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ORIGINAL ARTICLE

Influence of Music Therapy on the State of Anxiety During Radiotherapy

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OBJECTIVE

In patients with cancer, both the disease and treatment process may cause various psychosocial problems, the most frequent of which is anxiety. Therefore, reducing anxiety level is essential for the psychosocial well-being of patients.

METHODS

The present study aimed to evaluate the effects of music therapy on state anxiety during radiotherapy. The study was conducted on 72 radiotherapy outpatients, who were divided into two groups. One group received music therapy and listened to songs of their choice, whereas the other group received no music therapy. The state anxiety level of the patients was evaluated a day before and upon completion of the therapy. Data were analysed using t-test, analysis of variance and chi-square test in dependent and independent groups.

RESULTS

The study found that anxiety levels of patients in the music therapy group decreased (p=0.001) and those of patients in the no-music therapy group increased compared with the baseline values (p=0.003). Moreover, anxiety levels of patients in the no-music therapy increased after radiotherapy compared with those before radiotherapy (p=0.006). Difference between the anxiety levels of patients before radiotherapy was not statistically significant (p=0.071); however, difference between the anxiety levels after radiotherapy was statistically significant (p=0.036).

CONCLUSION

Music therapy can reduce anxiety levels of patients undergoing radiotherapy.

Keywords: Music therapy; oncology patients; radiotherapy; state anxiety.

Introduction

Cancer is one of the most serious and common health problems worldwide that result in death. It accounts for 13% of the mortality rates in developed countries, and is the second most frequent cause of death after ischemic heart disease.[1] Current treatment of cancer involves surgery, chemotherapy, and radiotherapy. Approximately 4 of 10 patients (40%) with cancer receive radiotherapy at some point of their treatment. Radiotherapy is used to treat different types of cancer, and may be administered before or after surgery as a solitary treatment or in combination with chemotherapy. Radiotherapy is often administered for 2–5 weeks with doses in multiple daily fractions.

Patients experience several side effects during the

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treatment process. In particular, along with various physical side effects, emotional and social problems, such as anxiety, depression, fear, loneliness, and hopelessness, may be experienced as a result of long-term treatment and uncertainty.[2,3] Among these, anxiety is one of the most common symptoms. The incidence of anxiety in cancer patients is >50%, and approximately 30% of the patients suffer from chronic anxiety.[4] Studies in Canada, Australia, and the USA demonstrated that 42%–75% of cancer outpatients with elevated anxiety and depression levels do not have access to psychological support.[5-7] Mackenzie recently reported that 50% of radiation oncology outpatients experience anxiety.[8] The American Psychological Association defines anxiety as an emotion characterized by feelings of tension, worried thoughts, and physical changes, such as increased blood pressure..[9] Anxiety often coexists with depression and affects patients' quality of life.[10,11] Anxiety as one of the most common psychosocial disorders causes further problems, including fatigue, sleep disturbances, eating disorders, increased heart rate, and high blood pressure.[12] Furthermore, anxiety also has an adverse effect on the continuity and potential benefits of treatment as it results in negative emotions.[13,14]

The oncology team aims to use a holistic approach to support the patient while providing an efficient therapy. Currently, various alternatives for supportive care are available. Music therapy is one of the alternative methods used to reduce anxiety.[15] 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.[16] The use of music therapy as a treatment option dates back to centuries. It was first used by Paragiter in the early 18th century and Dogiel in 1830, especially in patients with psychiatric disorders and those in the intensive care unit and operating rooms.[17,18] Music therapy was suggested to influence physiological responses by affecting blood circulation and pressure. The first use of music therapy in hospitals was in the fields of anesthesiology and analgesia. In the mid-20th century, researchers began to develop theories to explain the neurological basis of music therapy and investigated the effects of music therapy on physiological parameters.[19]

Music therapy is an evidence-based complementary treatment method, which is frequently used as a part of integrative oncological treatment programs.[20] It is used to improve, maintain, remediate, or prevent one or more clinical issues in patients according to their specific needs for habilitation and rehabilitation.[16] Although both quantitative results [2,21] and qualitative outcomes [22] of music therapy are promising in terms of reducing anxiety and stress levels in patients receiving radiotherapy, music therapy procedures described in previous studies are diverse.[3]

Despite studies in the literature regarding the use of music therapy to reduce anxiety levels in patients receiving radiotherapy, no such study has been conducted in Turkey. The present study hypothesized that patients who receive music therapy by listening to the songs of their choice experience lower levels of anxiety than those who do not receive music therapy.

