

# The Effect of Reflexology on Chemotherapy-induced Nausea, Vomiting, and Fatigue in Breast Cancer Patients

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Received: November 15, 2016, Accepted: February 17, 2017

## ABSTRACT

**Objective:** Patients receiving chemotherapy struggle with the side effects of this treatment. These side effects obligate the patients to use not only the pharmacological methods but also non-pharmacological relaxing methods. This study was conducted to determine the effect of reflexology on chemotherapy-induced nausea, vomiting, and fatigue in breast cancer patients. **Methods:** The study was conducted as a pretest–posttest experimental design. The study was conducted with sixty patients, thirty as the control and thirty as the experimental groups. A sociodemographic form, Rhodes index of nausea, vomiting, and retching (INVR), and Brief Fatigue Inventory (BFI) were used to collect the data. Analysis of variance, t-test, percentage calculations, and Chi-square methods were used to evaluate the data. The data obtained were assessed using the “Statistical Package for Social Science 21.0” software. **Results:** It was determined

that the difference between the total mean scores of INVR in the experimental and control groups was significant on the onset and first and second measurements, and the difference between total mean scores of development and distress between the groups was statistically significant in the third measurement ( $P < 0.05$ ). The results of the study showed that the BFI mean scores of patients in the experimental group gradually decreased in the first, second, and third measurements ( $P < 0.05$ ). **Conclusions:** The present study proved that reflexology decreased the experience, development, distress of nausea, vomiting, and retching as well as fatigue in the experimental group. Hence, the use of reflexology is recommended for chemotherapy-induced nausea, vomiting, and fatigue.

**Key words:** Breast cancer, nausea, nursing, reflexology

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Website: [www.apjon.org](http://www.apjon.org)

DOI:  
10.4103/apjon.apjon\_15\_17

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**Cite this article as:** Özdelikara A, Tan M. The effect of reflexology on chemotherapy-induced nausea, vomiting, and fatigue in breast cancer patients. *Asia Pac J Oncol Nurs* 2017;4:241-9.

## Introduction

According to the data published by the World Health Organization (WHO), the global burden of cancer has doubled within the last 30 years.<sup>[1]</sup> In Turkey, on the other hand, the incidence of breast cancer is observed to be 35% among women.<sup>[2]</sup> The number of newly diagnosed breast cancers in 2012 was 1.67 million, and breast cancer makes up 25% of all types of cancer in women (International Agency for Research on Cancer, Globocan, 2012).<sup>[3]</sup> According to the data of the WHO, the number of women who died of breast cancer worldwide in 2011 was 508,000. Breast cancer incidence increases as life expectancy increases, and urbanization and western lifestyles are adopted more and more in today's ever-developing world. It frequently occurs in both developed and less developed countries.<sup>[4]</sup>

The wide range of treatments from early diagnosis methods and radiotherapy to surgical intervention has increased the success rate in struggle with breast cancer.<sup>[5]</sup>

Different treatment methods applied have brought along side effects that challenge patients to cope with. Especially, the chemotherapy practices may cause undesired side effects and exhaustion for the patient in this process. Nausea, vomiting, and fatigue, which emerge as a result of chemotherapy treatment, are among the most frequently experienced side effects in cancer patients.<sup>[6]</sup>

Fatigue is reported to be at the rate of 70%–100% in cancer patients and 80%–100% in patients receiving chemotherapy.<sup>[5]</sup> Fatigue may develop due to the accumulation of metabolic wastes in cancer as well as cachexia, loss of appetite, nausea, fever, sleep disorders, and anemia.<sup>[6]</sup>

Nausea and vomiting could be observed in 40%–70% of cancer patients during the course of disease.<sup>[7]</sup> This can be observed within 3–4 hours after chemotherapy and also continue until 72 hours later.<sup>[8,9]</sup> The complex and aggressive nature of cancer (chemotherapy, radiotherapy, and surgical intervention) and the serious side effects caused by conventional treatment methods have impelled patients and their relatives to move to complementary and alternative medicine (CAM) methods.<sup>[6,8]</sup> Especially, difficulties in covering the high-cost treatment methods of chronic, degenerative, and malignant diseases which develop in parallel with the extension of lifetime and the natural nontoxic features of CAM methods have caused patients and their relatives to show an increasing interest in CAM methods.<sup>[10,11]</sup>

Reflexology signifies stimulation of the reflex points on ears, hands, and feet, which are accepted as little mirrors of specific organs and zones of the body, with massage.

