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CORRESPONDENCE

Effect of mindfulness-based therapy on spiritual well-being in breast cancer patients: a randomized controlled study

Hatice Oner Cengiz[1] · Berna Bayir[2] · Serap Sayar[2] · Mehmet Demirtas[3]

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Abstract

Background Spiritual well-being is directly related to the quality of life in breast cancer patients. Mindfulness-based therapy interventions can decrease distress levels in women with breast cancer, while improving spiritual well-being.

Objective To investigate the effect of mindfulness-based therapy on spiritual well-being in breast cancer patients.

Methods This randomized controlled clinical trial was conducted in accordance with the Consolidated Standards of Reporting Trials. A total of 70 participants were enrolled from September, 2021 to July, 2022. Primary outcome included spiritual well-being, and secondary outcome included quality of life. The data were collected using the Patient Sociodemographic and Medical Data Form and Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (SpWB) (FACIT-Sp Version 4). In the statistical analysis, the independent sample *t* test and paired sample *t* test were used to examine the intervention effect on primary and secondary outcomes, according to numbers, percentage, mean, standard deviation, and conformity to normal distribution.

Results The average age of the therapy group was 42.22 ± 6.86, and the control group was 41.64 ± 6.04. The average score of meaning (12.25 ± 3.03), overall score average of the spiritual well-being (31.56 ± 8.90), the emotional well-being (13.46 ± 5.78) and physical well-being (16.71 ± 5.59), and overall average score of the quality of life (66.98 ± 17.72) of the therapy group was statistically significantly higher ($p < 0.05$).

Conclusion The mindfulness-based training may enhance the spiritual well-being and quality of life of breast cancer patients. Nurses should be encouraged for mindfulness-based training sessions to make it a widespread practice, and to regularly evaluate the results.

Trial registration NCT05057078 (date: September 27, 2021).

Keywords Breast cancer · Mindfulness · Nursing · Spirituality

Introduction

Due to advances in early diagnosis and treatment methods in breast cancer, the mortality and morbidity rate has decreased [1–3]. Depending on surgical intervention or adjuvant therapy, patients with breast cancer may experience physical symptoms [1, 4, 5] such as fatigue [6], hot flashes [4], arm discomfort due to mastectomy [4], vaginal dryness [4] pain [4, 6], nausea and vomiting [4] as well as psychological symptoms [1, 4, 7], such as deterioration of sexuality [4], depression [6, 8], anxiety [6, 8], and fear of recurrence of the disease [4]. In addition to these symptoms, the perception of the disease posing a life-threatening risk may cause patients to experience crisis since it influences them in physical, psychosocial, behavioral, and spiritual aspects [9]. It is emphasized that patients with breast cancer have a lower level of

✉ Hatice Oner Cengiz
htcnr8878@gmail.com

Berna Bayir
berna.bayir@karatay.edu.tr

Serap Sayar
oranserap@gmail.com

Mehmet Demirtas
mehmet-4489@hotmail.com

[1] Faculty of Nursing, Department of Nursing, Department of Surgical Diseases Nursing, Ankara University, Ankara, Turkey

[2] KTO Karatay University School of Health Sciences Department of Nursing, Konya, Turkey

[3] Malatya Turgut Ozal Medical Center Radiation Oncology Clinic, Malatya, Turkey

religious activity due to feelings of emptiness, anger, powerlessness, and abandonment by God [10]. Therefore, after diagnosis, individuals have difficulty finding the meaning and purpose of life. Such condition causes them to question their beliefs, increase their concerns about spirituality both existentially and religiously, and thus experience spiritual distress. But on the other hand, there is a growing interest in the role of spirituality as a component of quality of life of cancer survivors [11]. Spirituality is defined as the dynamic and intrinsic dimension of human life that relates to the way persons experience, express, and/or seek meaning, purpose, and transcendence, and the way they connect to the moment, to self, to others, to nature, and to the significant and/or the sacred [9]. Spirituality can play a vital role in healing and well-being, as spirituality confers inner strength and peace serves as a means of coping with cancer [11]. The spiritual and religious dimensions, which are important components of the patient's quality of life, should be considered as an integral part of patient care [11]. That is because of the fact that an individual can adapt spiritual coping methods by tending to spirituality while facing a life-threatening and painful illness [10, 12]. Spirituality, used in breast cancer patients to cope with physical and psychological symptoms of the disease [13] is one of the strategies that help them find hope and gratitude, and become positive [14] since it provides inner strength, peace, comfort, and integrity, and plays an important role in healing and increasing spiritual well-being [11]. Increasing the spiritual well-being of women with breast cancer can improve the quality of life depending on coping with the symptoms of the disease and treatment [5, 15]. The spirituality, which is an important strategy for coping with daily life problems and diseases, has positive effects on individuals' mental and physical health [16]. In previous studies, it has been determined that the quality of life is also higher in those with high spiritual well-being [17, 18]. In a systematic review, it was found that religion/spirituality is associated with pain and physical symptoms, and a high state of spiritual well-being contributes to psychological well-being [19]. Therefore, interventions that will increase spiritual well-being in patients with breast cancer can also contribute to improving their quality of life. One of these interventions is mindfulness-based therapy (MBT). MBT represents a unique form of psychotherapeutic and/or supportive intervention that warrants attention for cancer patients, including those diagnosed with breast cancer [3]. The concept of mindfulness was first defined as the ability to be aware of the moment of resentment consciously and without judgment [5]. Through non-judgmental/reactive mindfulness, being present in the "moment" may increase self-regulation of feelings and thoughts, while decreasing deep thinking and detailing on past or future experiences [16, 20]. Therefore, mindfulness is considered a way of improving physical and psychological well-being in individuals, increasing the quality of life, relieving pain, reducing stress in the short and long term, and making life meaningful [16]. In studies examined the effect of MBT in patients with breast cancer, it was found that anxiety [3, 6, 7, 20], depression [3, 6, 7], and fatigue [3] levels of the patients decreased, while quality of sleep [3], social engagement [8], quality of life [3, 21, 22], and physical activity [23] increased. However, different results were obtained in the studies examining its effect on spiritual well-being. In a study, MBT was found to have no effect on spiritual well-being [7], while some indicated that it increased the levels [24, 25]. The results of these relatively few studies may be affected by factors such as sampling selection criteria and sample size. Therefore, the information in the literature that it reduces anxiety, fatigue, and depression levels promises a positive effect on spiritual well-being. In the light of this information, the aim of this study was to determine the effect of MBT on spiritual well-being in breast cancer patients.

