Clinical trial

The effect of music listening intervention applied during radiation therapy on the anxiety and comfort level in women with early-stage breast cancer: A randomized controlled trial

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ABSTRACT

Introduction: The aim of this study was to examine the effect of a music listening intervention applied during radiation therapy on the anxiety and comfort level experienced by women with early-stage breast cancer.
Method: This randomized controlled study was conducted with 60 patients residing in a city located in western Turkey. After providing informed consent, the Hospital Anxiety and Depression Scale (HADS), and Radiation Therapy Comfort Questionnaire (RTCQ) were administered. A music listening intervention was applied to the patients in the intervention group during radiation therapy once a day for 5 weeks. The patients in the intervention group listened to Bach's 19 Trio Sonatas via an MP3 player with headphones for 20–40 min. The HADS and RTCQ were administered after the 5th week to evaluate anxiety and comfort levels.
Results: When HADS and RTCQ scores of the patients in the control and intervention groups before and after the intervention were compared, the differences between the groups were found to be statistically significant in favour of the intervention group ($p < 0.001$). There was a significant difference between intervention and control groups the pretest-posttest difference scores of HAD-A (F = 31.889, *p = 0.000*) and HAD-D (F = 46.848, *p = 0.000*) subscales of the HADS. A significant difference was also found between intervention and control groups the pretest-posttest RTCQ scores (F = 50.434, *p = 0.000*).
Conclusions: Music may provide an effective, non-invasive, cost-effective, easy to apply complementary approach without side effects which can be administered to women with breast cancer during radiation therapy.

1. Introduction

Today, cancer is the second leading cause of death after cardiac diseases and is one of the most important health problems due to its prevalence and negative effects on quality of life [1]. According to the recent cancer statistics; a total of 14.1 million new cancer cases were reported and 8.2 million deaths occurred due to cancer in 2012. While lung (13.0%), breast (11.9%) and colon (9.7%) cancers are the most commonly diagnosed types of cancer in the world; generally lung (19.4%), liver (9.1%), and gastric (8.8%) cancers cause death. It is estimated that new cancer cases will reach 26 million in 2030 [2]. According to the latest data of the Turkish Ministry of Health, approximately 162.000 cancer cases have recently been identified in Turkey. Cancer incidence is 269.7 per 100.000 in men and 173.3 per 100.000 in women. The most prevalent type of cancer is lung cancer (28%) in men and breast cancer (24%) in women in Turkey [3].

The diagnosis and subsequent treatment for breast cancer causes anxiety. Radiation Therapy (RT), one of treatment methods, is an important stress factor and studies have indicated that anxiety may influence patients undergoing RT sometimes throughout the course of disease and treatment and this ranges from 10% to 50% [4,5]. Lewis et al. determined that the anxiety was higher in patients with breast cancer during RT [6]. In the study conducted by O'Callaghan et al. in cancer patients undergoing radiotherapy for the first time, anxiety mean scores before the first radiotherapy treatment were higher than mean scores after radiotherapy treatment [7]. Highest anxiety levels were before RT (RT planning) and during the first RT session, but then reduced rapidly [4,5,7,8].

Factors such as the detection of a tumour in breast, the fear of radiation therapy, lack of information about devices used and their effects, different perceptions about waiting for treatment, the treatment room and side effects can all cause anxiety [9–11].

Anxiety and impaired comfort are among the most important factors affecting the commitment of patients to Radiation Therapy [9,12]. Being an essential need, comfort is one of the basic elements of holistic nursing care [13]. Maintenance of patients' well-being requires to

examine not only the bio-physical aspects (i.e. focusing on symptoms), but also the social, psychological, environmental, cultural, and economic aspects [9,13]. In nursing care, it is necessary to comfort patients and their families. Thus, nurses who are considered to be key healthcare professionals should address patients holistically, identify their comfort needs, and plan, apply, and evaluate convenient nursing interventions for their unmet needs [9,13]. Nursing interventions which increase the comfort level of patients generally include holistic care practices such as relaxation exercises, massage, imagination, aromatherapy, and music [9,13]. The term music medicine is used for music interventions applied generally by medical personnel who are not music therapists [14]. Since a music therapist was not employed in the present study, it is appropriate for terminology of music medicine. In 2005, the American Music Therapy Association defined music therapy as the clinical and evidence-based use of music to accomplish individual goals in a therapeutic relationship by a credential professional who has completed an approved music therapy program [15].