Reflexology is a massage type regulating the complex body functions and causing relaxing and relaxation.<sup>[12]</sup>

Reflexology is one of the treatment methods that could be directly involved in the practice by nurses.<sup>[10,13,14]</sup> The greatest benefit of reflexology is that it provides a remarkable relief and relaxation for the person.<sup>[12]</sup> In addition, it has good effects on regulating the bloodstream, enhancing the immune system as well as removing a number of problems such as digestion problems (indigestion, constipation, nausea-vomiting, etc.), hypertension, headache, urinary system problems, and sexual problems.<sup>[12,13]</sup>

This study was conducted to examine the effect of reflexology on nausea, vomiting, and fatigue in breast cancer patients.

## Methods

### Sample

This study, which was performed with control and experimental groups, was conducted with patients diagnosed with Stage I–III breast cancer attending the Ambulatory Chemotherapy Unit of Ondokuz Mayıs University Medical Faculty Hospital to receive their first chemotherapy cycle between April 2011 and October 2013. A total of sixty patients (30 experimental and 30 control group), who were voluntary to participate in the study and met the inclusion criteria of the study, were included in this study. According to the literature, the size of sample groups specified to conduct the parametric tests was reported to be at least 30. Therefore, the study was conducted with a total of sixty patients, with thirty patients in the experimental group and thirty patients in the control group. Patients continued to receive standard antiemetic treatments. Patients in the experimental and control groups were selected from the population using the random sampling method.

The inclusion criteria of the study were determined as follows:

- Being older than 18
- Knowing the diagnosis of the disease
- Receiving no radiotherapy
- Receiving an epirubicin and cyclophosphamide
- Having received no reflexology therapy before
- Literate in Turkish
- Having no hemorrhage, epilepsy, or fever
- Having no paraplegia or thrombosis
- Having no gall-kidney stones
- Having no leg varicosis and foot disease (open wound or fracture on foot)
- Having no diagnosis of psychiatric disorder or dementia
- Having accepted to participate in the study.

## Instruments

In the data collection process, a sociodemographic data form, prepared by the researcher in the light of literature<sup>[9,10]</sup> and involved questions about sociodemographic characteristics, Brief Fatigue Inventory (BFI), and Rhodes index of nausea, vomiting, and retching (INVR) to evaluate the severity of nausea-vomiting and fatigue were used.

### Brief fatigue inventory

Validity and reliability of BFI were established in the Turkish society by Çınar *et al.*<sup>[15]</sup> Each item of BFI, which involves nine items, is scored between 0 and 10. While fatigue severity score is calculated by dividing the total scores of the first, second, and third items into 3, the score of fatigue's effect on life activities is calculated by dividing the total scores of 4a, 4b, 4c, 4d, 4e, and 4f items into 6. Zero score obtained in BFI signifies that there is no fatigue, 1–3 signifies low-level fatigue, 4–6 signifies moderate-level fatigue, and 7–10 scores indicate high-level fatigue.

### Rhodes index of nausea, vomiting, and retching

INVR was developed by Rhodes and McDaniel and adapted into the Turkish society by Genç and Tan.<sup>[16]</sup> In this study, the alpha internal consistency coefficient of the “Nausea, Vomiting, and Retching Index” was determined as 0.94. To score the “Nausea, Vomiting, and Retching Index,” items 1, 3, 6, and 7 are reversed. The scoring of each item is made as follows: 0 = minimum distress and 4 = maximum distress. The scale involves three subscales as the symptom experience, symptom development, and symptom distress.

