Effectiveness of Music Therapy for Anxiety Reduction in Women With Breast Cancer in Chemotherapy Treatment

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In the last decade, the public use of complementary and alternative therapies for the solution of various health problems has increased dramatically. Listening to music can be considered a support to the traditional medical practice for the reduction of anxiety and stress related to chemotherapy. KEY WORDS: *anxiety, CATs, music therapy*
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In the last decade, the public use of complementary and alternative therapies (CATs) in the intervention of various health problems has increased dramatically. Complementary and alternative therapies are therapeutic practices that are not currently considered an integral part of conventional allopathic medical practice. They may lack biomedical explanation, yet some, such as physical therapy modalities, dietary therapy, or acupuncture, have become widely accepted after more focused research. Therapies are termed as "complementary" when used in addition to conventional treatments and "alternative" when used as a substitute for conventional treatment.

In the United States of America, researchers using nationally representative samples have reported that at least 40% of the American population use some type of CAT annually.[1] In Italy, it has been estimated that approximately 1 million (2%) of the population are current users of CATs and approximately 11 million (19%) have used such treatments at least once.[2,3]

The majority of research on the use of CATs among patients affected by cancer has been conducted in the United States. A recent survey suggests that between 25% and 84% of US patients with cancer have used CATs after diagnosis, with variation in utilization rates depending on geographical area and type of cancer.[4] In Europe, a recent research report[5] suggests that CATs are popular among patients with cancer, with 35.9% using some form of CAT (range among countries 14.8%–73.1%). There are specific cancer-related reasons for using CATs; for example, a Canadian survey suggested that 94% of these patients experienced disease-related symptoms such as fatigue and anxiety that were not relieved by conventional treatment.[6] Most patients with cancer were satisfied with the conventional cancer treatment they received; however, many were displeased with the discomfort caused by the side effects of chemotherapy.

People seek complementary treatments

- to be treated in a holistic manner (body and mind);
- to play an active role in the decision making about their health[4];
- to feel hopeful;
- to improve their quality of life, boost their immune system, prolong life, or relieve symptoms.[7]

The National Center for Complementary and Alternative Medicine (NCCAM) classified the specific alternative therapies in these categories: whole medical systems, mind-body medicine, biologically based practices, manipulative and body-based practices, and energy medicine.

Music therapy belongs to the category "mind-body medicine."[8] Music therapy is the monitored use of music to promote clinical change. Music therapy can

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be active and passive—the former is based on improvisation between therapist and patient, and it requires the patient's active musical role. In the latter mode, patients, individually or in a group, listen to music recorded or played with musical instruments by a therapist.

During receptive music therapy, patients choose their favorite music to enhance therapeutic effectiveness. For each person, music is a unique experience and preference is influenced by sex, age, culture, present mood, and attitude. It is vital for the patient to find music acceptable and pleasant. Music with 60 to 80 beats/min is restful, while faster beats can stimulate and give energy to depressive and melancholic people.

Established as a profession after World War II, music therapy is now available in a variety of healthcare settings and medical departments on an international scale, including psychiatry, drug and school rehabilitation, development disability, geriatric treatment, palliative care, general surgery, and oncology programs. Music therapy has been subject to considerable research, especially in intensive care units; randomized trials also demonstrate that listening to recorded music reduces anxiety before and after surgical procedures.[9,10] There is some evidence that live music provided by a music therapist is more effective than recorded music. In what we believe to be the only study of its type, 50 hospitalized patients with cancer were assigned randomly to receive live music therapy or recorded music. Live music was significantly more effective than recorded music in reducing anxiety levels.[10]

Anxiety is the reaction to the threat of a serious disease or to a possible physical injury.[11] Fear and unpleasant emotional reaction occur with the prospect of suffering a threat to one's own personal safety, more so, if the subject feels the potential injury is imminent, destructive, and excessive compared to one's ability to fight it effectively.[12] Anxiety disorders are frequently present in oncology. In this sector, anxiety can represent one of the symptoms of a series of disorders that have different clinical, prognostic, and therapeutic indications. About 15% to 40% of oncology patients suffer from psychological disorders related to anxiety and depression during chemotherapy.[13]

Benson and colleagues documented a decrease in the sympathetic nervous activity in relaxed states.[11] Their relaxation response study found that listening to music leads people to a relaxed state, which enables them to perceive cancer pain to a lesser degree.[14] Music is one way to distract patients' attention and to induce a relaxation state.[12]

The purpose of this study was to evaluate the effect of musical therapy on anxiety in a population of breast cancer patients receiving conventional medical treatment.

