

MUSIC THERAPY

Effects of music therapy and guided visual imagery on chemotherapy-induced anxiety and nausea–vomiting

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Aims and objectives. To reveal the effects of music therapy and visual imagery on chemotherapy-induced anxiety and nausea–vomiting.

Background. Behavioural techniques such as music therapy and visual imagery are becoming increasingly important in dealing with chemotherapy-induced anxiety, nausea and vomiting.

Design. The study is an experimental and cross-sectional one and performed on a single sample group with the pre–post-test design consisting of 40 individuals. The individuals in the sample group comprised both the control and the case group of the study.

Methods. To obtain the study data, the following forms were used: the Personal Information Form, Spielberger State-Trait Anxiety Inventory, The Visual Analogue Scale and Individual Evaluation Form for Nausea and Vomiting adapted from The Morrow Assessment of Nausea and Vomiting.

Results. In the study, the participants' state and trait anxiety levels decreased significantly ($p < 0.05$). Music therapy and visual imagery reduced the severity and duration of chemotherapy-induced nausea and vomiting significantly ($p < 0.05$). In our research, 40% of the patients did not have anticipatory nausea and 55% of the patients did not have anticipatory vomiting during the third chemotherapy cycle during which music therapy and guided visual imagery were implemented.

Conclusions. It was determined that complementary approaches comprising music therapy and visual imagery had positive effects on chemotherapy-induced anxiety, nausea and vomiting, which are suffered too often and affect the patients' whole lives adversely.

Relevance to clinical practice. This study is worthy of interest as it has revealed that music therapy and visual imagery which have been proven to be effective in many health problems in different areas are also important, and practical complementary approaches that are effective in getting chemotherapy-induced anxiety, nausea and vomiting under control.

Key words: Chemotherapy, chemotherapy nursing, guided visual imagery, music therapy, nausea–vomiting

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Introduction

Nausea and vomiting are among the most common and serious side effects of cancer chemotherapy. Standard pharmacological methods of antiemetic therapy are inadequate for dealing with these side effects (Bergkvist & Wengström

2006, Tipton *et al.* 2007, Middleton & Lennan 2011). Although antiemetic agents such as Ondansetron (Zofran), a new serotonin antagonist (5-HT₃), are widely used today, of the patients receiving chemotherapy, approximately 40% still suffer from nausea and 75% from vomiting (Morrow *et al.* 1998b, Molassiotis 2000, Melchart *et al.* 2006). If

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chemotherapy-induced nausea and vomiting are not brought under control properly, they lead to further complications such as anorexia and metabolic imbalances and thus worsen cancer patients' physical and psychological conditions and lower their quality of life (Miller & Kearney 2004, Foubert & Vaessen 2005, Gimeno 2010).

These severely and frequently experienced side effects turn into nausea and vomiting in 25–30% of the patients as a learned response after the therapy especially during the fourth cycle of the therapy owing to psychological, neurological and physiological systems (Tipton *et al.* 2007, Gimeno 2010, Roscoe *et al.* 2011). Anticipatory nausea and vomiting are the nausea and vomiting reactions that appear within 24 hours before chemotherapy and develop as result of a learned conditioned reflex mechanism. In particular, if nausea and vomiting cannot be fully controlled during the first cycle of the therapy, it paves the way for such a conditioning (Grunberg 2004, Middleton & Lennan 2011). It is now known that anxiety plays a role in the development of nausea (Grunberg 2004, Aapro *et al.* 2005, Roscoe *et al.* 2011). In the literature, it is reported that anticipatory nausea has been seen in 29% of the patients and anticipatory vomiting in 11% of the patients (Foubert & Vaessen 2005, Jordan *et al.* 2005). Antiemetic medications are usually ineffective in anticipatory or conditioned nausea–vomiting that cannot be controlled (Aapro *et al.* 2005, Doğanavşargil *et al.* 2006, Roscoe *et al.* 2011). Approximately 20% of the patients experiencing chemotherapy-induced nausea and vomiting refused the treatment (Morrow *et al.* 1998a, Bender *et al.* 2002).