Research hypotheses

H1: In patients with breast cancer who receive the mindfulness-based therapy, the overall score average of the SP-12, measured using the FACIT-Sp Version 4 scale, will be significantly higher than those who will not receive the therapy.

H2: In patients with breast cancer who receive the mindfulness-based therapy, the overall score average of the FACIT-G quality of life, measured using the FACIT-Sp Version 4 scale, will be significantly higher than those who will not receive the therapy.

Methods

Design and ethical considerations

This study was conducted as a two-group (therapy group and control group) randomized controlled trial evaluating the effect of MBT on patients with breast cancer. Ethical approval was obtained from the ethics committee (KTO Karatay University Non-pharmaceutical and Non-medical Device Research Ethics Committee Chairmanship. Date September 07, 2021 registration number E-41901325–050.99–14 ,950/2021/029). In the study, the articles in the Declaration of Helsinki were complied with. This study was registered in the Clinical Trial Registry (registration number NCT05057078) prior to data collection process. All participants were thoroughly briefed on the research process before providing their consent, and all were ensured that there would be no consequences in case they choose to withdraw at any stage. Verbal and written consent was obtained from all participants. The study was conducted in accordance with the Consolidated Standards of Reporting Trials (CONSORT) 2010 guidelines.

Sample and settings

The study was conducted at a training and research hospital, from September, 2021 to July, 2022.

Inclusion criteria (a) being aged between > 18 and < 65 with breast cancer, (b) being diagnosed at least 6 months ago, (c) being able to understand and write Turkish and communicate effectively with researchers and other patients, (d) receiving outpatient treatment, and (e) having a computer or smartphone.

Exclusion criteria (a) having another type of cancer, (b) having a stage IV breast cancer, and (c) having a psychiatric disorder.

Removal criteria (a) not regularly participating in the therapy program, (b) being diagnosed with a psychiatric disorder during the research process, and (c) beginning to receive inpatient treatment during the research process.

Sample size and randomization

The G*Power software version 3.1.9.4 (Franz Faul, Universitat Kiel, Germany) test was used to determine the sample size [26] In the analysis performed as a priori, the article published by Park et al. FACIT-Sp mean was referenced [25]. Prior analyses were performed based on the *t* tests (mean values: difference between two independent mean values (two groups)). Accordingly, it was determined that the sample should consist of a total of 66 patients, including 33 patients in each group with a margin of error of 0.05, statistical power of 95%, and effect size of 0.90. The dropout rate was found to be 7.8%. Given the likelihood of withdrawals, 35 participants were assigned to each group, with a total of 70. The study flowchart was shown in Fig. 1. The participants were assigned randomly to the therapy group that received MBT and the control group that received routine care. Group assignments were performed randomly using the simple full randomization method. In order to determine the order of application, the names of the study groups (mindfulness program group

