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

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Introduction

According to the data published by the World Health Organization (WHO), the global burden of cancer has doubled within the last 30 years.[1] In Turkey, on the other hand, the incidence of breast cancer is observed to be 35% among women.[2] 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).[3] 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.[4]

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

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.[6]

Fatigue is reported to be at the rate of 70%–100% in cancer patients and 80%–100% in patients receiving chemotherapy.[5] 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.[6]

Nausea and vomiting could be observed in 40%–70% of cancer patients during the course of disease.[7] This can be observed within 3–4 hours after chemotherapy and also continue until 72 hours later.[8,9] 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.[6,8] 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.[10,11]

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.[12]

Reflexology is one of the treatment methods that could be directly involved in the practice by nurses.[10,13,14] The greatest benefit of reflexology is that it provides a remarkable relief and relaxation for the person.[12] 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.[12,13]

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

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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[9,10] 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*.[15] 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.[16] 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 1st 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.

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Results

The age average was determined as 50.93 ± 11.27 in the experimental group and 51.06 ± 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.

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
t		3.62	−3.20	−3.95	−4.67
df		58	58	58	58
P		1	<0.001	0	0
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
t		0.72	−3.59	−4.80	−4.08
df		58	58	58	58
P		>0.05	1	0	0
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
t		3.54	−4.26	−5.05	−4.50
df		58	58	58	58
P		1	0	0	0
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
t		2.82	−3.94	−5.05	−1.82
df		58	58	58	58
P		<0.05	0	0	>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
t		3.74	−2.94	−3.85	−4.41
df		58	58	58	58
P		0	<0.05	0	0
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
t		910	−3.32	−4.56	−3.77

df		58	58	58	58
P		>0.05	<0.05	0	0
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
t		3.03	−4.02	−4.58	−5.68
df		58	58	58	58
P		<0.05	0	0	0
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
t		2.84	−3.68	−4.84	−5.19
df		58	58	58	58
P		<0.05	0	0	0
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
t		3.18	−3.61	−3.85	−5.02
df		58	58	58	58
P		<0.05	1	0	0
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
t		0.33	−3.86	−4.84	−4.34
df		58	58	58	58
P		>0.05	0	0	0

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
t		3.83	−5.75	−5.29	−5.39
df		58	58	58	58
P		0	0	0	0
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	0	0

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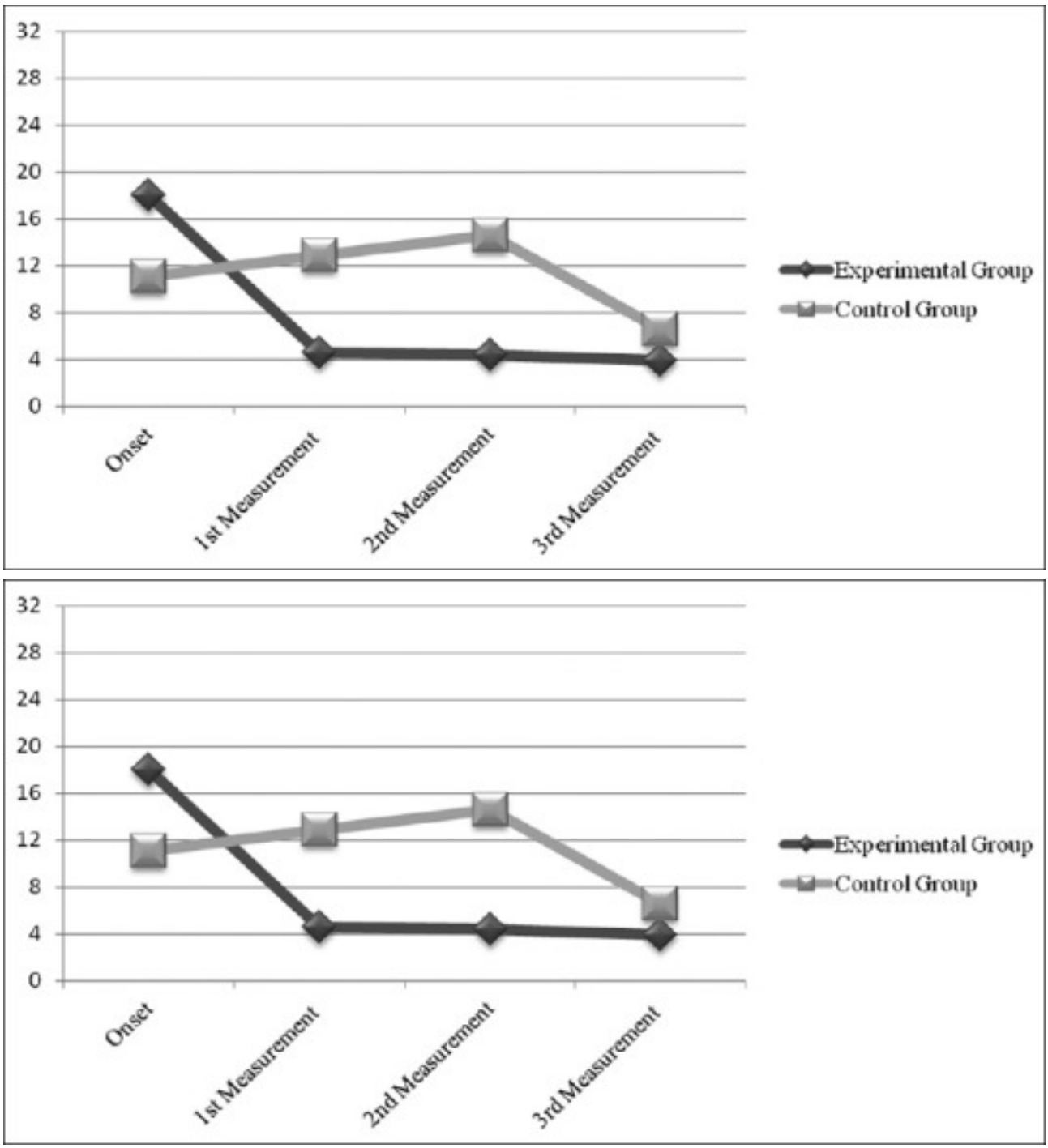
INVR: Rhodes index of nausea, vomiting, and retching