The importance of behavioural treatment and approaches in the control of anxiety is being increasingly emphasised (Newell *et al.* 2002, Clark *et al.* 2006, Kenyon 2007). Relaxation therapy for anxiety allows the emergence of positive psychological reactions against anxiety (Robb 2000, Miller & Kearney 2004). One of the positive effects of relaxation therapy is an individual's sense of control on his/her experiences. If the stimulus is controlled, this stimulus is perceived as less threatening in life in the future (Covington & Crosby 1997). Relaxation techniques that are more advantageous than pharmacological methods as they have no side effects are easy to learn and are easy to use both at home and in the hospital (Morrow *et al.* 1998b, Bender *et al.* 2002).

Visual imagery, as a behavioural technique, can reduce feelings of anxiety by strengthening an individual's belief he/she uses in establishing control over a situation (Rhodes & McDaniel 2001, Roffe *et al.* 2005). Visual imagery is a therapeutic tool for a person using his/her imagination in achieving a desired objective. Visual imagery techniques related to the outside world that includes environmental reflections or landscapes are often recommended to

facilitate relaxation. Visual imagery techniques are used to reduce side effects and discomforts developing as a result of the therapy provided for the care of a cancer patient. They are also used to positively increase an individual's attitude towards the treatment technique (Van Fleet 2000, Burns 2001, Gimeno 2010).

One of the important approaches used in reducing anxiety is music therapy (Somakçı 2003, Cooke *et al.* 2005, Gallagher 2011). As the effect of music on human beings is multi-dimensional, it is used in treatment and has become an important part of medicine and health care in recent years (Esch *et al.* 2004, Gallagher *et al.* 2006, Gallagher 2011). Music therapy causes the brain to physiologically release endorphin and thus creates an effect similar to that of morphine in the body (Esch *et al.* 2004, Hart 2009). Physical reactions caused by music are the result of the stimulation of the autonomic nervous system responsible for rhythms such as heart rate, respiratory rate, electrical conductivity, blood pressure and endocrine functions (Biley 2000, Esch *et al.* 2004, Hart 2009).

Psychologically, music contributes to spiritual strengthening owing to its features such as inspiration and persuasion. Pitch range, density and tone colour of music (baseness, height) stimulate the unconscious automatic response at the lower brain. Calm and soft music is a useful tool in alleviating pain and anxiety (Cooke *et al.* 2005, Hart 2009). Because of its integrative power, music may help access the desired results in coping with anxiety and stress more easily if it is accompanied with relaxation techniques such as visual imagery.

Patients who suffer nausea/vomiting, one of the most important side effects of chemotherapy, cannot cope with intense and repeated nausea and vomiting sufficiently and thus decide not to continue the treatment. If chemotherapy, which is extremely costly and causes patients experience discomfort, is not delivered in effective doses and periods, the individual's quality of life and life expectancy are affected adversely, and the country's economy suffers. In this context, behavioural techniques such as music therapy and visual imagery are becoming increasingly important in dealing with chemotherapy-induced nausea and vomiting as they are extremely easy to use and cost-effective, but they have a high impact on an individual. However, the review of the literature has revealed that there is only one study (Frank 1985) conducted to control chemotherapy-induced anxiety and nausea/vomiting by using such behavioural techniques as music therapy and visual imagery. Therefore, more studies are needed to determine the effect of music therapy and visual imagery on chemotherapy-induced anxiety and perceived nausea and vomiting.

Aim and hypothesis

The present study was carried out to investigate the effects of music therapy and visual imagery on chemotherapy-induced anxiety and nausea and vomiting.

Hypotheses of this research:

- H₁: Music therapy and visual imagery reduce chemotherapy-induced anxiety.
- H₂: Music therapy and visual imagery reduce the severity of chemotherapy-induced nausea.
- H₃: Music therapy and visual imagery shorten the duration of chemotherapy-induced nausea.
- H₄: Music therapy and visual imagery reduce the severity of chemotherapy-induced vomiting.
- H₅: Music therapy and visual imagery shorten the duration of chemotherapy-induced vomiting.

Ethical considerations

In the planning stage, we petitioned the hospital management to receive the permission to conduct the study, and the approval was obtained from the Ethics committee of Cumhuriyet University, Faculty of Medicine (decision number 2005/02-12). The study was conducted in accordance with the principles of the Declaration of Helsinki. Written and verbal approval was then obtained from the Respiratory Disease Clinic and Radiation Oncology Center Administration and Head Nurse. All patients were informed about the procedure, and their written-verbal consents were obtained. All patients consented to participate in the study.