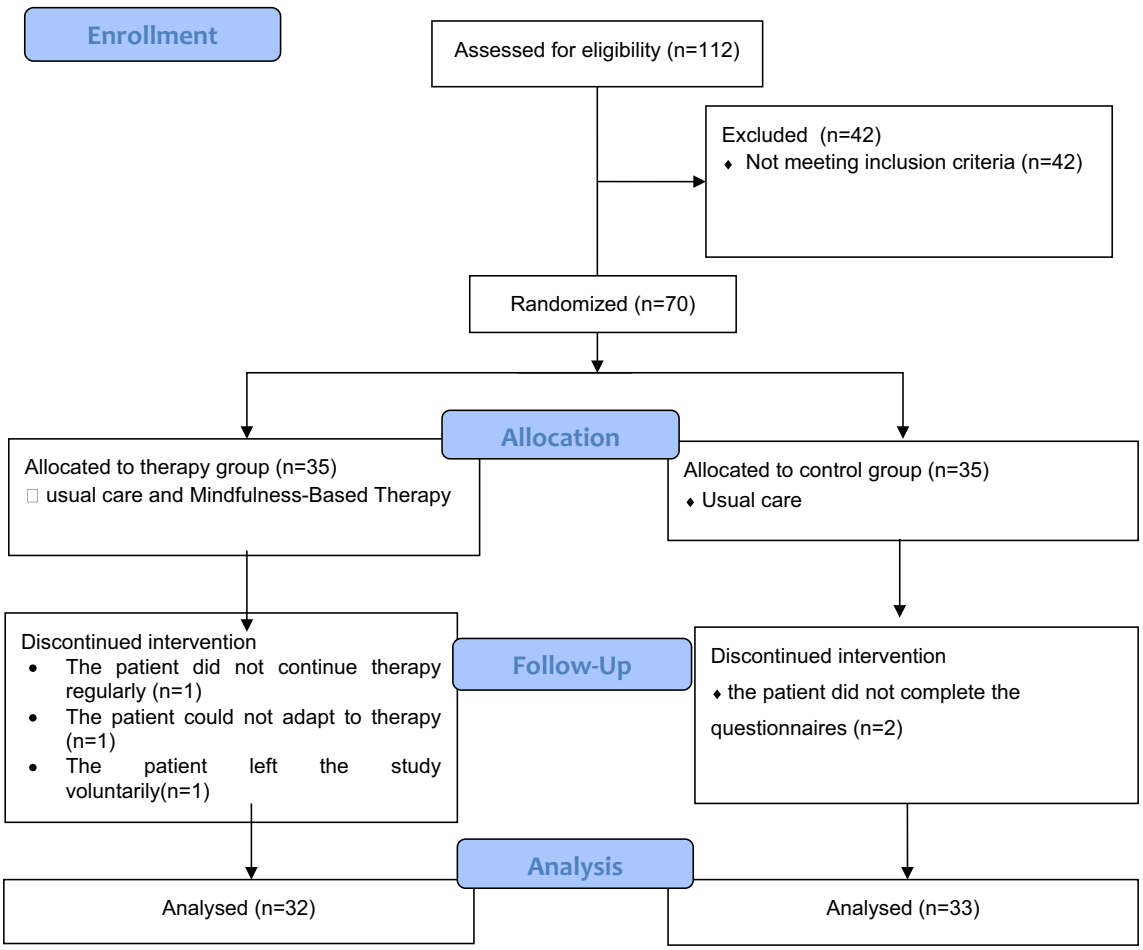

Fig. 1 The study flowchart according to CONSORT 2010

and control group) were written on a paper 35 times by the researcher, and the participants were selected randomly by drawing lots. Therefore, the researcher could not be blinded. The data entry was performed by the author, who was not involved in data collection and had no conflict of interest.

Intervention

Therapy group

Prior to the study, the researcher obtained a certificate after receiving training on mindfulness-based therapy. Since the COVID-19 measures were still in practice during data collection process and cancer patients were considered to be in the risk group, therapy sessions and data collection process were carried out online. MBT was performed via Zoom Cloud Meeting 5.9.3 (3169). The patients themselves (who could) or their relatives were allowed to install the program on their computers or smartphones. They were guided in this regard. Those who met the inclusion criteria were informed about the objective and significance of the study. The sessions were scheduled on appropriate days for the patients included in the therapy group. The days were determined by contacting the therapy group at the beginning of each week to ensure compliance with their schedules.

The therapy group was divided into 4 groups. The number of patients in the groups was between 8 and 10. A group was created for each group via WhatsApp. Throughout the week, a reminder message was sent by the trainer periodically including voice records and required tasks. The MBT was conducted within eight sessions, as once a week for 8 weeks. Each session lasted approximately 45 to 60 min. The intervention followed the standard MBT protocol with minor modifications (e.g., different mindful movement practices; focus on clarifying personal values). The therapy was applied for eight sessions after the preparatory session. There were no side effects related to MBT in the therapy group patients. The subject of therapy group sessions is given in Table 1.

Control group

The patients included in the control group were not applied any intervention. After the data collection process was completed, the patients in the control group were sent audio recordings used for exercises with an explanation about MBT via WhatsApp.

Observation indicators

Primary outcome Spiritual well-being.

Secondary outcome Quality of life.

Data collection

The data were collected online by the researchers using the Patient Sociodemographic and Medical Data Form and the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (SpWB) (FACIT-Sp Version 4). The forms were prepared online using Google Form and shared with the patients.

The patient sociodemographic and medical data form The form, consisting of 11 questions about age, gender, marital status, educational status, income status, employment status, number of children, time of diagnosis, time of treatment, treatment type and stage of breast cancer, was prepared by the researchers.