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].



32
28
24
20
16
12
8
4
0
Onset
1st Measurement
2nd Measurement
3rd Measurement
Experimental Group
Control Group

Figure 1

Total scores of patients in the subscale of experience

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

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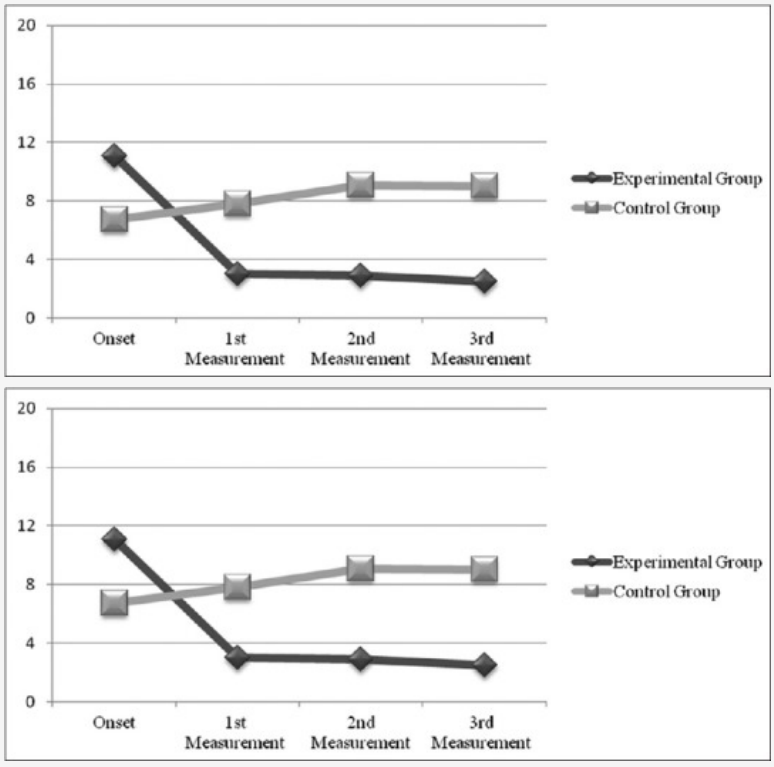

Examining the total mean scores of nausea, vomiting, and retching distress, it was determined that patients in the experimental group had lower mean scores in the first, second, and third measurements, and the difference between the groups was statistically significant in the onset and first, second, and third measurements (

P

< 0.05) [

Figure 3

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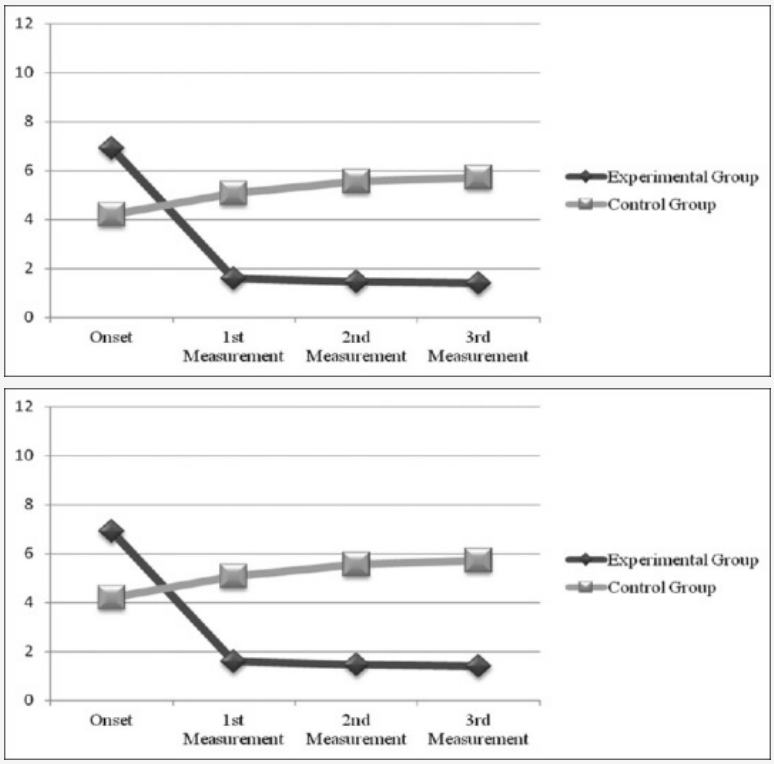

Table 2

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
[Figures4
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] (
P
< 0.05).
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	<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	1

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