METHODS

Design

The study was a clinical experimental design performed on a randomized control group. A sample of 60 female patients with stage I–II breast cancer during adjuvant postsurgical chemotherapy treatment were selected from 2 oncology units of 2 Italian hospitals over a period of 12 weeks (from September to November 2006).

Inclusion criteria were surgical intervention, stage I–II (Staging System of American Joint Committee on Cancer) breast cancer, admission to day hospital for adjuvant chemotherapy treatment, Italian nationality, resident in nearby Italian regions (Veneto, Trentino, and Friuli), married and with children, and aged 40 to 60 years. Patients were excluded if they suffered from serious debilitating pathologies or hypoacusis or from anxiety evaluated through the Italian version of the Spielberg State-Trait Anxiety Inventory (STAI-Y2 score >50), were in anxiolytic therapy, or were not interested in music.

Ethical approval

The health directors of both hospitals approved the study and the ethical committees also regarded the survey as risk-free for the patients.

Sample

A convenience sample of subjects was recruited from those admitted to the day hospital on Thursdays and Fridays in accordance with the inclusion criteria. Subjects were randomly assigned to the standard control group or to the intervention with music therapy group. Subject participation was voluntary, complying with the consent procedures in force ensuring confidentiality and anonymity and the right to withdraw from the study. Sixty-five patients were eligible and 60 participated in the study. Recruitment procedure and data collection are shown in Figure 1.

The control group patients received standard assistance: After the medical visit for therapy

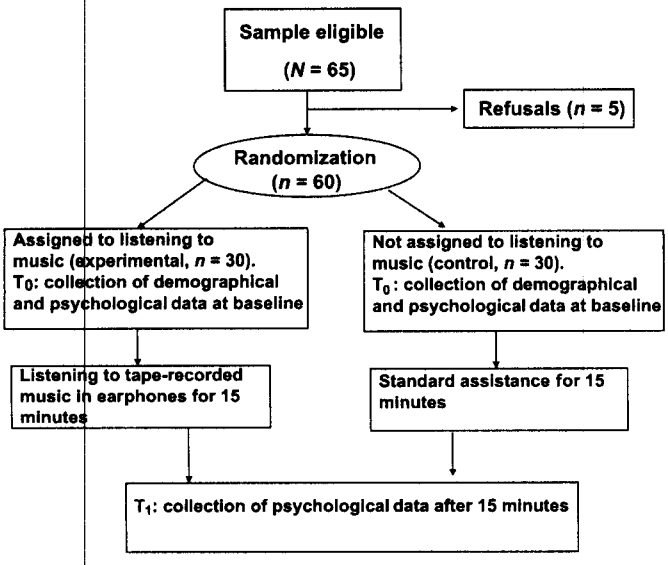

FIGURE 1. Process of data collection.

prescription they waited for the call for chemotherapy in the waiting room for 30 minutes. The experimental group patients had the opportunity to choose and listen to pretaped musical themes with Walkman and earphones for 15 minutes. The types of music are reported in Table 1.