Functional assessment of chronic illness therapy-spiritual well-being (SpWB) (FACIT-Sp version 4 The scale was developed by Peterman et al. (2002) to determine spiritual well-being in chronic patients and cancer patients. Validity and reliability for Turkish society were done by Aktürk et al. (2017). The scale is used to measure spiritual well-being in patients with chronic diseases. All questions in the FACIT-Sp are rated on a 5-point scale (0 = not at all; 4 = very much), and evaluate overall spiritual well-being during the previous week. FACIT-Sp version 4 consists of quality of life (FACT-G) and spiritual well-being (Sp). The FACT-G (version 4) includes 27 items and four subscales: physical well-being (PWB = 7 items, score range 0–28), social/family well-being (SWB = 7 items, score range 0–28), emotional well-being (EWB = 6 items, score range 0–24), and functional well-being (FWB = 7 items, score range 0–28). The FACT-G scores range from 0 to 108 points, and higher scores indicate a better overall QoL. Sp consists of 12 items and three subscales. The scale was developed to assess the spiritual well-being of cancer patients or individuals with other chronic diseases. It enables profound investigation of all components of spiritual well-being via three subscales ("Peace," "Meaning," and "Faith"). It is a Likert-type scale that includes 12 items, and scale items are rated between 0 and 4 (0 never, 4 always). The Meaning (items 2, 3, 5, and 8), Peace (items 1, 4, 6, and 7), and Faith (items 9–12) subscales each have a total score range of 0–16, so that the range of total scores for the complete scale is 0–48. A higher score signifies greater spiritual well-being. The scale can be applied in 5 to 6 min. Peterman et al. determined that the value of Cronbach's *a* for the scale ranges from 0.81 to 0.83 [27]. In the current study, it was found to be 0.84.

The first measurement The Patient Sociodemographic and Medical Data Form and the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (SpWB) (FACIT-Sp Version 4) were applied to the patients included in the therapy group immediately before the first session. The

Table 1 Subject of therapy group sessions

Preparatory session	• Contact information was obtained with the consent of the participants. • Brief information was given to the therapy group about the mindfulness practice. • It was explained that the application will be made with an online zoom link and the necessity of creating an infrastructure for this. • The materials required during the mindfulness practice (Comfortable clothes, a mat or a soft thick blanket suitable for laying on the floor, three raisins/dried fruits) were specified. • The date and time were determined for the first meeting.
First session	• Meeting with the participants was started by using the awareness meeting method. In this form of acquaintance, the participants introduced themselves to each other in pairs. The person who listened to what the other person said, told what they heard as far as he could remember. • What is mindfulness? How aware are we of life? These were discussed. • By showing a picture with nine dots, the participants were asked to connect these nine dots with 4 lines without ever raising their hands. This was used as a kind of focus exercise. • The story "Across the Stream", which contains the messages that we cannot focus on our surroundings while trying to keep up with the tempo of time, was read. • A mindful eating technique was applied with three raisins. The task of "eating mindfully" was given at least one meal during the week. • The first session was terminated after one minute of silence.
Second session	• Mutual feedback was received on the assigned assignments. • It was argued that it is not impossible to connect the 9 points. • Everyone was asked to lie down in a comfortable place or on a mat and focus on what was being said. In this way, a body scan was performed, focusing their attention on the limbs, trunk, and head, respectively. • After sharing the thoughts after the body scan, everyone was asked to take a comfortable sitting position. In this way, they were told to focus on the breath and then focus on sounds coming from near and far. In this way, the sitting exercise is completed. • Participants were asked to do 10-15 minutes of "sitting exercise" every day during the week. • For six days, the participants were asked to perform a "body scan" with the audio recording sent to them. • They were asked to create a "calendar of pleasant moments" by taking notes on the topics they liked every day of the week. • The first session was ended after the eyes were closed and they sat in silence for a minute.

Patient Sociodemographic and Medical Data Form and the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (SpWB) (FACIT-SpVERSION 4) were applied to those included in the control group during the first interview.

Final measurement The patients in the therapy group were re-applied the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (SpWB) (FACIT-Sp Version 4) immediately after the last session (after 8 weeks). The patients in the control group were re-applied the Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being (SpWB) (FACIT-Sp Version 4) 8 weeks after the first measurement.

Statistical analysis

The data obtained from the research were analyzed using the SPSS version 25.0 (SPSS Inc., Chicago, IL, USA) program. Sociodemographic and clinical characteristics of the patients in the therapy and control groups were examined by taking the number, percentage, arithmetic mean, and standard deviation. In order to show the similarity between the groups in terms of sociodemographic and clinical characteristics, the significance test of the difference between the two averages for the age variable and chi-squared analysis for other categorical variables were used. The conformity of the data to the normal distribution was examined using the Shapiro–Wilk test. The independent sample *t* test was used to evaluate the difference between the mean scores of the quality of life and spiritual well-being of the therapy and control groups, since the data showed normal distribution. The paired sample *t* test was used to compare the mean scores of quality of life and spiritual well-being over time (before and after the intervention) in the in-group measurements.