Research has suggested that music enables cancer patients to relieve and cope with the side effects of chemotherapy, increases their comfort levels, and decreases their anxiety levels [13,14,16,18–22]. In the study conducted by Zhao et al. with cancer patients, it was found that the patients in the intervention group listened to music to throughout radiation therapy and this significantly decreased their anxiety levels [19]. In the study by Smith et al., demonstrated that while there was no significant difference between the experimental and control groups in terms of the music listening intervention applied during radiation therapy, there was a decrease in the anxiety scores of the experimental group after the music listening intervention [18]. Chen et al. reported that a music listening intervention applied before radiation therapy significantly decreased the anxiety levels of the patients [23].

Music which is easy to apply and cost-effective and has no side effects and plays an active role in physical, psychological, social, emotional, and spiritual recovery is an intervention and because of these properties it can be performed in nursing practice [13,16,17]. In this context, music can be used to reduce anxiety and increase comfort in patients undergoing radiation therapy.

In Turkey, there have been no studies to evaluate the effect of music on anxiety and comfort levels of patients undergoing radiation therapy. This study was planned to examine the effect of music listening, on the anxiety and comfort levels of patients undergoing radiation therapy.

2. Methods

2.1. Study design

This study was a randomized controlled trial.

2.1.1. Setting and sample

The population of the study consisted of individuals who has a diagnosis of early-stage breast cancer attending the radiation oncology outpatient clinic of Dokuz Eylul University Medical Faculty Hospital, located in the western Turkey, and who were receiving radiation therapy between November 2017 and October 2018.

The sample size of the study was determined by performing the power analysis in the G-power statistics software. It was determined that 30 patients were required for each of intervention and control groups based on statistical power of 0.80 (1-β), effect size of 0.74, and the significance level of 0.05 (α) calculated in previous studies [18]. 60 patients (30 patients in the intervention group, 30 patients in the control group), who were receiving treatment in the mentioned centre and met the inclusion criteria, were included in the study. The inclusion criteria of the study for patients were determined as; (a) being 18 years and over, (b) being diagnosed with breast cancer, stage I,II, (c) having no hearing-speech problem, (d) receiving no psychiatric treatment (taking no anti-anxiety/antidepressant drugs), (e) Not being in the terminal stage, (f) having cancer in the right breast (because breath-

holding technique is administered to patients with left-sided breast cancer, they cannot listen to music during the application), and (g) volunteering to participate in the study.

2.2. Instruments for evaluation

The data were collected using a Questionnaire for Socio-demographic and Disease Characteristics, which was prepared by the researcher upon the literature review, Hospital Anxiety and Depression Scale (HADS), and Radiation Therapy Comfort Questionnaire (RTCQ).

2.2.1. The questionnaire on socio-demographic and disease characteristics

The demographic form was prepared by the researchers according to the information identified in similar studies [18,20,23,24]. The socio-demographic data were collected with a total of 5 questions including age, marital status, educational level, working condition and social security; whereas, the disease-related data were collected with a total of 5 questions about stage of disease, diagnosis duration, state of administering surgery/chemotherapy, and number of radiation therapies.

