^2 = 0.752$</td>
</tr>
<tr>
<td>Age ($X = 49.97 \pm 11.31$)</td>
<td></td>
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<tr>
<td>Between 20 and 40</td>
<td>3 15.0</td>
<td>4 20.0</td>
<td></td>
</tr>
<tr>
<td>Between 41 and 60</td>
<td>15 75.0</td>
<td>12 60.0</td>
<td></td>
</tr>
<tr>
<td>60 and over</td>
<td>2 10.0</td>
<td>4 20.0</td>
<td></td>
</tr>
<tr>
<td>Diagnosis</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Breast cancer</td>
<td>8 40.0</td>
<td>10 50.0</td>
<td>$\chi^2 = 1.292$</td>
</tr>
<tr>
<td>Lung cancer</td>
<td>7 35.0</td>
<td>5 25.0</td>
<td>$p = 0.524$</td>
</tr>
<tr>
<td>Others$^a$</td>
<td>5 25.5</td>
<td>5 25.0</td>
<td>$p = 0.141$</td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cyclophosphamide + doxorubicin + Fluorouracil</td>
<td>7 35.0</td>
<td>11 55.0</td>
<td>$\chi^2 = 3.917$</td>
</tr>
<tr>
<td>Paclitaxel + platino</td>
<td>8 40.0</td>
<td>4 20.0</td>
<td>$p = 0.670$</td>
</tr>
<tr>
<td>Others$^b$</td>
<td>5 25.0</td>
<td>5 25.0</td>
<td>$p = 0.24$</td>
</tr>
<tr>
<td>The number of chemotherapy treatments received</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three treatments</td>
<td>11 55.0</td>
<td>10 50.0</td>
<td>$\chi^2 = 0.100$</td>
</tr>
<tr>
<td>Four treatments</td>
<td>9 45.0</td>
<td>10 50.0</td>
<td>$p = 0.752$</td>
</tr>
</tbody>
</table>

---

### Table 4

Mean BFI scores of the patients before, right after and the next day after chemotherapy.

<table>
<thead>
<tr>
<th>Time</th>
<th>Intervention group ($n = 20$)</th>
<th>Control group ($n = 20$)</th>
<th>Mann–Whitney U test</th>
<th>Cohen’s $d$ effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$X \pm SD$</td>
<td>$X \pm SD$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before chemotherapy</td>
<td>55.20 ± 20.85</td>
<td>39.40 ± 18.03</td>
<td>$Z = 2.516 p = .012$</td>
<td>ES = 0.81</td>
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<tr>
<td>Right after chemotherapy</td>
<td>44.5 ± 23.10</td>
<td>39.55 ± 17.67</td>
<td>$Z = 0.758 p = .449$</td>
<td>ES = 0.24</td>
</tr>
<tr>
<td>The next day after chemotherapy</td>
<td>48.05 ± 22.90</td>
<td>48.05 ± 22.90</td>
<td>$Z = 2.315 p = .020$</td>
<td>ES = 0.84</td>
</tr>
<tr>
<td>Friedman Test</td>
<td>$\chi^2 = 25.600 p = .000$</td>
<td>$\chi^2 = 3.308 p = .191$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Given, 2007), pain (Aghabati et al., 2010; Chang, 2008; Ferrell-Torry & Glick, 1993; Gross et al., 2013; Smith et al., 2009; Toth et al., 2013), sleep (Smith, Kemp, Hempfill, & Vojiri, 2002; Toth et al., 2013), muscle tension and anxiety (Campeau et al., 2007; Hernandez-Reif et al., 2004; Post-White, Kinney, & Savik, 2003; Post-White et al., 2009; Wilkinson et al., 2007), nausea (Billhult, Bergbom, & Stener-Victorin, 2007; Fellowes, Barnes, & Wilkinson, 2004), fatigue (Aghabati et al., 2010; Listing et al., 2009; Monti & Yang, 2005; O’Mathúna, 2009; Sood et al., 2007), and many of these difficulties (Cassileth & Vickers, 2004; Fellowes et al., 2004; Myers, Walton, Bratsman, et al., 2008; Pruthi Degnim, Bauer, DePompolo, & Nayar, 2009; Russell, Sumler, Bratsman, et al., 2007; Schwartz, 2000). Therefore, we consider that our study findings will provide a significant contribution to the literature.