Table 1 (continued)

Third Session		• Awareness of what is in the pleasant moments calendar was discussed. • Experiences during the meditations held during the week were shared. • What is autopilot? An awareness speech was given about how often we experience this. If there are things we prefer to avoid, it was made to be noticed. • A 15-minute sitting exercise was performed. • 15 minutes of yoga was practiced with conscious awareness. • The session was completed with a 3-minute mindful breathing exercise. • Homework: Creating a "calendar of unpleasant moments" during the week, trying to realize the state of being on autopilot during the day, doing yoga with awareness every other day and doing daily sitting exercises.
Fourth Session		• The unpleasant moments noted during the week and the feelings these moments create in individuals were discussed. • Focusing exercise was carried out by asking the listener to tell the whole group what he heard, in pairs, to explain their plans and thoughts about the future. • Mindful breathing exercise was performed by focusing on mindful breathing for 20 minutes. The participants were given the command to "breathe as you normally would during this exercise, but notice the changes in your chest and abdomen during breathing". • The article on 21 ways to reduce stress was read and the possibilities of making it a part of life were discussed. • The awareness of our body's reactions to stress was explained. • Yoga was practiced with awareness for 15 minutes. • One day yoga and one day body scan were given as weekday homework on consecutive days. • The session was completed with 1 minute of silence.
Fifth session		• Awareness of the body's reactions in case of stress was discussed during the week. Participants were asked to share their experiences. • Body scanning was done on the mats. • Mutual experiences were shared on the stress factors brought by the treatment process, the difficult situations experienced and the reactions given to them, and the methods of coping with the reactions. • The existence of compassion and self-compassion was discussed and thoughts shared. • The session was completed with a 3-minute awareness breathing exercise.
Sixth session		• This week has been determined as the day of silence. Participants were asked not to verbally communicate with anyone around them or with us throughout the session. • During the two hours of the session, the participants were kept quiet. • During this silence, sitting exercise, mindfulness yoga exercises, breathing exercise, step exercise were applied. • During these exercises, if the participants encountered difficult situations such as fear, anger, sadness, and impatience, they were asked to turn these feelings into friendship and curiosity with awareness. • It was given as homework to fill in the "communication exercises" calendar for the 7th week and the session was completed.
Seventh session		• Mutual communication was established regarding the "communication exercises" calendar filled during the week. • The effects of difficulties in communication on our bodies were discussed. • Body scanning, yoga and sitting exercises were performed. • The exercise of consciously eating any food available near us was done. • For the next week, it was given as homework to do body scan, yoga and sitting exercises without sound recording, respectively. • The session was completed by breathing with awareness for 3 minutes.
Eighth Session		• Experiences during the week were shared. • The article "If I had a chance to live my life again" was read. • The sustainability of the exercises learned without a voice recording was discussed. The plans made for this were shared. • They were asked to question themselves about how they could make sense of the stories we read. • The program was completed with 5 minutes of awareness breathing exercise and 1 minute of silence.

Results

Baseline characteristics

The distribution and comparison of the patients in the therapy and control groups according to their sociodemographic and medical characteristics are given in Table 2. The average age of the patients in the therapy group was 42.22 ± 6.86, while the average age of those in the control group was 41.64 ± 6.04. There were no statistically significant differences between the groups in terms of clinical characteristics. The groups showed homogeneous distribution.

Primary outcomes

The comparison of some characteristics of the treatment and control groups with the FACIT-Sp mean scores is given in Table 3. Accordingly, there was no difference between the mean scores of the pretest and posttest according to the diagnosis time, receiving chemotherapy, receiving radiotherapy, surgical intervention, and stage of the breast cancer. The overall average score of the spiritual well-being (Sp) and subscale score averages of the both groups are given in Table 4 and Fig. 2. Accordingly, in the in-group comparison, it was determined that there was no statistical difference between the Meaning, Peace,

Table 2 Baseline demographic data and clinical characteristics of the patients in the therapy and control group

Characteristics	Control group ($n=33$)	Therapy group ($n=32$)	Test	p
Age ($\bar{x}\pm$ SD)	41.64 ±6.04	42.22 ±6.86	0.36*	0.71
	n (%)	*N* (%)		
Education status				
Primary school	15 (52.9)	10 (29.0)	3.48	0.32
High school	12 (36.4)	12 (37.5)		
University	6 (18.2)	10 (31.3)		
Working status				
Not working	22 (66.7)	16 (50.0)	1.85**	0.17
Working	11 (33.3)	16 (50.0)		
Marital status				
Married	27 (81.8)	24 (75.0)	0.44**	0.50
Single	6 (18.2)	8 (25.0)		
Diagnosis time				
> 6 months– ≤ 1 year	12 (36.4)	15 (75.0)	1.98**	0.18
> 1–5 year	21 (63.6)	17 (25.0)		
Receiving chemotherapy				
Yes	31 (93.9)	25 (78.1)	3.40**	0.06
No	2 (6.1)	7 (21.9)		
Receiving radiotherapy				
Yes	25 (75.8)	26 (81.3)	0.29**	0.59
No	8 (24.2)	6 (18.8)		
Surgical intervention				
Yes (> 6 months)	33 (100.0)	32 (100.0)		
Stage of the breast cancer				
Stage 1	6 (18.2)	13 (40.6)	6.80**	0.07
Stage 2	17 (51.5)	8 (25.0)		
Stage 3	10 (30.3)	11 (34.4)		