### Data collection

Individual interviews were conducted with breast cancer patients who attended Ondokuz Mayıs University Medical Faculty Hospital and Chemotherapy Unit where the study was conducted, and patients who met the inclusion criteria of the study and agreed to participate in the study were randomly included in the experimental/control groups.

Randomization was created by taking into consideration the patient's first application day of the week to the clinic. Patients who came on the 1<sup>st</sup> day of a week were received to experimental group; groups were created as 1 day experiment and 1 day control (Monday-experiment, Tuesday-control, Wednesday-experiment, Thursday-control, and Friday-experiment) on the following days. The experimental and control groups of patients received the same chemotherapy cycle, which is 21 days apart. The experimental and control groups of patients were pretested (sociodemographic form, BFI, and INVR) within 24 hours after the first chemotherapy cycle. No other application, except for the routine nursing care (antiemetic

application, follow-up of vital signs and laboratory findings and consultancy for chemotherapy, etc.), was applied to the control group of patients. Experimental posttest measurement was taken from the control group within 24 hours after every chemotherapy cycle synchronously with the experimental group. In the control group, on the other hand, only the routine nursing care (such as antiemetic application, follow-up of vital findings and laboratory findings, and consultancy for chemotherapy) was applied, and the posttest measurements were performed within 24 hours following four chemotherapy cycles simultaneously with the experimental group. As for the experimental group of patients, reflexology was applied during drug infusion beginning with the second chemotherapy cycle (the researcher applied foot reflexology on patients in the experimental group, who came to the following chemotherapy cycle, during the chemotherapy infusion). Experimental measurement was taken from the experimental group of patients within 24 hours after every chemotherapy cycle A, posttest (BFI, INVR) was applied 24 hours after reflexology. Reflexology was applied in totally three sessions (one in each of three chemotherapy cycles), and a posttest was applied to the patients 24 hours after each reflexology practice over the phone. At the end of the study, three reflexology sessions and four test measurements (onset, first, second, and third measurements) were applied to the experimental group.

### Intervention

Each reflexology session took approximately 30–40 min. Sessions were applied in a special room within the chemotherapy unit on ergonomic and position changeable beds. Each session started on the right foot and continued on the left one. Primary relaxation techniques were performed on both feet, and then, reflexology techniques were performed on all system organs.

The researcher received theoretical and practical training by participating in the “reflexology course” at the “Psikoakademi Centre.” Before cleansing the patient's feet, the researcher washed their hands with an antibacterial soap. The patient's feet were cleansed according to the patient's preference for washing with water or using a disposable wet cloth. Joint points of the patients were supported by lying in a supine position on the patient's bed in the room. The researcher stood at the end of the patient's bed during the treatment. To provide the slipperiness during reflexology, scentless baby oil was used at room temperature. The practice started on the patient's right foot. The foot was relaxed by applying primarily effleurage, shaking, rotation, and stretching methods. During the practice, one hand of the researcher supported the foot of the patient and the researcher used the fingers of their other hand, and

a caterpillar technique with the thumb was mostly used. Organs of the gastrointestinal and urinary systems were the primary focus on both feet. The practice ended with solar plexus pressure on both feet.

### Statistical analysis

The data obtained as a result of the study were assessed through computer using the “Statistical Package for Social Science 21.0 (IBM SPSS version 21.0)” packaged software. While percentage and Chi-square tests were used to analyze descriptive characteristics of patients, the *t*-test was used to determine whether there was a statistically significant difference between the means of two independent samples.

### Ethical consideration

Before conducting the study, the Ethics Committee’s approval was obtained from Atatürk University Health Science Institute, and written permission was received from the Ambulatory Chemotherapy Unit of Ondokuz Mayıs University Medical Faculty Hospital, where the study would be conducted. After patients were informed about the study and their questions were answered, their written and verbal consents were obtained.