Methods

Sample and setting

This cross-sectional and experimental study was conducted at the chest diseases department and the chemotherapy unit of the radiation oncology centre of a university hospital. The reason why units where the study was conducted were chosen was that they mostly admitted patients to undergo chemotherapy and that they used chemotherapeutic agents that could cause nausea/vomiting during chemotherapy treatment.

The study was carried out on a single sample group with the pre-post test and repeated-measures design. The individuals in the sample group comprised both the control and the case groups of the study. Between April 2008–March

2009 during the study process, 40 participants meeting the sampling criteria were assigned to the control group during the second cycle of chemotherapy and to the experimental group during the third cycle of chemotherapy. The reason why Cisplatin, Vepesid, Mytomycin-C and Velbe were chosen as chemotherapeutic agents in this study was that when these chemotherapeutic agents are administered intravenously, they cause a lot more nausea/vomiting than do other chemotherapeutic agents.

To meet hypotheses of parametric tests, forty individuals were included in the study. Patients who met the sample criteria from the two units and who received 30 to 90-minute combination chemotherapy intravenously for one day or three consecutive days were included in the study until the desired number of patients was reached in the sample. To determine pre-treatment anticipatory nausea/vomiting, individuals receiving the second course of chemotherapy comprised the control group because in the first course of chemotherapy, chemotherapy-induced nausea/vomiting occurs during or after the therapy. The same individuals comprised the experimental group of the study when they received the third course of chemotherapy.

Sample criteria

This study included the following patients: those who were in the 18–70 age group, who were not diagnosed with a neurological or psychiatric disease, who did not have sedation therapy, who did not have loss of vision or hearing, who experienced nausea and vomiting within 24-hour period after the first course of chemotherapy and presented to receive the second course of chemotherapy, who received 30 to 90-minute sessions of intravenous chemotherapy infusion, who were administered the same doses of the same chemotherapy agents and antiemetics both when in the control group and when in the case group, and who were administered chemotherapeutic agents likely to cause nausea and vomiting Platinol (Cisplatin[®]; Onko, Istanbul, Turkey), Etoposide (Vepesid[®]; ER-Kim İlaç, Istanbul, Turkey), Mitomycin (Mitomycin-C[®]; Onko, Istanbul, Turkey) ve Vinblastin (Velbe[®]; Liily İlaç, Istanbul, Turkey).

Instruments

The forms and tools used to collect data in the investigation are as follows:

- 1 State-Trait Anxiety Inventory (STAI).
- 2 Personal Information Form.
- 3 Visual Analogue Scale (VAS).
- 4 Individual Nausea and Vomiting Evaluation Form.

State-Trait Anxiety Inventory

In the study, STAI was used to measure the level of anxiety before and after chemotherapy. STAI, which was developed by Spielberger *et al.* (1964) to determine the state and trait anxiety levels separately, is a self-report questionnaire consisting of short statements. It was adapted into Turkish by Öner and Le Compte (1998) and its validity–reliability studies were conducted by them as well. In several studies, Cronbach's alpha coefficient was found to be between 0.83–0.92 and was stated that the scale had high validity. In our study, Cronbach's alpha coefficient was found to be 0.73 for the State Anxiety Inventory and 0.81 for the Trait Anxiety Inventory.

State-Trait Anxiety Inventory includes two 20-item scales. It is a psychological assessment tool used to determine the levels of state anxiety and trait anxiety. The former perceived by individuals as a result of stresses they face in their daily lives reflects transitory, situational circumstances. The latter is independent of conditions and reflects personality characteristics. It was especially developed for use in research (Öner & Le Compte 1998).

The State Anxiety Inventory was developed to measure what is felt at that moment, and the Trait Anxiety Inventory was developed to measure what has been felt in the last seven days. The State Anxiety Inventory has four-choice responses: (1) not at all, (2) somewhat, (3) moderately so and (4) very much so. The choices in the Trait Anxiety Inventory are as follows: (1) almost never, (2) sometimes, (3) often and (4) almost always. Theoretically, scores obtained from either inventory range between 20–80. The higher the score is the greater the anxiety is (Öner & Le Compte 1998).

Personal Information Form

The Personal Information Form is a 13-question form. Five of the questions are on demographic characteristics such as the patients' age, gender, education level, marital status and place of residence. Remaining eight questions are related to medical diagnosis, chemotherapeutic drugs administered, the dose and duration of the chemotherapeutic drugs, antiemetic drugs administered and the dose and duration of the antiemetic drugs and the period during which the medicine worked.