2.2.2. Hospital anxiety and depression Scale-HADS

The scale was developed by Zigmond and Snaith to determine the risk of anxiety and depression in patients and measure the change of the risk level and severity [25]. Turkish validity and reliability study of the scale was conducted by Aydemir et al. [26]. It is used for rapidly identifying anxiety and depression in individuals, who suffer from a physical disease and apply to primary healthcare, and determining the risk group rather than making a diagnosis. Among a total of 14 questions, seven questions (odd numbers) measure anxiety and seven questions (even numbers) measure depression. The answers are rated between 0–3 points in a four-point likert scale. Scoring each item of the scale is different. The items 1, 3, 5, 6, 8, 10, 11, and 13 indicate a gradually decreasing severity and are scored as 3, 2, 1, and 0. On the other hand, the items 2, 4, 7, 9, 12, and 14 are scored as 0, 1, 2, and 3. While the items 1, 3, 5, 7, 9, 11, and 13 are summed for the subscale of anxiety, the items 2, 4, 6, 8, 10, 12, and 14 are summed for the subscale of depression. The lowest and highest scores of both subscales are 0 and 21, respectively. Cut-off point of the Turkish version of the HADS is found to be 10 for the subscale of anxiety (HAD-A) and 7 for the subscale of depression (HAD-D). The Cronbach's alpha coefficient is found to be 0.8525 for the subscale of anxiety and 0.7784 for the subscale of depression [26]. In this study, on the other hand, the Cronbach's alpha value was found to be 0.80 for the subscale of anxiety and 0.78 for the subscale of depression.

2.2.3. Radiation therapy comfort questionnaire (RTCQ)

RTCQ was developed by Kolcaba and its Turkish validity and reliability study was conducted by Karabacak and Acaroğlu [27,28]. Used for evaluating the comfort status of the women receiving radiation therapy due to breast cancer, the questionnaire is a six (1–6)-point likert scale with 26 items, each of which is scored from "strongly agree" to "strongly disagree". The highest scores of the questionnaire indicate a better comfort (min 1 and max 6) status. The highest and lowest total scores of the questionnaire are 156 and 26, respectively. Karabacak and Acaroğlu determined that Cronbach's alpha value of the RTCQ was 0.61 for the test application and 0.63 for the retest application. In this study, the Cronbach's alpha value was 0.71 [28].

2.3. Intervention and intervention protocol

The researcher evaluated whether the patients met the study criteria, informed them, and once they had agreed, received their written consent. Among the patients who agreed to participate in the study, the first patient who came to the radiation oncology outpatient clinic was assigned to the intervention group and the second patient was assigned
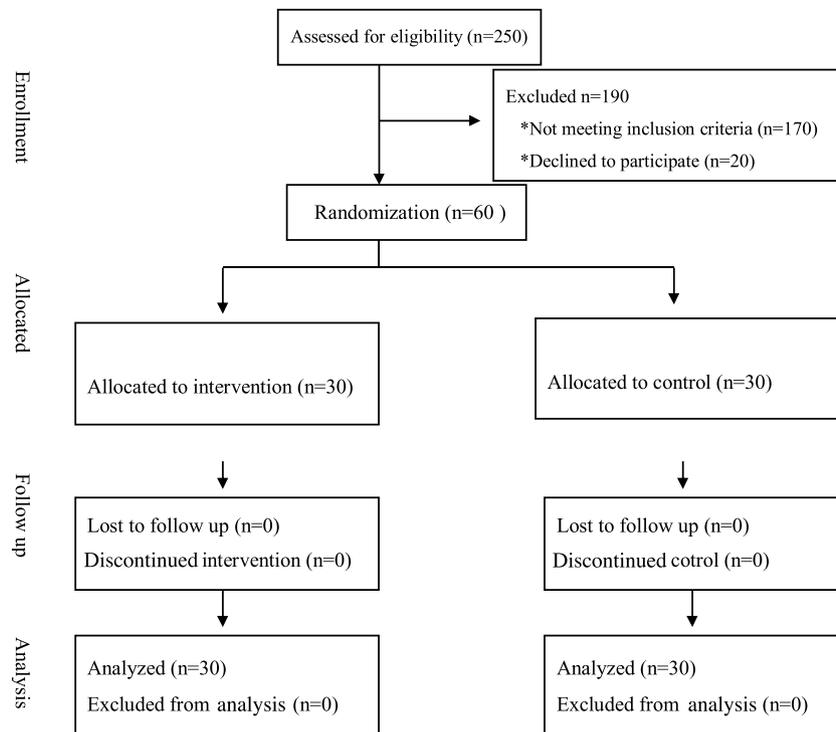
Fig. 1. Consort flow diagram.

to control group so that they were randomly assigned to the study groups (Fig. 1). The same procedure was continued until there were 30 patients in each group. The music listening intervention was applied to the patients in the intervention group, the control group received no intervention.