## Results

The age average was determined as  $50.93 \pm 11.27$  in the experimental group and  $51.06 \pm 10.97$  in the control group. About 53.3% of the patients in the experimental and control groups were 50 and older. Furthermore, 80% of those in the experimental group and 66.7% in the control group were married, and 40% of patients in both groups were primary school graduates. Majority of patients were housewives (73.3% in the experimental group and 86.7% in the control group), lived in the city center (60% in the experimental group and 53.3% in the control group), and were diagnosed with Stage II breast cancer (76.7% in the experimental group and 73.3% in the control group). All the patients in the experimental and control groups had social insurance.

Table 1 illustrates the comparison of patients in the experimental and control groups in terms of mean scores of nausea, vomiting, and retching experience.

Accordingly, even though the patients in the experimental group had higher mean scores of nausea, vomiting, and retching, experience, development, and distress in the onset measurement compared to the control group were distinctly lower in the experimental group in the first, second, and third measurements where reflexology was applied.

As a result of the statistical examination, while the difference between the groups in terms of the onset measurement mean scores was found statistically insignificant in the areas of vomiting experience, vomiting

development, and vomiting distress, it was found statistically significant in all other areas ( $P < 0.05$ ). In the first, second, and third measurements where reflexology was applied, on the other hand, the difference between the experimental and control groups was found statistically significant in all areas ( $P < 0.05$ ).

Examining the total mean scores of nausea, vomiting, and retching experience, it was determined that patients in the experimental group had higher onset mean scores compared to the control group; however, the mean scores of first, second, and third measurements were lower, and while this difference was significant in the onset, first, and second measurements ( $P < 0.05$ ,  $P < 0.001$ ), it was statistically insignificant in the third measurement ( $P > 0.05$ ) [Figure 1].

As a result of the evaluation of the total mean scores of nausea, vomiting, and retching development between the groups, the mean scores of first, second, and third measurements were lower in the experimental group. The difference between these groups was statistically significant in the onset and first, second, and third measurements ( $P < 0.05$ ) [Figure 2].

Examining the total mean scores of nausea, vomiting, and retching distress, it was determined that patients in the experimental group had lower mean scores in the first, second, and third measurements, and the difference between the groups was statistically significant in the onset and first, second, and third measurements ( $P < 0.05$ ) [Figure 3].

Table 2 illustrates the comparison of the groups in terms of the BFI mean scores of patients in the experimental and control groups. Examining Table 2, it was determined that the mean scores of fatigue severity and daily activity exposure levels were higher in the onset in patients in the experimental group compared to those in the control group; however, they decreased in the first, second, and third measurements and were also lower in the first, second, and third measurements. This difference between the groups was statistically significant in the onset and first, second, and third measurements [Figures 4 and 5] ( $P < 0.05$ ).

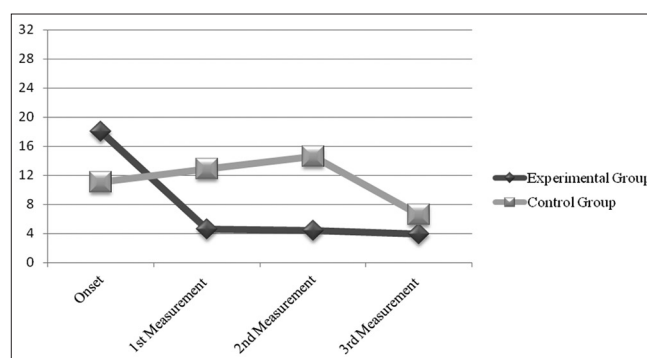


Figure 1: Total scores of patients in the subscale of experience

Table 1: Comparison of groups in terms of Rhodes index of nausea, vomiting, and retching mean scores of patients after reflexology