Visual Analogue Scale

Visual Analogue Scale, a measuring instrument consisting of a 100-mm-straight line, was used to determine the severity of nausea and vomiting before and after chemotherapy. It is possible to make a relatively more objective

and measurable assessment with VAS. VAS is a visual analogue scale widely used to measure the severity of chemotherapy-induced nausea and vomiting. The left end of the scale (0) indicates the absence of nausea and/or vomiting, while the right end (10) indicates the most severe form of nausea and/or vomiting (McCormack *et al.* 1988, Wewers & Lowe 1990, Muth *et al.* 1996).

Individual Nausea and Vomiting Evaluation Form

This form is based on the Morrow Assessment of Nausea and Vomiting/Morrow Assessment of Nausea and Emesis (MANE) developed by Morrow (1992) and widely used throughout the world for the self-assessment of the severity and duration of nausea by patients at home. The form prepared to be filled by the patient was arranged so that the patient could evaluate nausea/vomiting occurring in two separate periods: before chemotherapy and during/after chemotherapy. The form includes the following 16 questions: suffering nausea and vomiting in one or both periods (yes, no), severity (very mild, mild, moderate, severe, very severe and unbearable), duration (in hours) and the period during which patients suffered worst nausea/vomiting (during the treatment, 0–4 hours after the treatment, 4–8 hours after the treatment, 8–12 hours after the treatment, 12–24 hours after the treatment, 24 hours or more after the treatment, never), how many hours before chemotherapy the first nausea/vomiting occurs, medication taken for nausea/vomiting (yes, no) and if taken how beneficial the medication is (a lot, quite a lot, somewhat, not at all).

Administration of music therapy and guided visual imagery

Five nature paintings (100 cm × 200 cm) were used for guided visual imagery. Paintings depicted such views of nature as beach, forest, lake and mountain, prairie, and sky and clouds. Researchers prepared a different music CD for each painting. Music CDs included soft, serene instrumental Turkish Music and were prepared by the teaching staff of the Department of Music, Fine Arts Faculty of our university and under the supervision of Fatih BIYIK, the founding member of the Turkish Music Chorus, Department of Turkish Music of Sivas Municipality Conservatory. Fatih Biyik is also the second chief conductor of the above-mentioned chorus, works as an instructor, and violin and oud player at the above-mentioned Conservatory. According to Turkish literature, soft, serene instrumental music is more relaxing than loud ones (Güvenç 1993, Ak 1997, Somakcı 2003). Each CD comprised 60 minutes of musical content.

Procedures

During the second chemotherapy course, the individuals in the control group were not informed about the intervention including music therapy and visual imagery, but they were informed about the procedure in which the severity and duration of their chemotherapy-induced nausea and vomiting and the side effects of the chemotherapy, and their informed consent indicating that they would participate in the study was received. Participants were informed that they would be administered antiemetic drugs they were supposed to take during and after the therapy.

During the third chemotherapy course, patients in the case group were provided information about the intervention including music therapy and visual imagery in addition to the information given before the second chemotherapy course, and their informed consent was received. Individuals both in the control group and case group of the sample were asked to fill in the Personal Information Form and State Anxiety Inventory before the chemotherapy started. The items of the inventory were read aloud to illiterate participants.

Thirty minutes prior to chemotherapy, all patients were asked to indicate the severity of their nausea and vomiting complaints separately on a 10-cm VAS, points marked by the participants were measured with a ruler, and the values detected were recorded in the data collection form in millimetres. Then, the values marked in every 10-mm range were grouped into 1-cm intervals.

Then, the patient underwent chemotherapy without any application when he/she was in the control group. However, when he/she was in the case group, he/she was shown five paintings depicting different nature views and asked to choose the painting which appealed to him/her most and gave the sense of peace and calmness. The painting was put in a place by the researchers so that the patient could see it comfortably. The patient was told to imagine that he/she was in the place the painting depicted. To stimulate his/her imagination and to enable him/her to feel relaxed, a previously recorded music CD for that view was inserted in a CD player and given to him/her. The researcher informed the patient about the planned duration of chemotherapy and asked him/her to turn on the music 15 minutes before chemotherapy starts. The participants were told to focus on the visual image or look at it intermittently so that they could stimulate their imaginations while listening to the music. They were also provided with easy to use, small and lightweight headphones to prevent environmental noise from distracting their attention and to ensure their concentration on the music.