Data are presented as mean ± standard deviation, range, number, and percentage. Data were analyzed by unpaired *t* test, independent sample *t* test, or chi-squared test as appropriate. Significance level was set at $p<0.05$, and values in bold are significant

N number, *SD* standard deviation

*Independent sample *t* test

**Chi-squared test

Table 3 Comparison of some characteristics of therapy and control groups with FACIT-Sp mean scores

		Pre-test			Post-test		
		$\bar{x}\mp$SD	Z/X^2	p	$\bar{x}\mp$SD	Z/X^2	p
Therapy group							
Diagnosis time	> 6 months– ≤ 1 year	85.06 ± 23.46	0.96	0.61	101.76 ± 27.41	0.44	0.64
	> 1–5 years	90.35 ± 27.46			99.22 ± 24.98		
Receiving chemotherapy	Yes	84.00 ± 22.05	− 0.93	0.35	95.59 ± 23.30	1.95	0.12
	No	91.45 ± 30.95			122.25 ± 25.77		
Receiving radiotherapy	Yes	83.89 ± 22.61	− 0.99	0.32	98.70 ± 21,29	0.13	0.89
	No	93.13 ± 30.08			100.50 ± 47.89		
Surgical intervention	Yes	85.08 ± 21.94	− 0.41	0.68	94.28 ± 21.91	1.78	0.11
	No	87.57 ± 31.97			115.50 ± 29.31		
Stage of the breast cancer	Stage 1	85.96 ± 29.21	3.54	0.31	101.55 ± 28.35	0.98	0.41
	Stage 2	75.89 ± 13.47			91.75 ± 21.04		
	Stage 3	91.45 ± 23.29			104.45 ± 22.51		
Control group							
Diagnosis time	> 6 months– ≤ 1 year	75.27 ± 29.89	1.62	0.20	76.35 ± 27.36	0.60	0.43
	> 1–5 years	88.76 ± 25.36			83.08 ± 28.00		
Receiving chemotherapy	Yes	83.62 ± 28.30	− 0.52	0.59	79.16 ± 27.64	− 1.05	0.29
	No	87.50 ± 3.53			101.00 ± 00.00		
Receiving radiotherapy	Yes	82.51 ± 30.09	− 0.86	0.38	75.49 ± 25.37	− 1.58	0.11
	No	88.06 ± 17.57			99.30 ± 30.43		
Operated	Yes	79.38 ± 26.81	− 1.25	0.21	75.75 ± 28.71	− 1.29	0.19
	No	95.79 ± 26.88			90.66 ± 21.63		
Stage of the disease	Stage 1	92.00 ± 34.75			75.05 ± 13.81		
	Stage 2	81.98 ± 28.91	0.18	0.91	75.31 ± 30.40	1.61	0.44
	Stage 3	82.16 ± 21.55			90.35 ± 27.52		

*For variables with two categories, Z values are given using Mann Whitney U test, and for variables with three or more categories, X^2 values are given using Kruskal–Wallis test

and Faith subscale scores and the overall score average of the spiritual well-being in both groups at the first and final measurement ($p > 0.05$). However, although there was no significant difference, it was noteworthy that in the final measurement, the average score of the patients in the therapy group increased, while the average score of the control group tended to decrease. In the intra-group comparisons, it was found that the average score of the Meaning subscale (12.25 ± 3.03) and the overall score average of the spiritual well-being (31.56 ± 8.90) obtained in the last measurement in the therapy group were statistically significantly higher than the control group ($p< 0.05$).

Secondary outcomes

The in-group and intra-group comparisons of the quality of life mean scores and subscales of the patients in the therapy and control group are given in Table 5 and Fig. 3. According to the in-group comparison, there was no statistical difference between the physical well-being, social life-family well-being, emotional well-being, functional well-being average scores, and the overall quality of life score average in the first and final measurements conducted in both groups ($p > 0.05$). However, although there was no significant difference, it was noteworthy that the average scores of patients in the therapy group increased in the final measurement, while the average scores of the control group tended to decrease. According to the intra-group comparison, the emotional well-being (13.46 ± 5.78), physical well-being (16.71 ± 5.59), and the overall quality of life score averages (66.98 ± 17.72) of the therapy group obtained in the final measurement were found to be statistically significantly higher compared to the control group ($p < 0.05$).