INVR	Group	Onset	First measurement	Second measurement	Third measurement
Subscale of experience					
Nausea experience	Experimental	8.63±3.16	2.53±2.80	2.56±2.94	2.06±3.33
	Control	4.96±4.55	5.46±4.15	6.16±4.01	6.56±4.09
<i>t</i>		3.62	-3.20	-3.95	-4.67
df		58	58	58	58
<i>P</i>		0.001	<0.001	0.000	0.000
Vomiting experience	Experimental	4.03±4.08	0.83±1.57	0.86±1.97	0.96±2.39
	Control	3.26±4.16	3.83±4.29	4.50±3.63	4.00±3.29
<i>t</i>		0.72	-3.59	-4.80	-4.08
df		58	58	58	58
<i>P</i>		>0.05	0.001	0.000	0.000
Retching experience	Experimental	5.33±2.45	1.23±1.27	0.96±1.77	0.86±1.92
	Control	2.80±3.04	3.60±2.76	3.96±2.72	4.00±3.29
<i>t</i>		3.54	-4.26	-5.05	-4.50
df		58	58	58	58
<i>P</i>		0.001	0.000	0.000	0.000
Experience score	Experimental	18.00±7.51	4.60±4.76	4.40±5.52	3.90±6.89
	Control	11.03±11.24	12.90±10.49	14.63±9.62	6.56±4.09
<i>t</i>		2.82	-3.94	-5.05	-1.82
df		58	58	58	58
<i>P</i>		<0.05	0.000	0.000	>0.05
Subscale of symptom development					
Nausea development	Experimental	5.86±2.14	1.83±2.05	1.80±2.02	1.43±2.35
	Control	3.33±3.02	3.70±2.79	4.20±2.74	4.40±2.82
<i>t</i>		3.74	-2.94	-3.85	-4.41
df		58	58	58	58
<i>P</i>		0.000	<0.05	0.000	0.000
Vomiting development	Experimental	2.66±2.66	0.56±1.07	0.56±1.25	0.63±1.56
	Control	2.03±2.72	2.40±2.82	2.80±2.36	2.40±2.02
<i>t</i>		0.910	-3.32	-4.56	-3.77
df		58	58	58	58
<i>P</i>		>0.05	<0.05	0.000	0.000
Retching development	Experimental	2.56±1.43	0.60±0.67	0.56±1.10	0.43±1.00
	Control	1.40±1.54	1.73±1.38	2.06±1.41	2.20±1.37
<i>t</i>		3.03	-4.02	-4.58	-5.68
df		58	58	58	58
<i>P</i>		<0.05	0.000	0.000	0.000
Symptom development score	Experimental	11.10±4.74	3.00±3.22	2.93±3.60	2.50±4.34
	Control	6.76±6.85	7.83±6.41	9.06±5.91	9.00±5.29
<i>t</i>		2.84	-3.68	-4.84	-5.19
df		58	58	58	58
<i>P</i>		<0.05	0.000	0.000	0.000
Subscale of distress development					
Nausea distress	Experimental	2.76±1.19	0.70±0.83	0.76±1.00	0.63±0.99
	Control	1.63±1.54	1.76±1.38	1.96±1.37	2.16±1.34
<i>t</i>		3.18	-3.61	-3.85	-5.02
df		58	58	58	58
<i>P</i>		<0.05	0.001	0.000	0.000
Vomiting distress	Experimental	1.36±1.47	0.26±0.52	0.30±0.79	0.33±0.84
	Control	1.23±1.59	1.43±1.56	1.70±1.36	1.60±1.35
<i>t</i>		0.33	-3.86	-4.84	-4.34
df		58	58	58	58
<i>P</i>		>0.05	0.000	0.000	0.000
Retching distress	Experimental	2.76±1.19	0.26±0.52	0.40±0.72	0.43±0.97
	Control	1.40±1.54	1.86±1.43	1.90±1.37	1.96±1.21
<i>t</i>		3.83	-5.75	-5.29	-5.39

Contd...