When the patients’ BFI scores in our study obtained before, right after and on the next day after chemotherapy were compared, it was determined that the control group patients’ fatigue levels right after and on the next day after chemotherapy were higher than those before chemotherapy, and that their post-chemotherapy fatigue levels increased gradually. However, the intervention group patients’ fatigue levels statistically significantly decreased on the next day after chemotherapy (p = .026; effect size = 0.84) (Table 4). Therefore, it can be said that the hypothesis H1, that the back massage provided during chemotherapy significantly reduces fatigue suffered in the process of chemotherapy was supported. However, in the literature, there are studies with the results that the fatigue level caused by chemotherapy increases gradually in the process of chemotherapy treatment. In studies which evaluated the level of fatigue after chemotherapy, it is stated that 70–100% of the patients suffer fatigue (Gerber et al., 2011), that they suffer fatigue even after a year or more subsequent to chemotherapy (Cella, Davis, Breitbart, & Curt, 2001), that the level of fatigue increases in the further phases of chemotherapy, that those who receive chemotherapy for the third time have higher levels of fatigue than those who receive chemotherapy for the first time (Lee et al., 2008) and that the highest level of fatigue is observed on the day chemotherapy is received (Schwartz, 2000). Therefore, if fatigue caused by the chemotherapy process is to be brought under control, it can be said that back massage during chemotherapy is an important and primary nursing practice. During the interviews conducted with the participants of our study on the next day after chemotherapy, those who had massages during chemotherapy treatments stated that they were more comfortable than they were in previous chemotherapy treatments, which is a noteworthy feedback in the assessment of the efficacy of our study. In their study, Cassileth and Vickers (2004) reported that the effectiveness of the massage provided for cancer patients to reduce the symptoms was more in the first 2–5 hours and that the effects of the massage lasted longer in outpatients. Wilkinson et al. (2007) stated that the effectiveness of the massage provided for cancer patients might last for 2–6 weeks after the intervention.

When the state anxiety levels of the patients participating in our investigation were taken into consideration, it was observed that the mean anxiety scores of the patients in the control group increased after chemotherapy but the mean anxiety scores of the patients in the intervention group decreased after chemotherapy (Table 5). In line with our findings, it can be said that hypothesis $H_2$, that the back massage during chemotherapy is effective on anxiety suffered during chemotherapy and that the massage significantly reduces state anxiety, was supported. During the phone calls made to patients a day after chemotherapy, the patients stated that they had a comfortable sleep and they felt more energetic and comfortable, which supports the findings of our study. Therefore, it is thought that back massage during chemotherapy, a nursing practice, is an effective method in reducing the level of anxiety suffered by individuals. In another study, it is stated that massage applied to control the symptoms in cancer patients affects anxiety more than it affects other symptoms (Myers, Walton, Bratsman, et al., 2008).

In this context, one of the strengths of our study is that the study was conducted with the matched control group in terms of personal characteristics such as age, gender, diagnosis and treatment. Another strong aspect of this study is that it reveals the importance of the complementary and supportive nursing interventions which help cancer patients cope with the symptoms they experience during the treatment process of the disease. On the other hand, since the study was conducted on a small sample group, it is hard to generalize the findings of the study.

5. Conclusions

In line with the findings of our study conducted to determine the effects of back massage; a nursing intervention, on the chemotherapy induced acute fatigue and the level of anxiety developing in this process, it can be suggested that back massage administered during chemotherapy is effective on anxiety and fatigue suffered during chemotherapy, and decreases state anxiety and acute fatigue significantly. Therefore, it can be recommended that the awareness, understanding and sensitivity of professionals, especially of nurses, working in oncology centers and chemotherapy application units regarding this application should be increased and that they should be encouraged to implement this intervention.

Acknowledgments

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References


Table 5

The mean STAI scores of patients before and right after chemotherapy.

<table>
<thead>
<tr>
<th>Patient group</th>
<th>Intervention group (n = 20)</th>
<th>Control group (n = 20)</th>
<th>Mann-Whitney U test</th>
<th>Cohen’s d effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X ± SD</td>
<td>X ± SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before chemotherapy</td>
<td>33.35 ± 11.89</td>
<td>33.35 ± 11.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right after chemotherapy</td>
<td>28.80 ± 6.75</td>
<td>28.80 ± 6.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilcoxon test</td>
<td>Z = 3.703 p = .000</td>
<td>Z = 3.703 p = .000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