Materials and Methods

The present study was conducted to evaluate the effects of music therapy using songs of patients' choice on anxiety state during radiotherapy. The research was conducted in the department of radiation oncology at a university hospital in the East Black Sea Region, Turkey. Inclusion criteria included patients aged ≥18 years, with a life expectancy of ≥6 months, who were receiving radiotherapy, who could speak Turkish, and who volunteered to participate in the study. Exclusion criteria included patients with visual and hearing impairment who were receiving radiotherapy to the brain region due to a psychiatric/neurological disease and who were receiving any type of therapy that did not comply with the study procedures. Among patients who were admitted to the clinic for radiotherapy, 72 volunteers who met the study criteria were included in the study and divided into two groups. Their therapies were scheduled in accordance with the standard treatment protocol of the clinic, and no nonstandard therapies were administered. We ensured that the two groups were divided similarly in terms of socio-economic status, age, and sex.

We received approval from the local ethics committee and hospital management to conduct the study, along with informed consent from patients.

Data Collection Tools

Data were collected using a standardized demographic data questionnaire and State Anxiety Inventory (SAI). The medical data of patients were retrieved from hospital records, and other data were collected by the first author via face-to-face interviews.

Table 1 Sociodemographic characteristics (n=72)

Characteristics		Experimental group (n=36)		Control group (n=36)		*p* value
		n	%	n	%	
Gender	Female	17	47.2	13	36.1	0.478
	Male	19	52.8	23	63.9	
Age	28-45	8	22.2	9	25.0	0.589
	46-65	22	61.1	18	50.0	
	66 ve over	6	16.7	9	25.0	
Education status	Primary school	13	36.1	14	38.9	0.086
	Secondary+High School	13	36.1	19	52.8	
	University	10	27.8	3	8.3	
Diagnostics	Gastrointestinal	10	27.8	6	16.7	0.483
	Genitourinary	9	25.0	12	33.3	
	Other	17	47.2	18	20.0	

Demographic data questionnaire: Demographic data questionnaire developed by the researchers consisted of information about sex, age, educational level, and diagnosis.

State Anxiety Inventory: SAI developed by Spielberg et al. measures the anxiety level at a given time, and the Turkish version of the scale was validated by Öner and Le Compte.[23] The 40-item inventory is composed of two separate scales: first 20 questions measure anxiety levels, and the remaining measure enduring anxiety levels. SAI requires the individuals to describe how they feel at a particular time under certain conditions and respond to questions considering their emotions under the circumstances. In our study, SAI was used to measure the anxiety levels, and the items were scored as recommended. In a validation study of the Turkish version of SAI, Cronbach's alpha for S-Anxiety was 0.86. [23] The anxiety levels of patients from both the groups were evaluated a day before the therapy and after its completion.

Procedure of musical intervention: An 11-item questionnaire (Music Genre Preference Form) developed by the researchers was used to determine the music genre preferred by each participant. Three playlists of instrumental music were created in three different genres after participants' preferences were evaluated (Turkish folk music, Turkish classical music, and Turkish popular music). Playlists that were 15-min long were recorded on an Mp3 player with patients' names on the player. Playlists were broadcasted in the therapy room every day during radiotherapy using a stereo-powered reference monitor (Tamaha HS50M), which reproduces the original sound by maintaining the same power at each frequency. Patients listened to music for 12–15 min during their therapies. Over the course of radiotherapy, patients were advised not to listen to other music during the day.

Control group

Patients in the control group were not given any information on music therapy during the study period to avoid bias.

Statistical Analysis

Data were analyzed using the SPSS version 23.0 software. In intergroup comparisons, the chi-square test was used to compare categorical variables and t-test and variance analysis to compare continuous variables between dependent and independent groups. A p value of <0.05 was considered statistically significant.