After chemotherapy, the participants were asked to fill in the State Anxiety Inventory and the Trait Anxiety Inventory while they were both in the case group and in the control group. After chemotherapy, all the patients were asked to mark the severity of their nausea and vomiting complaints on a 10-cm VAS again and the values were recorded. The patients were given the 'Individual Nausea – Vomiting Evaluation Form' to fill it in on the 5th day of chemotherapy, when they were both in the control group and in the case group. Necessary explanations on how to fill the forms were made to the literate patients and the illiterate patients' relatives. Patients and their relatives were asked to bring the forms they filled in when they came to the next chemotherapy course.

Analysis

Data collected through data collection forms and tools were analysed on the computer using SPSS (V 15.0 for Windows; SPSS Inc., Chicago, IL, USA) program. For the statistical evaluation, the percentage and the significance of the difference between the spouses test were used.

Based on the demographic characteristics of the patients, scores used for the evaluation of pre-and postchemotherapy nausea and vomiting levels on the Visual Analogue scale were as follows: no nausea and vomiting was scored '0', moderate nausea and vomiting was scored between 1–5 and severe nausea was scored between 6–10.

Findings

The mean age of individuals participating in the study was 59.65 ± 9.67 . Of the participants, 77.5% were men, 50% were primary school graduates, 95% were married, 67.5% lived in a city and 80% were diagnosed with lung cancer (Table 1).

When the patients' pre- and postchemotherapy state anxiety levels and postchemotherapy trait anxiety levels were examined, it was seen that state anxiety levels achieved by them before the second chemotherapy cycle when they were in the control group (43.45 ± 7.027) were statistically significantly higher than those they achieved during the third cycle when they were in the case group (38.75 ± 3.788) ($p < 0.05$). While the participants' trait anxiety levels were higher (56.03 ± 9.014) after the second chemotherapy cycle, their levels decreased statistically significantly after the third chemotherapy cycle during which music therapy and visual imagery were implemented (52.18 ± 9.356) ($p < 0.05$) (Table 2).

The patients' mean pre-chemotherapy nausea score was (3.45 ± 2.846) in the second cycle in the control group,

Table 1 Demographical characteristics of the individuals participating in the study ($n = 40$)

Characteristics	<i>n</i>	%
Age ($X = 59.65 \pm 9.67$)		
41–59	19	47.5
60 and over	21	52.5
Gender		
Female	9	22.5
Male	31	77.5
Level of education		
Illiterate	7	17.5
Literate	3	7.5
Elementary school	20	50.0
Junior high school	5	12.5
Senior high school	5	12.5
Marital status		
Married	38	95.0
Single	2	5.0
Place of residence		
Village	9	22.5
Town	4	10.0
City	27	67.5
Diagnosis		
Lung cancer	32	80.0
Gastric cancer	6	15.0
Breast cancer	1	2.5
Adeno cancer	1	2.5

Table 2 Patients' pre- and postchemotherapy mean scores for state and trait anxiety

	Control $X \pm SD$	Case $X \pm SD$	Significance level
<i>Distribution of patients' pre- and postchemotherapy mean scores for state anxiety</i>			
Pre-chemotherapy	43.45 \pm 7.027	38.75 \pm 3.788	$t = 3.157$ $p = 0.002$
Postchemotherapy	42.50 \pm 7.538	38.23 \pm 4.371	$t = 3.158$ $p = 0.002$
Significance level	$t = 0.943$ $p = 0.445$	$t = 0.160$ $p = 0.905$	
<i>Distribution of patients' pre- and postchemotherapy mean scores for trait anxiety</i>			
Postchemotherapy	56.03 \pm 9.014	52.18 \pm 9.356	$t = 3.165$ $p = 0.003$

and it decreased statistically significantly in the third cycle in the case group (2.28 ± 2.532) ($p < 0.05$). Similarly, the mean nausea score decreased from 4.40 ± 2.960 – 2.85 ± 2.476 after chemotherapy. When the patients' pre- and postchemotherapy nausea levels for each cycle (2nd and 3rd cycles) were evaluated, it was determined that their postchemotherapy nausea levels were statistically

significantly higher than their prechemotherapy nausea levels when they were in the control group. However, when they were in the case group, there was no increase in their postchemotherapy nausea levels (Table 3). Of the patients, 80% suffered nausea during and after chemotherapy when they were in the control group and 70% suffered nausea when they were in the case group. Of the patients, 10% suffered very severe nausea and 5% suffered unbearable nausea when they were in the control group; however, no patient had very severe or unbearable nausea when they were in the case group (Table 4). In our study, the patients' mean severity scores for vomiting during the chemotherapy process were similar to those for nausea (Table 3).