2.3.1. Intervention

2.3.1.1. Selecting the music type. A portable MP3 player with double earphones procured by the researcher was used for the music listening intervention. The patients in the intervention group were taught how to use the MP3 player for turning on, turning off and adjusting the volume and their questions were answered in an available room in the unit before the radiation therapy. The music type and the duration of listening were determined according to previous research which suggested that music can cause irritation during continuous listening, but music listened to for 15–40 min in one session, for a few times a day, throughout 3–5 days a week can create a therapeutic effect with instrumental music providing better relaxation than music with lyrics [13,16,29–32].

The patients in the intervention group listened to the 19 Trio Sonatas, a relaxing piece of Bach, which was chosen by a music and rhythm expert, via an MP3 player with earphone for 20–40 min during radiation therapy in the treatment unit. The piece chosen was Bach's 19 trio sonatas in which James Galway plays the flute. [32,33].

The literature has suggested that 15–40 min music listening is sufficient for music medicine, but music may cause irritation when it is listened for a longer time [29,30]. Thus, the patients listened to music for approximately 20–40 min.

2.3.1.2. Intervention protocol

2.3.1.2.1. Intervention group. On the first day of treatment, the patients were taken to the waiting room for radiation therapy and completed socio-demographic and disease characteristics questionnaire, the HADS and the RTCQ. They were provided with the music listening intervention via an MP3 player with earphone *during radiation therapy five times a week for 5 weeks*. At the end of the 5th week (when the intervention ended), the scales (HADS and RTCQ) were

applied again and the comfort and anxiety levels of the patients were evaluated.

2.3.1.3. Control Group. The patients who were included in the study filled out the questionnaire for socio-demographic and disease characteristics, HADS and RTCQ on the first day. No music listening intervention was administered to the patients in this group. At the end of the 5th week, the HADS and RTCQ were completed again and patients comfort and anxiety levels evaluated.

2.4. Data analysis

The data were entered into SPSS 21.0 program. The χ^2 test and independent Student's *t*-test were used to compare whether or not there was any difference between the intervention and control groups in terms of basic characteristics. ANCOVA analysis was performed to show the effect of repeated measurements.

2.5. Ethical considerations

In order to conduct the study, a written approval was obtained from the Ethics Committee of Dokuz Eylul University (ethics committee no: 2017/26–39). The patients were informed about the study within the scope of the Declaration of Helsinki and their written informed consents were received.

3. Results

3.1. Participant characteristics

A total of 250 patients were assessed for eligibility (Fig. 1). Of the 80 eligible patients 60 agreed to participate. These patients were sequentially randomized into the intervention group or control group. No participants withdrew from the study. The average age of the participants was 59.40 ± 13.28 years. Among the patients, 35.0% were primary school graduates and 78.3% were married. The patients were diagnosed with breast cancer for 9.18 ± 6.66 months on average and

Table 1
Baseline Characteristics at pretest between intervention and control groups.