Table 2 Anxiety levels of patients before and after treatment in both the groups

	Experimental Group $\overline{X}$ ± SD	Control Group $\overline{X}$ ± SD	*p* value
Before Radiotherapy	44.5±6.3	42.2±4.2	0.071
After Radiotherapy	42.1±4.8	44.7±5.3	0.036
p value	0.001	0.003	

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Table 3 Anxiety levels of patients according to sex, age, educational level, and diagnosis (n=72)

Characteristics		Experimental group			Control group			All group		
		Before Radiotherapy	After Radiotherapy	*P* value	Before Radiotherapy	After Radiotherapy	*P* value	Before Radiotherapy	After Radiotherapy	*P* value
Gender	Female	43.4±5.9	41.1±4.8	0.023	42.0±4.4	44.3±4.5	0.075	42.8±5.2	42.5±4.8	0.695
	Male	45.5±6.6	43.1±4.8	0.019	42.3±4.2	44.9±5.8	0.022	43.8±5.6	44.1±5.4	0.707
P value		0.326	0.228		0.857	0.763		0.476	0.471	
age	28-45	44.0±5.4	42.7±4.4	0.413	41.1±3.7	44.3±4.2	0.088	42.4±4.7	43.5±4.2	0.369
	46-65	44.1±5.6	41.2±4.5	0.001	42.5±4.9	44.7±6.1	0.092	43.4±5.3	42.8±5.5	0.445
	66 ve over	46.8±9.7	44.8±6.2	0.384	42.8±3.2	45.2±5.0	0.096	44.4±6.6	45.0±5.3	0.629
P value		0.646	0.264		0.647	0.943		0.596	0.364	
Education status	Primary school	44.5±4.9	42.0±5.4	0.010	42.6±3.7	45.2±6.4	0.116	43.5±4.3	43.7±6.0	0.886
	Secondary+High School	44.0±9.0	41.9±5.1	0.144	42.0±4.9	44.1±4.9	0.042	42.8±6.8	43.2±5.0	0.638
	University	45.4±3.7	42.7±4.1	0.078	42.0±1.0	46.3±1.5	0.083	44.6±3.5	43.5±4.0	0.446
P value		0.877	0.924		0.912	0.724		0.605	0.939	
Diagnostics	Gastrointestinal	47.2±8.4	43.6±5.1	0.032	42.5±3.8	46.3±4.0	0.015	45.4±7.2	44.6±4.8	0.549
	Genitourinary	44.5±5.4	41.7±4.0	0.087	43.4±3.6	45.5±5.7	0.052	43.9±4.4	43.9±5.3	1.000
	Other	43.0±5.1	41.5±5.2	0.091	41.3±4.7	43.7±5.4	0.120	42.2±4.9	42.6±5.2	0.612
P value		0.267	0.560		0.448	0.503		0.131	0.421	

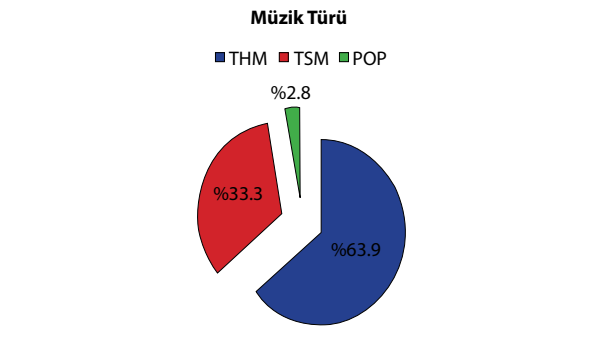

Fig. 1. Distribution of music genre of choice in the experimental group.

Results

Table 1 shows descriptive features of patients in the experimental and control groups. Patients in both the groups were similar in terms of age, sex, educational level, and diagnosis (p>0.05). Turkish Folk Music (TFM) was preferred by 63.9% of the participants, Turkish Classical Music (TCM) by 33.3% of the participants and Turkish Popular Music (TPM) by 2.8% of the participants (Fig 1).

It was found that the anxiety levels of patients who listened to music were lower after treatment than before treatment, whereas those of patients who did not listen to music were higher after radiotherapy (Table 2). In both the groups, the differences in the anxiety levels of patients before and after treatment were statistically significant (p=0.001 and 0.003, respectively). There were no statistically significant differences between the anxiety levels of patients in the two groups before treatment (p=0.071); however, the differences between the groups after treatment were statistically significant (p=0.036).

The anxiety levels of patients according to sex, age, educational level, and diagnosis are shown in Table 3. There was no statistically significant difference between the anxiety levels of patients before and after radiotherapy in terms of sex, age, educational level, and diagnosis (p>0.05). In the experimental group, the anxiety level was significantly lower after radiotherapy in females (p=0.023), males (p=0.019), patients aged 46–65-years (p=0.001), primary school graduates (p=0.010), and patients with gastrointestinal disease (p=0.032). On the other hand, there was no statistically significant difference in the anxiety levels in terms of age, sex, educational level, and diagnosis. In the control group, the anxiety level was significantly higher after treatment in males (p=0.022), secondary+high school graduates (p=0.042), and patients with gastrointestinal disease (p=0.015).