Table 1: Contd...

INVR	Group	Onset	First measurement	Second measurement	Third measurement
df		58	58	58	58
P		0.000	0.000	0.000	0.000
Distress score	Experimental	6.90±2.90	1.60±1.65	1.46±2.06	1.40±2.59
	Control	4.2±4.47	5.06±4.13	5.56±3.82	5.73±3.55
t		2.70	-4.26	-5.16	-5.39
df		58	58	58	58
P		<0.05	0.000	0.000	0.000

INVR: Rhodes index of nausea, vomiting, and retching

Table 2: Comparison of the groups in terms of Brief Fatigue Inventory mean scores

BFI	Group	Onset	First measurement	Second measurement	Third measurement
Fatigue severity	Experimental	3.67±1.94	1.62±1.41	1.28±1.61	1.20±1.44
	Control	1.97±1.59	2.63±2.09	2.11±1.48	2.33±1.65
t		3.70	-2.19	-2.05	-2.83
df		58	58	58	58
P		0.000	<0.05	<0.05	<0.05
Daily life activity exposure levels	Experimental	1.88±1.26	0.53±1.17	0.51±0.98	0.41±0.65
	Control	1.01±1.16	1.66±2.00	1.17±0.97	1.47±1.52
t		2.78	-2.65	-2.60	-3.53
df		58	58	58	58
P		<0.05	<0.05	<0.05	0.001