Variable	Group		Total sample (n = 60)	Significance, P-value
	Intervention group (n = 30) n (%)	Control group (n = 30) n (%)	n (%)	
Age (mean ± SD)	62.20 ± 12.49	56.60 ± 13.66	59.40 ± 13.28	1.657 0.103[b]
Diagnosis duration (months)(mean ± SD)	10.40 ± 7. 53	7.96 ± 5.51	9.18 ± 6. 66	1.427 0.159[b]
Marital status				
Married	21(70.0)	26(86.7)	47(78.3)	2.455 0.209[a]
Single	9(30.0)	4(13.3)	13(21.7)	
Educational Level				
İlliterate	4(13.3)	2(6.7)	6(10.0)	2.051 0.562[a]
Primary education (age 7 to 11)	12(40.0)	9(30.0)	21(35.0)	
Secondary education (age 12 to 15)	7(23.3)	8(26.7)	15(25.0)	
University	7(23.3)	11(36.7)	18(30.0)	
Stage of disease				
Stage I	17(56.7)	18(60.0)	35(58.3)	0.069 0.793[a]
Stage II	13(43.3)	12(40.0)	25(41.7)	
Currently receiving surgery				
Yes	27(90.0)	24(80.0)	51(85.0)	1176 0,472[a]
No	3(10.0)	6(20.0)	9(15.0)	
Currently receiving chemotherapy				
Yes	21(70.0)	22(73.3)	43(71.7)	0.082 0.774[a]
No	9(30.0)	8(26.7)	17(28.3)	
Number of radiation therapies				
< 10	3(10.0)	5(16.7)	8(13.3)	0.595 0.743[a]
10-20	5(16.7)	5(16.7)	10(16.7)	
> 20	22(73.3)	20(66.7)	42(70.0)	

[a] Chi-square analyse.
[b] Independent t test.

58.3% of the patients had the stage I disease. 85.0% of the patients received surgical therapy, 71.7% received chemotherapy, and 70.0% received Radiation Therapy for more than 20 times (Table 1). All patients were receiving social security and 76.7% were unemployed but these results are not presented in the table.

There was no statistically significant difference between the intervention and control groups in terms of age, duration of diagnosis, marital status, educational level, stage of disease, the state of receiving surgical therapy/chemotherapy, and the number of radiation therapies (p > 0.05) (Table 1).

3.1.1. Difference between HADS and RTCQ scores of intervention and control groups

When HADS and RTCQ scores of the patients in the control and intervention groups before and after the intervention were compared, the differences were found to be statistically significant between the groups in favour of the intervention group ($p < 0.001$; Table 2).

There was a significant difference between intervention and control groups the pretest-posttest difference scores of HAD-A (F = 31.889, $p = 0.000$) and HAD-D (F = 46.848, $p = 0.000$) subscales of the HADS. Their HAD-A and HAD-D mean scores showed a statistically significant decrease after the music listening intervention; in other words, the anxiety and depression levels of the patients decreased (Table 2).

A significant difference was also found between intervention and control groups the pretest-posttest RTCQ scores (F = 50.434, $p = 0.000$). The comfort levels of the patients increased after the music listening (Table 2).

3.1.2. Effect size

The effect size was 0.58 for HAD-A and HAD-D, the subscales of HADS and 0.53 for RTCQ.

4. Discussion

This study is important because it reveals the positive effect of a music listening intervention during radiation therapy on the anxiety and comfort levels of women with early-stage breast cancer.

Table 2
Difference of HADS and RTCQ scores between intervention and control group at pretest and post-test.

Variable	Intervention group Mean (SD)	Control group Mean (SD)	Significance test[a] (p)
HADS			
HAD-A			
Pre test	7.80 (3.82)	7.56(4.26)	$F^a = 31.889$
Post test	5.20 (2.83)	8.56(3.30)	p = 0.000
HAD-D			
Pretest	7.43(4.19)	686(4.59)	$F^a = 46.848$
Posttest	4.13(1.85)	8.33(4.02)	p = 0.000
RTCQ			
Pre test	99.76(15.98)	100.10(14.93)	$F^a = 50.434$
Post test	119.03(11.90)	96.53(16.64)	p = 0.000

Abbreviations: HADS: Hospital Anxiety and Depression Scale; HAD-A: Hospital Anxiety and Depression- Anxiety; HAD-D: Hospital Anxiety and Depression-Depression; RTCQ: Radiation Therapy Comfort Questionnaire.
[a] ANCOVA analysis was performed to show the effect of repeated measurements.

For patients diagnosed with cancer, the treatment (surgical, radiation therapy, chemotherapy, etc.) and the course of disease causes anxiety and depression as well as the diagnosis of cancer. Anxiety, depression and other symptoms increase the severity of negative physiological and psychological effects of the treatment on patients and affects their comfort levels negatively [19–21].