In our study prior to chemotherapy, of the patients, 42.5% had nausea and 37.5% had vomiting when they were in the control group, whereas 40% had nausea and 25% vomiting while they were in the case group. While 2.5% of the patients suffered unbearable nausea prior to chemotherapy when they were in the control group, none of them reported unbearable nausea when they were in the case group (Table 5).

The evaluation of the duration of pre- and postchemotherapy nausea suffered by the patients in our study revealed that of them, 20% had nausea and 17.5% had vomiting during 1–6 hours before chemotherapy when they were in the control group, but the rates were 12.5% for nausea and 15% for vomiting when they were in the case group. Similarly, the evaluation of nausea and vomiting which lasted 49 hours or longer prior to chemotherapy

Table 3 Distribution of patients' pre- and postchemotherapy mean scores for nausea–vomiting

	Control $X \pm SD$	Case $X \pm SD$	Significance level
<i>Distribution of patients' pre- and postchemotherapy mean scores for nausea</i>			
Pre-chemotherapy	3.45 \pm 2.846	2.28 \pm 2.532	$t = 18.615$ $p = 0.001$
Postchemotherapy	4.40 \pm 2.960	2.85 \pm 2.476	$t = 13.333$ $p = 0.001$
Significance level	$t = 2.333$ $p = 0.032$	$t = 3.857$ $p = 0.001$	
<i>Distribution of patients' pre- and postchemotherapy mean scores for vomiting</i>			
Pre-chemotherapy	2.68 \pm 2.814	1.70 \pm 2.420	$t = 9.783$ $p = 0.001$
Postchemotherapy	3.35 \pm 2.713	2.18 \pm 2.448	$t = 7.759$ $p = 0.001$
Significance level	$t = 1.316$ $p = 0.742$	$t = 1.800$ $p = 0.057$	

Table 4 According to the patients' statements status and characteristics of experiencing nausea and vomiting during and after the second and third chemotherapy cycles

	Control (2nd chemotherapy cycle)		Case (3rd chemotherapy cycle)	
	<i>n</i>	%	<i>n</i>	%
<i>Presence of nausea</i>				
Those suffering from nausea	32	80.0	28	70.0
Those not suffering from nausea	8	20.0	12	30.0
<i>Severity of nausea</i>				
No Nausea	8	20.0	12	30.0
Very mild	—	—	6	15.0
Mild	7	17.5	11	27.5
Moderate	11	27.5	11	27.5
Severe	8	20.0	—	—
Very severe	4	10.0	—	—
Unbearable	2	5.0	—	—
<i>Time of the most severe nausea</i>				
No Nausea	8	20.0	12	30.0
During chemotherapy	4	10.0	5	12.5
0–4 hours after chemotherapy	1	2.5	3	7.5
4–8 hours after chemotherapy	6	15.0	—	—
8–12 hours after chemotherapy	5	12.5	4	10.0
12–24 hours after chemotherapy	14	35.0	8	20.0
24 hours or more after chemotherapy	2	5.0	8	20.0
<i>Presence of vomiting</i>				
Those suffering from vomiting	20	50.0	10	25.0
Those not suffering from vomiting	20	50.0	30	75.0
<i>Severity of vomiting</i>				
No vomiting	20	50.0	30	75.0
Very mild	3	7.5	3	7.5
Mild	12	30.0	6	15.0
Moderate	3	7.5	1	2.5
Severe	2	5.0	—	—
Very severe	—	—	—	—
Unbearable	—	—	—	—
<i>Time of the most severe vomiting</i>				
No vomiting	20	50.0	30	75.0
During chemotherapy	3	7.5	—	—
0–4 hours after chemotherapy	2	5.0	1	2.5
4–8 hours after chemotherapy	3	7.5	—	—
8–12 hours after chemotherapy	12	30.0	—	—
12–24 hours after chemotherapy	—	—	—	—
24 hours or more after chemotherapy	—	—	9	22.5

revealed that, of the patients, 15% suffered nausea and 7.5% suffered vomiting when in the control group. However, 5% of them experienced nausea but none had vomiting when in the case group. During 1–6 hours after chemotherapy, nausea occurred in 20% of them and vomiting in 22.5% of them when they were in the control group. However, when they were in the case group, the rates were 17.5 and 20% respectively. The evaluation of those who had nausea and vomiting for 49 hours or longer after chemotherapy indicated that, of the patients, 25% had nausea and 10% had vomiting when in the control

group, but 12.5% had nausea and 7.5% had vomiting when in the case group (Table 6).