BFI: Brief Fatigue Inventory

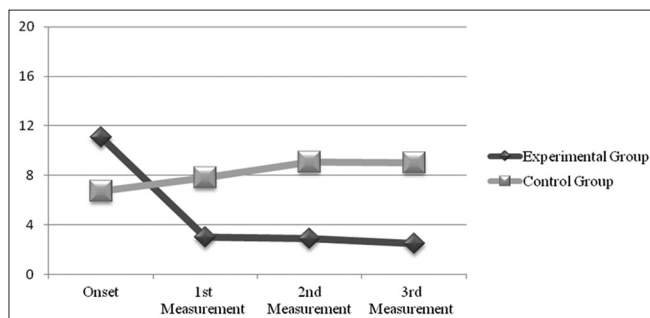


Figure 2: Total scores of patients in the subscale of symptom development

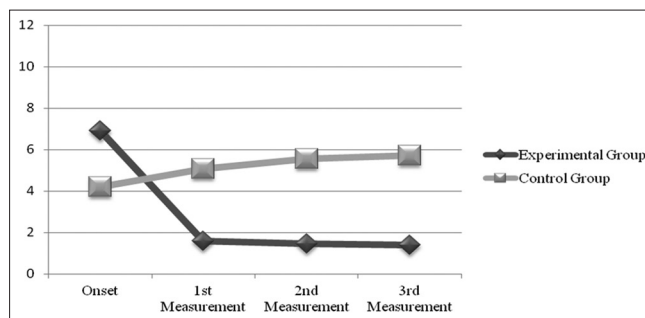


Figure 3: Total scores of patients in the subscale of distress

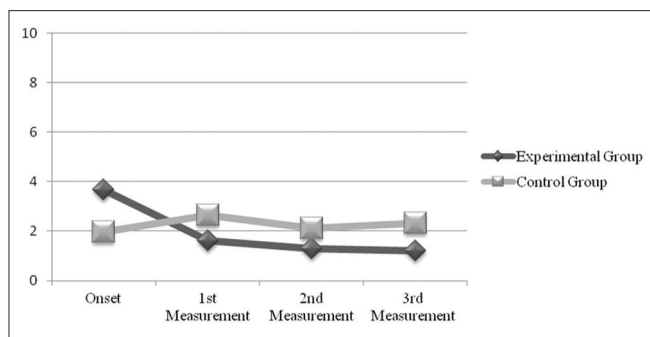


Figure 4: Fatigue severity scores of patients after reflexology

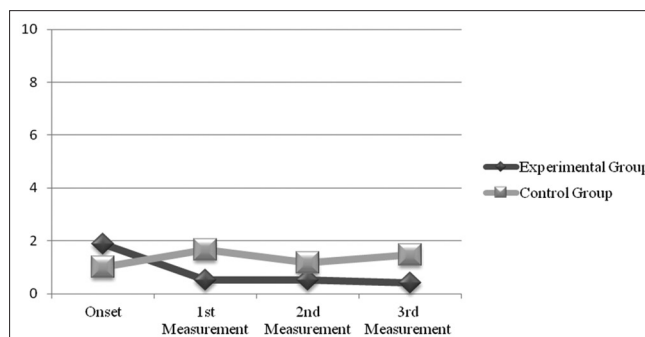


Figure 5: Daily life activity exposure level scores of patients regarding daily life activities after reflexology

## Discussion

Nausea, vomiting, and fatigue are among the side effects most frequently experienced by patients receiving treatment for breast cancer.<sup>[17]</sup> Scientific studies performed for patients

with breast cancer have been intensified to especially prevent the adverse effects of these symptoms. Acupuncture, back massage, relaxation training, and Reiki applied on cancer patients also decrease nausea, vomiting, and fatigue.<sup>[18-21]</sup>

Taking these studies into consideration, it could be asserted that both pharmacological and nonpharmacological methods could be used in coping with and removing the chemotherapy-induced nausea, vomiting, and fatigue, and the results of relevant studies will make a contribution to the nursing literature.

In the end of this research, when the average of the total score of INVR of the patients was examined, it was observed that the average of the total score of nausea, vomiting, and retching experience, formation, and distress of the patients in the experimental group gradually decreased but that of the patients in the control group gradually increased. It was also found that this difference between the average of the total score of INVR in the intergroup was statistically significant and that the average of the total score of nausea, vomiting, and retching experience, formation, and distress of the patients in the experimental group decreased. Mindoab *et al.* reported in their study with 37 cancer patients that reflexology had no positive effect on nausea and vomiting; however, this treatment decreased the severity and number of vomiting within the first 4 h after chemotherapy.<sup>[22]</sup> In his study that conducted with breast cancer patients receiving chemotherapy, Yang also determined that the reflexology practice decreased nausea and vomiting symptoms.<sup>[23]</sup> Furthermore, as a result of a meta-analysis study, it was determined that foot reflexology did the same for cancer patients.<sup>[24]</sup> It was also determined that the massage applied on cancer patients receiving chemotherapy bore the same outcome.<sup>[24]</sup> In literature, it has been reported that reflexology had decreased nausea and vomiting.<sup>[25-30]</sup> Reflexology also aims homeostasis, decreases stress, evokes natural healing mechanisms, and provides an advanced relaxation. It could be asserted that reflexology opens the energy canals just like acupuncture and acupressure, decreases stress just like body–mind therapies, and provides relaxation and homeostasis as do massage and relaxation methods.<sup>[13,31]</sup> As it is indicated in literature, reflexology helps contractions that push the chewed food through the digestive tract by functioning the reflexes of the digestive system from mouth to stomach with the stimulation of reflex points of the digestive system.<sup>[31]</sup> Reflexology, acupuncture, and acupressure are methods based on the idea of the existence of energy canals/meridians.<sup>[13]</sup> The literature has numerous studies revealing the decreasing effect of massage, relaxation, acupuncture, and acupressure as well as body–mind therapies such as hypnosis, yoga, and meditation on nausea and vomiting.<sup>[18,19,25,30,32]</sup>