In the present study, the music listening intervention applied to the women with breast cancer during radiation therapy significantly decreased their anxiety and depression levels. Similarly, in studies by Zhao et al., Chen et al. and Rossetti et al., music listening applied before and during radiation therapy significantly decreased the anxiety levels [19,21,23]. Likewise, Uslu also found that music was an effective intervention in reducing the anxiety levels in cancer patients undergoing radiation therapy [15]. In the study conducted by O'Callaghan et al. using the selected type of music, it was observed that although the anxiety mean score was not significant in the intervention group, the

mean score (standard deviation) decreased from 37(13.1) to 33(11.4) [7]. In the present study, the anxiety mean score decreased from 7.80 (3.82) to 5.20 (2.83).

The systematic review by Hertrampf and Wärja, reported that the music intervention had a positive effect on depression levels of patients with breast cancer [14]. The meta-analysis study by Wang et al. on patients with breast cancer also demonstrated that music intervention positively affected levels of depression [22]. Psychological problems affecting cancer patients may include anxiety, depression, mood disorders, distress, and emotional difficulties. The patients may experience these problems due to some fears such as death, pain, disability, impaired daily life, side effects of treatments or uncontrollable symptoms of the disease. Karasawa et al. found that RT anxiety was related to the following concerns: acute adverse effects (60.6%), treatment outcome (41.3%), RT use indicating an incurable tumour (40.4%), radiation exposure (26.6%), excess irradiation (22%), equipment and treatment room (16.5%), isolation (11.9%), and late adverse effects (9.2%) [34]. While the occurrence of depressive symptoms is four times greater in patients with cancer than the general population, patients with breast cancer show increased levels of depressive symptoms compared to most other malignancies [8]. Music can be an effective intervention for coping with psychological problems like anxiety and depression. Music affects the right hemisphere of brain, causes psychophysiological responses over the limbic system, provides relaxation, and may decrease pain, stress and anxiety by leading to the release of enkephalin and endorphin.

This study showed that the music listening intervention applied to the women with breast cancer during radiation therapy significantly increased their comfort levels. Similarly, in the study conducted by Bilgiç and Acaroğlu with patients diagnosed with cancer, found that the comfort mean scores of the patients increased after the music listening [13]. Patients with breast cancer experience a number of symptoms such as nausea-vomiting, loss of appetite, fatigue, pain, mucositis, anxiety and depression due to cancer and cancer treatments (chemotherapy, radiation therapy, etc.) [13,24,29]. These symptoms affect negatively the life quality of patients and impair their comfort. The results of many studies have indicated that music listening has effective results on struggling with these symptoms [13,20,24,29]. In this way, the comfort of patients is also affected positively. Thus, music is an important component of a holistic nursing intervention which could be applied in the population of cancer patients.

4.1. Limitations

In this study, only the short-term effects of music listening were evaluated and there was no follow up after 5 weeks. Thus, these results are only applicable to short-term effects of music on anxiety and comfort. Another limitation is patients in the intervention group were not allowed to self-select their preferred music but by providing only one music intervention suggests that it may be generalizable to this population. The use of different types of music may have had different impacts.

5. Conclusion

In the study, it was determined that music listening intervention applied to women with early-stage breast cancer during radiation therapy decreased their anxiety/depression levels and increased their comfort levels.

Nurses have important responsibilities in managing these symptoms because they spend more time with patients. Music can be administered as a non-invasive, easy to apply, cost-effective and independent nursing intervention without any side effects and with effective results in patients with early-stage breast cancer during radiation therapy. Given that there are an insufficient number of studies examining the effect of music on patients undergoing radiation therapy in Turkey, further

studies administering music listening interventions to patients with different types of cancer and exploring patients music preferences in music selection are needed to explore whether the use of such interventions could be routinely used in nursing practice.

Funding

Conflict of interest

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article. All authors have contributed significantly to the research.