While anticipatory nausea and anticipatory vomiting were not observed in 27.5% ($n = 11$) and 45% ($n = 18$) of the patients respectively before the second chemotherapy cycle during which music therapy or visual imagery was not implemented, the rates for not suffering anticipatory nausea and anticipatory vomiting were 40% ($n = 16$) and 55% ($n = 22$) respectively prior to the third cycle of chemotherapy during which music therapy and visual imagery were implemented.

Table 5 Based on the patients' statements status and characteristics of experiencing nausea and vomiting before the second and third chemotherapy cycles

	Control (2nd chemotherapy cycle)		Case (3rd chemotherapy cycle)	
	<i>n</i>	%	<i>n</i>	%
<i>Presence of nausea</i>				
Those suffering from nausea	17	42.5	16	40.0
Those not suffering from nausea	23	57.5	24	60.0
<i>Severity of nausea</i>				
No Nausea	23	57.5	24	60.0
Very mild	–	–	1	2.5
Mild	4	10.0	2	5.0
Moderate	6	15.0	7	17.5
Severe	3	7.5	5	12.5
Very severe	3	7.5	1	2.5
Unbearable	1	2.5	–	–
<i>Presence of vomiting</i>				
Those suffering from vomiting	15	37.5	10	25.0
Those not suffering from vomiting	25	62.5	30	75.0
<i>Severity of vomiting</i>				
No vomiting	25	62.5	30	75.0
Very mild	4	10.0	2	5.0
Mild	2	5.0	1	2.5
Moderate	7	17.5	6	15.0
Severe	2	5.0	1	2.5
Very severe	–	–	–	–
Unbearable	–	–	–	–

Discussion

In the light of our findings, it can be said that during the 2nd cycle of chemotherapy at which music therapy or visual imagery was not implemented, the patients' pre- and postchemotherapy state anxiety levels were higher when they were in the control group than when they were in the case group (Table 2). In line with our findings, it can be said that from the hypotheses mentioned earlier, H₁ is agreeable and that implementation of music therapy and visual imagery is effective on anxiety experienced in the process of chemotherapy and can reduce state and trait anxiety significantly. In her study investigating the effects of music therapy and visual imagery on anxiety and the severity and duration of nausea and vomiting in patients receiving chemotherapy, Frank (1985) determined that these approaches could reduce anxiety significantly, which was consistent with our study findings. In his study conducted to review the results of 29 studies, Evans (2002) stated that

music had been used to reduce anxiety. In studies, the effects of listening to music on patients with cancer receiving chemotherapy were investigated and a decrease was identified in the level of anxiety in patients in the study group (Ferrer 2007, Burns *et al.* 2008, Bulfone *et al.* 2009). In their study, Yıldırım and Gürkan (2007) stated that a large number of the patients in the study group said that they were pleased with the application because music made them feel relaxed, relieved, special and important, took their attention away from the disease, treatment and environment, helped them have daydreams (visual imagery) and made the environment more bearable for them. All these results are consistent with our study findings and support our research because, in our study too, all the patients made similar statements about the practice and stressed that music therapy and visual imagery were very important approaches in coping with the stress and side effects caused by cancer treatment.

In line with our findings, it can be said that music therapy and visual imagery affect the levels of chemotherapy-induced nausea and vomiting and reduce the severity of perceived nausea and vomiting (Tables 3 and 4). According to the results of our study, it can be said that of the hypotheses mentioned earlier, H₂ and H₄ are agreeable and that implementation of music therapy and visual imagery can reduce the severity of chemotherapy-induced nausea and vomiting significantly.