When the averages of the total score of fatigue severity of patients and the level of how much fatigue interfered their daily activities were examined, it was observed that these total score averages and levels of the experimental

group gradually decreased, but those of the control group increased in subsequent measurements in comparison to the initial measurement. Previous studies conducted with cancer patients also determined that reflexology decreased fatigue.<sup>[33-35]</sup> In another study in which chemotherapy-related fatigue conditions of breast cancer patients were examined, reflexology was found to reduce fatigue levels in patients.<sup>[22]</sup> Unal and Akpınar also reported that reflexology applied to hemodialysis patients in eight sessions significantly reduced fatigue in patients.<sup>[36]</sup> Kohara and colleagues reported that reflexology application with aromatherapy decreased fatigue rates of patients in their study with twenty cancer patients in the terminal period.<sup>[33]</sup> There are studies showing that reflexology reduces fatigue in patients with rheumatoid arthritis and hemodialysis in cancer patients.<sup>[33-37]</sup> There are many reasons for fatigue which develops during the process of chemotherapy treatment. Accumulation of metabolic wastes in the body, loss of appetite, nausea, and anemia are among these reasons.<sup>[6]</sup> A number of studies showed that relaxation and massage therapies decreased fatigue.<sup>[32,38-41]</sup> These, in turn, would impinge on the nerve endings on the feet and obstruct lymph flow. Massaging these areas would break down the crystalline deposits so that they could be reabsorbed and eliminated.<sup>[42]</sup> Reflexology improves circulation and may help with the disposal of waste products of tissue metabolism, particularly lactic acid.<sup>[43,44]</sup> Practices such as yoga grounded on decreasing stress also have positive effects on fatigue.<sup>[45]</sup> Similarly, the acupuncture method, originating from the traditional Chinese medicine and applied on certain points on the energy lines/meridians, is proven to decrease fatigue as well.<sup>[46-49]</sup> On the other hand, it is indicated that reflexology decreases stress and anxiety with the help of a deep relaxation and an intensive relaxing, and it also provides recirculation of energy by opening the blocked energy canals throughout the body and decreases fatigue symptoms<sup>[4]</sup> by removing toxins from the body.<sup>[29,50-52]</sup> The present study also implied that a decrease of nausea, which is depicted as a reason of fatigue, could be effective on the decrease of fatigue as well.<sup>[53]</sup>

## Conclusion

As a result, reflexology was found to have positive effects the on nausea, vomiting, and retching and fatigue of breast cancer patients receiving chemotherapy and was considered to have potential benefits as it significantly reduced chemotherapy and disease-related symptoms. This study has shown that reflexology reduces the symptoms of chemotherapy (nausea, vomiting, fatigue, etc.) in breast cancer patients. In accordance with the findings of this study, reflexology may be suggested as a complementary treatment method in the fight against chemotherapy

symptoms of breast cancer (nausea, vomiting, fatigue, etc.). In addition, it is important for the oncologists to inform physicians and nurses working in the oncology clinics about the positive effects of reflexology to pave the way to a more effective use of reflexology.

### Clinical effects

The current study evinced that reflexology has a significant positive effect on the quality of life of breast cancer patients. In this regard, the results we obtained are quite valuable. Reflexology can be safely used by patients with cancer who are undergoing chemotherapy. Quality of life is very important for patients who are exposed to the effects of chemotherapy in addition to the effects of the disease. There are various components of the quality of life, and the components which make up global health status and functioning scales (i.e., social functioning and emotional functioning) are often considered outside the immediate domain of medical treatment. Reflexology, like other support methods, is expected to start the process of improving the quality of life, especially among patients who need support in these areas/components. In addition, the aspects of quality of life can be improved with reflexology delivered by either certified reflexologists or lay providers.

### Limitations and Future Research

The current study evinced that reflexology has significant positive effects on the nausea-vomiting-retching and fatigue of breast cancer patients. In this regard, the results we obtained are quite valuable. Reflexology can be safely used by patients with cancer who are undergoing chemotherapy. Therefore, the use of reflexology for breast cancer patients can be suggested by health professionals. This study's limitation is conducting the research with female patients only. Future work is suggested to be done in mixed groups involving women and men.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

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