Acknowledgement

References

[1] E. Nazik, G. Öztunç, B. Şahin, Kemoterapi Alan Meme Kanserli Hastalarda Progresif Gevşeme Egzersizlerinin Uyku Kalitesi ve Ağrıya Etkisi, Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi 17 (3) (2014) 171–178.
[2] GLOBOCAN 2012. http://globocan.iarc.fr/Pages/fact_sheets_cancer.aspx (Accessed 05. April 2018).
[3] Kanser Daire Başkanlığı. http://www.kanser.gov.tr (Accessed 26, June 2018).
[4] H.E. Stiegelis, A.V. Ranchor, R. Sanderman, Psychological functioning in cancer patients treated with radiotherapy, Pat Educ Couns. 52 (2) (2004) 131–141.
[5] T. Mullaney, K. Olausson, L. Sharp, B. Zackrisson, D. Edvardsson, T. Nyholm, The influence of a department's psychosocial climate and treatment environment on cancer patients' anxiety during radiotherapy, Eur. J. Oncol. Nurs. 20 (2016) 113–118.
[6] F. Lewis, I. Merckaert, A. Liénard, et al., Anxiety and its time courses during radiotherapy for non-metastatic breast cancer: a longitudinal study, Radiother. Oncol. 111 (2014) 276–280.
[7] C. O'Callaghan, M. Sproston, K. Wilkinson, D. Willis, A. Milner, D. Grocke, G. Wheeler, Effect of self-selected music on adults' anxiety and subjective experiences during initial radiotherapy treatment: a randomised controlled trial and qualitative research, J. Med. Imaging Radiat. Oncol. 56 (2012) 473–477.
[8] G.O. Celik, A. Tuna, S. Samancioglu, M. Korkmaz, The fatigue, anxiety and depression levels of patients with breast cancer during radiotherapy, Int. J. Clin. Exp. Med. 9 (2) (2016) 4053–4058.
[9] G. Tuncer, S. Cinar Yucel, Comfort and anxiety levels of women with early stage breast cancer who receive radiotherapy, Asian Pac. J. Cancer Prev. 15 (5) (2014) 2109–2114.
[10] B. Dragomir, L. Fodoreanu, Correlations between state anxiety and quality of life in metastatic breast cancer patients, Rev. Med. Soc. Med. Nat. Iasi 117 (3) (2013) 610–615.
[11] S.S. Ho, W.K. So, D.Y. Leung, E.T. Lai, C.W. Chan, Anxiety, depression and quality of life in Chinese women with breast cancer during and after treatment: a comparative evaluation, Eur. J. Oncol. Nurs. 17 (6) (2013) 877–882.
[12] T. Hyphantis, A. Almyroudi, V. Paika, L.F. Degner, A.F. Carvalho, N. Pavlidis, Anxiety, depression and defense mechanisms associated with treatment decisional preferences and quality of life in non-metastatic breast cancer: a 1-year prospective study, Psycho-Oncology 22 (11) (2013) 2470–2477.
[13] Ş. Bilgiç, R. Acaroğlu, Effects of listening to music on the comfort of chemotherapy patients, West. J. Nurs. Res. 39 (6) (2017) 745–762.
[14] R.S. Hertrampf, M. Wärja, The effect of creative arts therapy and arts medicine on psychological outcomes in women with breast or gynecological cancer: a systematic review of arts-based interventions, Arts Psychother. 56 (2017) 93–110.
[15] G.H. Uslu, Influence of music therapy on the state of anxiety during radiotherapy, Turk. J. Oncol. 32 (4) (2017) 141–147.
[16] E. Karadağ, A. Karadakovan, The effect of music on the sleep quality and vital signs of the chronic renal failure patients who are getting hemodialysis treatment, Turkiye Klinikleri J. Nurs. Sci. 7 (2) (2015) 79–89.
[17] M. Uyar, E.A. Korhan, Yoğun bakım hastalarında müzik terapinin ağrı ve anksiyete üzerine etkisi [The effect of music therapy on pain and anxiety in intensive care patients], Ağrı. 23 (2011) 139–146.
[18] M. Smith, L. Casey, D. Johnson, C. Gwede, O.C. Riggins, Music as a therapeutic intervention for anxiety in patients receiving radiation therapy, Oncol. Nurs. Forum 28 (5) (2001) 855–862.
[19] P. Zhao, J. Liang, Q. Shao, F. Liang, H. Yuan, F. You, Intervention effects of musical therapy to physiological and psychological conditions in process of radiotherapy for patients with cancer, Chin. J. Cancer Prev. Treat. 15 (2008) 1097–1099.
[20] K. Boehm, H. Cramer, T. Staroszynski, T. Ostermann, Arts therapies for anxiety, depression, and quality of life in breast cancer patients: a systematic review and meta-analysis, Evid. Based Complement. Altern. Med. 1 (2014) 1–10.