Table 4 The overall average score of the spiritual well-being and subscale score averages of the patients in the therapy and control group

	Control group $\bar{x}\pm$ SD	Therapy group $\bar{x}\pm$ SD	t*	p
Meaning				
First measurement	10.15 ± 3.80	11.78 ± 3.15	1.87	0.06
Final measurement	10.06 ± 3.79	12.25 ± 3.03	2.56	**0.01***
t**/p	0.09/0.92	−0.70/0.48		
Peace				
First measurement	8.03 ± 3.58	8.43 ± 3.41	0.46	0.64
Final measurement	7.09 ± 2.77	8.59 ± 3.88	1.79	0.07
t**/p	1.13/0.26	−1.48/0.88		
Faith				
First measurement	10.63 ± 4.58	10.65 ± 5.02	0.01	0.98
Final measurement	9.93 ± 4.77	10.71 ± 4.15	0.70	0.48
t**/p	0.68/0.49	−0.64/0.95		
Total				
First measurement	28.81 ± 10.15	30.87 ± 9.22	0.85	0.39
Final measurement	27.09 ± 9.51	31.56 ± 8.90	1.95	**0.04***
t**/p	0.74/0.46	−0.31/0.75		

Data are presented as mean ± standard deviation, range, number, and percentage. Data were analyzed by unpaired t test, independent sample t test, or paired sample t test as appropriate. Significance level was set at $p < 0.05$, and values in bold are significant

*Independent sample t test

**Paired sample t test

Discussion

Breast cancer has a spiritual impact on patients, causing them to experience spiritual distress. Spiritual distress significantly reduces the quality of life of patients. MBT is considered a method that can be used to increase physical and psychological well-being and quality life of patients with breast cancer, as well as making life meaningful. In the current study, the effect of MBT on breast cancer patients was examined.

Spirituality is considered a source of strength and support for improving individuals' health who are seeking for the meaning and purpose of life [28]. Mindfulness-based interventions are stated to be effective in reducing psychological distress and other symptoms in cancer patients [24, 29]. It was found that mindfulness-based therapy provided for breast cancer patients undergoing chemotherapy significantly increased the score of the Meaning subscale of spiritual well-being [24]. In this study, it was found that the average score of the Meaning subscale of the therapy group was significantly higher in the last measurement compared to the control group. This finding supports the knowledge that MBT is considered a way to make life meaningful [16]. In addition, it can be concluded that it helps breast cancer patients who are questioning and seeking the meaning and purpose of life.

Table 5 The in-group and intra-group comparisons of the quality of life mean scores and subscales of the patients in the therapy and control group

	Control group $\bar{x}\pm$ SD	Therapy group $\bar{x}\pm$ SD	t*	p
PWB				
First measurement	13.48 ± 6.48	15.81 ± 6.66	1.42	0.15
Final measurement	12.87 ± 6.72	16.71 ± 5.59	2.49	**0.01**
t**/p	0.41/0.68	−0.66/0.50		
SWB				
First measurement	19.13 ± 5.49	20.16 ± 5.97	0.72	0.47
Final measurement	19.06 ± 5.74	20.36 ± 5.38	0.94	0.35
t**/p	0.06/0.95	−0.15/0.88		
EWB				
First measurement	9.75 ±5.22	12.90 ±5.40	2.39	**0.02**
Final measurement	8.75 ± 5.14	13.46 ± 5.78	3.47	**0.00**
t**/p	0.87/0.38	−0.39/0.69		
FWB				
First measurement	13.03 ± 6.82	14.15 ± 7.56	0.63	0.53
Final measurement	12.33 ± 7.00	16.75 ± 6.33	2.66	0.10
t**/p	0.36/0.72	−1.60/0.12		
Total				
First measurement	55.22 ± 18.26	63.06 ± 19.74	1.66	0.10
Final measurement	53.03 ± 18.65	66.98 ± 17.72	3.090	**0.00**
t**/p	−0.86/0.60	0.52/0.39		

Data are presented as mean ± standard deviation, range, number, and percentage. Data were analyzed by unpaired t test, independent sample t test, or paired sample t test as appropriate. Significance level was set at $p < 0.05$, and values in bold are significant

PWB physical well-being, *SWB* social/family well-being, *EWB* emotional well-being, *FWB* functional well-being

*Independent sample t test

**Paired sample t test

Mindfulness-based interventions are effective in reducing psychological distress and other symptoms in cancer patients [24, 29]. In a previous study, it was found that mindfulness-based interventions had no effect on increasing spiritual well-being [7]. In a randomized controlled study examining the effect of mindfulness-based cognitive therapy in breast cancer patients, it was determined that it significantly increased the spiritual well-being levels of the patients [25]. In another study, it was determined that 1-week MBAT intervention for breast cancer patients undergoing chemotherapy significantly decreased the psychological distress and significantly improved the SWB in terms of Meaning, Peace, and Faith [24]. Similarly in the current study, it was found that the overall spiritual well-being (SP-12) score average of the therapy group was statistically significantly higher compared to the control group according to the final measurement. According to the study findings, MBT may have increased the level of spiritual well-being by significantly increasing

Fig. 2 The overall average score of the spiritual well-being (SP-12) and subscale of the both groups