Discussion

Although there is a lot of literature on the use of music as a therapeutic intervention in various medical care settings, no studies have examined the role of music during radiotherapy in reducing the anxiety associated with radiotherapy for cancer. Moreover, only few stud-

ies have assessed the anxiety levels during radiotherapy. The present study aims to determine the effect of music intervention during radiotherapy.

Research shows that music can influence a wide range of physiological and psychological effects. These effects can trigger the release of hormones, which can alter body temperature by influencing the pulse rate, breathing, sweating, and blood circulation and positively contribute to a decrease in these effects which enhance disease progression.[24,25] However, these experiences are more likely to be positive when individuals are exposed to the music of their choice.[25]

In the present study, music genres were determined based on patients' preferences. Music is a symbolic expression signifying patients' psychological connections with their past and culture. The region of origin, music tune, lyrical or instrumental music, instruments, and even the singer affects the preference of a listener. Studies on music preferences demonstrated that desirable and undesirable music stimulate different regions in the brain [26,27], and that accurate determination of listeners' preferences is decisive in therapy outcomes.
Various studies have reported that music therapy is used during different periods of therapy. Some studies have reported the use of music therapy before treatment [3,22], some before and during treatment [21], some only during treatment [28,29], and some over the course of treatment on patient's demand.[2,30] In the present study, we preferred administering music therapy to patients during radiotherapy.

The present study found that after radiotherapy, the anxiety levels of patients who received music therapy were lower than those before treatment. Conversely, the anxiety levels of patients who did not receive any music therapy were higher after treatment than those before the treatment. In addition, the anxiety levels of patients who did not receive music therapy were found to be higher after treatment even when the anxiety levels were similar before treatment.[31,32]

Studies have reported significantly lower anxiety levels after treatment in patients who receive music therapy than in those who do not receive music therapy.[3,28,29,33,34] On the other hand, other studies have suggested that music therapy has no significant effect on the anxiety levels.[11,35] Smith et al.[21] reported lower anxiety levels in patients receiving music therapy, although the difference between the groups was not statistically significant. In a study by Callaghan et al., there was no significant decrease in the anxiety levels of patients; however, patients wanted to listen to music in future radiotherapy sessions.[35]

The present study also investigated the association between music therapy and age, sex, and educational level in patients who received music therapy. We found that music therapy was equally effective in both the sexes, and there was a significant decrease in anxiety levels in patients aged 46–64 years and primary school graduates. However, a larger sample size is required for further studies on these independent variables.

Limitations

The current study had some limitations. First, the data collected from the patients were quantitative; therefore, subjective experiences of the patients require further investigation in terms of the effects of music therapy. Second, no physiological variable was included in the study; hence, the effects of music therapy on physiological aspects need further examination. The effect of music therapy on the anxiety levels might be clearly demonstrated if individuals with higher anxiety levels were included in the study. In this small, single-institution study, both the groups were heterogeneous in terms of cancer types and stages. Furthermore, patients in the control group may have used other methods of relaxation to cope with their anxiety. Another limitation of the present study was that patients in both the groups might have interacted with each other or with individuals not included in the study in the waiting room before or after treatment. This potential interaction among the patients as well as the ongoing informal counselling provided by the radiotherapy personnel may have introduced bias if patients derived a significant level of support through these interactions.

Conclusion

The present study aims to contribute to a limited number of studies in the literature evaluating the use of music therapy for reducing the anxiety levels in cancer patients receiving radiotherapy. The results of the present study suggested that listening to music during treatment reduces the anxiety levels. In the radiotherapy waiting room or a simulation room, music is a relatively simple and low-cost way to ease patient anxiety. Additional research with large samples and adequate control of confounding variables may clarify the full impact of formal interventions, including music. Considering the negative effects of anxiety on the physiological and psychosocial well-being of patients, music therapy promises to be a method to improve the quality of life of cancer patients.

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Declarations

Disclosure of potential conflicts of interest

Informed consent: Informed consent was obtained from all individual participants included in the study.

Disclosures Statement

The authors declare that they have no conflict of interests.

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Ethics Committee Approval: This study was conducted in-accordance with local ethical rules.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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