[21] A. Rossetti, M. Chadha, B.N. Torres, J.K. Lee, D. Hylton, J.V. Loewy, L.B. Harrison, The impact of music therapy on anxiety in cancer patients undergoing simulation for radiation therapy, Int. J. Radiat. Oncol. Biol. Phys. 99 (1) (2017) 103–110.

[22] X. Wang, Y. Zhang, Y. Fan, X.S. Tan, X. Le, Effects of music intervention on the physical and mental status of patients with breast cancer: a systematic review and meta-analysis, Breast Care 13 (2018) 183–190.

[23] L.C. Chen, T.F. Wang, Y.N. Shih, L.J. Wu, Fifteen-minute music intervention reduces pre-radiotherapy anxiety in oncology patients, Eur. J. Oncol. Nurs. 17 (4) (2013) 436–441.

[24] T.R. Alcantara-Silva, R. Freitas-Junior, N.M.A. Freitas, W. Paula Junior, D.J. Silva, G.D.P. Machado, M.K.A. Ribeiro, J.P. Carneiro, L.R. Soares, Music therapy reduces radiotherapy- induced fatigue in patients with breast or gynecological cancer: a randomized trial, Integr. Cancer Ther. 17 (3) (2018) 628–635.

[25] A.S. Zigmund, R.P. Snaith, The hospital anxiety and depression scale, Acta Psychiatr. Scand. 67 (6) (1983) 361–370.

[26] Ö. Aydemir, T. Güvenir, L. Küey, S. Kültür, Hastane anksiyete ve depresyon ölçeği türkçe formunun geçerlik güvenilirlik çalışması, Türk Psikiyatri Dergisi 8 (1997) 280–287.

[27] K. Kolcaba, C. Fox, The effects of guided imagery on comfort of women with early stage breast cancer undergoing radiation therapy, Oncol. Nurs. Found. 26 (1) (1999) 67–72.

[28] Ü. Karabacak, R. Acaroğlu, The Interaction with Radiotherapy of Comfort Supportive Nursing Care and Education in Breast Cancer Patients, İ.Ü. Health Sciences Institute, İstanbul, 2004 PhD Thesis.

[29] S.T. Huang, M. Good, J.A. Zauszniewski, The effectiveness of music in relieving pain in cancer patients: a randomized controlled trial, Int. J. Nurs. Stud. 47 (11) (2010) 1354–1362.

[30] X.M. Li, K.N. Zhou, H. Yan, D.L. Wang, Y.P. Zhang, Effects of music therapy on anxiety of patients with breast cancer after radical mastectomy: a randomized clinical trial, J. Adv. Nurs. 68 (5) (2011) 1145–1155.

[31] M.M. Stanczyk, Music therapy in supportive cancer care, Rep. Pract. Oncol. Radiother. 1 (6) (2011) 170–172.

[32] E.A. Korhan, L. Khorshid, M. Uyar, The effect of music therapy on physiological signs of anxiety in patients receiving mechanical ventilatory support, J. Clin. Nurs. 20 (7-8) (2011) 1026–1034.

[33] U. Birkan, Klasik Batı Müziği ve Bach, Dinleyicinin Kitabı, Sage press, Istanbul, 2006, pp. 310–312.

[34] K. Karasawa, N. Horikawa, E. Kawase, et al., Assessment of psychological responses in patients about to receive radiotherapy, Radiat. Med. 23 (7) (2005) 478–484.