In a study of patients with cancer conducted by Burns *et al.* (2005), it was found that patients were interested in music, especially in listening to music. In a study carried out by Frank (1985) about the effects of music therapy and visual imagery on the severity and duration of chemotherapy-induced nausea/vomiting, it was determined that the severity of nausea–vomiting decreased significantly. In her study, Gimeno (2010) stated that music and visual imagery significantly reduced the incidence of chemotherapy-induced nausea and vomiting and that music could be used as a supportive approach in the process of chemotherapy for patients. Luebbert *et al.* performed a meta-analysis (2001) and reviewed 15 studies in which guided visual imagery was implemented, and they determined that this approach led to a significant reduction in nausea. However, as the incidence of vomiting in these studies was low, the effects of visual imagery on vomiting were not investigated. In their experimental studies of 71 Chinese women with breast cancer, Molassiotis *et al.* (2002) determined that 25-minute progressive muscle relaxation accompanied with guided visual imagery was effective against acute and delayed nausea/vomiting. In a study of patients who underwent bone marrow transplantation conducted by Sahler *et al.* (2003),

Table 6 Distribution of the duration of nausea – vomiting before and after chemotherapy

Duration of nausea (hours)	Control				Case			
	Before chemotherapy		After chemotherapy		Before chemotherapy		After chemotherapy	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
<i>Duration of nausea</i>								
No nausea	11	27.5	7	17.5	16	40.0	9	22.5
1–6 hours	8	20.0	8	20.0	5	12.5	7	17.5
7–12 hours	1	2.5	1	2.5	1	2.5	2	5.0
19–24 hours	4	10.0	1	2.5	3	7.5	4	10.0
25–30 hours	4	10.0	2	5.0	–	–	1	2.5
31–36 hours	3	7.5	5	12.5	2	5.0	2	5.0
37–42 hours	1	2.5	2	5.0	5	12.5	6	15.0
43–48 hours	2	5.0	4	10.0	6	15.0	4	10.0
49 hours or more	6	15.0	10	25.0	2	5.0	5	12.5
<i>Duration of vomiting</i>								
No nausea	18	45.0	11	27.5	22	55.0	16	40.0
1–6 hours	7	17.5	9	22.5	6	15.0	8	20.0
7–12 hours	3	7.5	1	2.5	3	7.5	1	2.5
19–24 hours	4	10.0	–	–	4	10.0	1	2.5
25–30 hours	–	–	3	7.5	–	–	1	2.5
31–36 hours	3	7.5	2	5.0	–	–	4	10.0
37–42 hours	2	5.0	5	12.5	1	2.5	1	2.5
43–48 hours	–	–	5	12.5	4	10.0	5	12.5
49 hours or more	3	7.5	4	10.0	–	–	3	7.5

the patients had music therapy and visual imagery aiming to provide relaxation for 45 minutes twice a week and their nausea levels were found to be lower. All these findings are consistent with the findings of our research and reveal the effect of music therapy and visual imagery on the severity of chemotherapy-induced nausea and vomiting.

According to our results, music therapy and visual imagery also shortened the duration of chemotherapy-induced nausea and vomiting (Table 6). Thus, of the Hypotheses mentioned earlier, H₃ and H₅ can be said to be agreeable. In her study, Frank (1985) determined that the duration of vomiting decreased in patients who had music therapy and visual imagery.

Patients whose nausea and vomiting symptoms are poorly controlled during their previous chemotherapy courses are likely to suffer these symptoms more often in their later treatments. Nausea/vomiting not brought under control in earlier treatments paves the way for anticipatory nausea and vomiting. Chance of bringing chemotherapy-induced nausea and vomiting under control in patients receiving chemotherapy for the first time is three times higher than in patients who have received chemotherapy before (Glaus *et al.* 2004, Grunberg 2004, Roscoe *et al.* 2011). Behavioural treatments are effective in anticipatory emesis (Foubert & Vaessen 2005, Jordan *et al.* 2005). In her study

investigating the effect of music on nausea/vomiting and their symptoms during chemotherapy, Standley (1992) determined that patients who listened to music or played a musical instrument experienced less nausea. In our study too, music therapy and visual imagery affected anticipatory nausea and vomiting.

Conclusion and recommendations

In our study carried out to assess the impact of music therapy and visual imagery on nausea and vomiting which affect patients' lives adversely, it was determined that these complementary approaches have a beneficial effect on chemotherapy-induced anxiety and nausea/vomiting that patients suffer. In the light of the data and experience obtained during the research process, the following are recommended: (1) To reduce chemotherapy-induced anxiety and nausea/vomiting, music therapy and visual imagery should be implemented in chemotherapy units, because these methods are effective, easy to use and economic, (2) On-the-job training programs should be held, to increase the interest and sensitivity of professional teams working in oncology units regarding these approaches and (3) To generalise the research findings for larger populations, studies including larger sample groups should be performed.

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