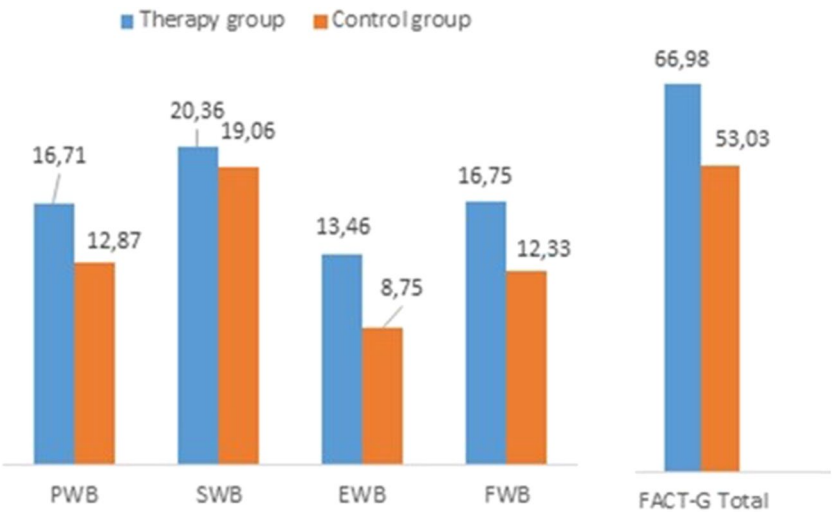

Fig. 3 The overall average score of the FACT-G total and subscale of the both groups

the Meaning subscale of spirituality in particular. The H1 hypothesis of the study was confirmed.

Patients perceiving the disease as posing a life-threatening risk may cause them to experience crisis since it influences them in physical, psychosocial, behavioral, and spiritual aspects [9]. Mindfulness interventions are considered a way to ensure physical and psychological well-being in patients [16]. In this study, it was determined that the average physical well-being, emotional well-being subscales, and total FACT-G scores of the therapy group in the final measurement were statistically significantly higher compared to the first measurement results. In a previous study, it was found that 6-week mindfulness-based reduction program increased the level of emotional well-being of breast cancer patients [30]. In other studies [20, 31, 32] and systematic reviews [3, 6], mindfulness-based interventions were found to reduce the fatigue levels of breast cancer patients. In other systematic reviews and meta-analysis studies, it was found that mindfulness-based interventions had a significant therapeutic effect on sleep [3, 31]. It is reported that the increase in the level of mindfulness in individuals mediates an increase in the quality of life in addition to an increase in spiritual and mental health [33]. In recent studies conducted with breast cancer patients, it has been determined that mindfulness-based stress reduction program has a positive effect on the quality of life of patients [21, 22, 25]. It may be concluded that this result supports the knowledge [16] that mindfulness and mindfulness-based initiatives are seen as a way to increase the physical and psychological well-being of individuals, helping them live better. The H2 hypothesis of the study was confirmed.

Conclusions

In this study, which was carried out in order to determine the effect of MBT on spiritual well-being in patients with breast cancer, it was determined that MBT program applied for 8 weeks increased the level of spiritual well-being and quality of life of patients. Nurses who care for patients with breast cancer can increase their quality of life by increasing their spiritual well-being during surgery and other treatment processes by using MBT intervention from the first

diagnosis. So nurses should be encouraged to perform MBT sessions to make it a widespread practice, and to regularly evaluate the outcomes.

Limitations

The research has some limitations. Since the study was conducted during the COVID-19 pandemic and the participants were a risky group, MBT could not be applied face to face. Therefore, MBT, which requires close communication with patients, has been challenging for researchers and patients. In addition, since the patients attended from their homes, the noise in the home environment and their role in the home negatively affected their focus on the MBT intervention.

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Author contribution All authors contributed to the study conception and design. Conceptualization: Hatice Öner Cengiz. Methodology: Hatice Öner Cengiz. Data curation: Berna Bayir and Mehmet Demirtaş. Formal analysis and investigation: Serap Sayar and Berna Bayir. Writing—original draft preparation: Hatice Öner Cengiz. Writing—review and editing: Hatice Öner Cengiz, Berna Bayir, Serap Sayar, and Mehmet Demirtaş. All authors read and approved the final manuscript.

Data availability The data that support the findings of this study are available upon reasonable request.

Declarations

Ethics approval Ethical approval was obtained from the ethics committee (KTO Karatay University Non-pharmaceutical and Non-medical Device Research Ethics Committee Chairmanship. Date September 07, 2021 registration number E-41901325–050.99–14950/2021/029). In the study, the articles in the Declaration of Helsinki were complied with. This study was registered in the Clinical Trial Registry (registration number NCT05057078) prior to data collection process. All participants were thoroughly briefed on the research process before providing their consent, and all were ensured that there would be no consequences in case they choose to withdraw at any stage. Verbal and written consent was obtained from all participants. The study was conducted in accordance with the Consolidated Standards of Reporting Trials (CONSORT) 2010 guidelines.

Consent to participate Informed consent was obtained from all individual participants included in the study.

Consent for publication Patients signed informed consent regarding publishing their data.

Conflict of interest The authors declare no competing interests.

Ethics committee permission KTO Karatay University Non-pharmaceutical and Non-medical Device Research Ethics Committee Chairmanship. Date: September 07, 2021 E-41901325–050.99-Number of decision: 14950/2021/029.

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