TABLE 1. Type of music and preselected themes

Type of music	Themes
New age	"Valentine Be Mine," "Suite From the Man Who Planted Trees," "Small Steps to the Moon" (from "Pearl" New Age Music and Sounds, vol 61)
Nature melodies	"The Sky," "House at the Sea," and "Confraternity" (from "Avatar2" Ecosound)
	"Depths Galleon" (from "Piano" by the Sea Nature Quest An Adventure in Nature and Music: Saturna Music Publishing; 1993)
	"Just Before Daybreak," "New Dawn," "Carry Me Away," and "Early Calm" (from Glorious Sunrise: Nature Harmony CMC; 1994)
Film soundtrack	"An Angel Falls" by Sarah McLachlan (from "City of Angels")
	"Ocean of Memories" (from "Titanic")
Celtic melodies	"Ireland Ballads," "Famine Song," and "Estampie" (from "Celtic Harp" Celestio)
Classical music	"Minuetto-Allegretto" (from "Jupiter" Symphony No. 41 in Do maggiore K 551 Wolfgang Amadeus Mozart)

Anxiety assessment instruments

Anxiety levels were assessed with the Spielberg State-Trait Anxiety Inventory (STAI), modified to suit the Italian population. The Italian version of the assessment tool is called STAI-Y, and it is a 40-item, self-reported questionnaire that is used to measure the state and trait anxiety in the adult. Completing this questionnaire requires approximately 10 minutes. State anxiety (Y1) is conceptualized as a "transitory emotional state or condition that is characterized by subjective, consciously perceived feelings of tension and apprehension, and heightened autonomic nervous system activity." In contrast, trait anxiety (Y2) refers to "relative stable individual differences in anxiety proneness" and reflects core differences among people in their tendency to respond to situations that are perceived as threatening. Trait anxiety is not expected to fluctuate over time. Responses to each of the 40 questions were scored on a scale from 1 (not at all) to 4 (very much so). The test was divided into 20 trait anxiety statements (how the patient feels generally) and 20 state anxiety statements (how the patient feels at that moment). The scores[15] for state anxiety and those for trait anxiety can each range from 20 to 80. There are 3 levels of anxiety identified: low (20–39), moderate (40–59), and high (60–80). The reliability and validity of the scales have been demonstrated in diverse populations including medical and surgical patients with test-retest and alpha-reliability coefficients[16,17] ranging from .83 to .92.

Data collection and statistical analysis

The data analysis was performed with the statistical software SPSS, Version 12.0, and the Mann-Whitney test. Statistical significance was defined as $P \leq .05$.

RESULTS

Sociodemographic and clinical characteristics of the interviewed population are shown in Table 2. Variables between experimental and control subjects did not reveal any significant statistical differences.

The average values of pretest trait anxiety (STAI-Y2) in the experimental and control groups are 40.9 (SD = 6.3) and 36.1 (SD = 9.3), respectively. Their comparison does not reveal any significant statistical differences.

The average scores of pretest state anxiety (STAI-Y1) in the experimental and control groups are

TABLE 2. Sociodemographic characteristics of control and experimental groups

Variables	Experimental ($n = 30$)	Control ($n = 30$)
Sex		
Female	30	30
Age, mean (SD), y	49.2 (6.9)	52.7 (6.1)
Marital status		
Married	27	26
Separated	3	3
Widowed		1
Children		
1	10	9
>2	20	21
Residence		
Friuli Venezia Giulia and Veneto	30	30
Catholic religion	30	30
Familiar/social support		
Present	30	30
Qualification		
Primary school	6	12
Intermediate school	15	8
Secondary school	7	8
Degree	2	2
Cancer type		
Breast	30	30
Stage		
I	9	7
II	21	23
Invasive treatments		
Practiced	24	24
Not practiced	6	6
Adjuvant chemotherapy	30	30

46.2 (SD = 11.0) and 43.4 (SD = 10.6), respectively. Their comparison does not reveal any significant statistical differences.

The comparisons between the 2 pretests (STAI-Y1 and STAI-Y2) are statistically significant in the experimental group ($P < .01$) (Mann-Whitney test) and in the control group ($P < .05$) (Mann-Whitney test). These data suggest that waiting for a chemotherapy cycle is a factor that raises anxiety.

Figure 2 shows pretest and posttest average scores of the anxiety state (STAI-Y2) in experimental and control groups. The posttest state anxiety scores in the experimental group decreased by 9.9 ($P < .001$) (Mann-Whitney test) after musical intervention. In the control group, there was an increase in the anxiety level 15 minutes after waiting for the chemotherapy cycle ($P = .583$) (Mann-Whitney test).

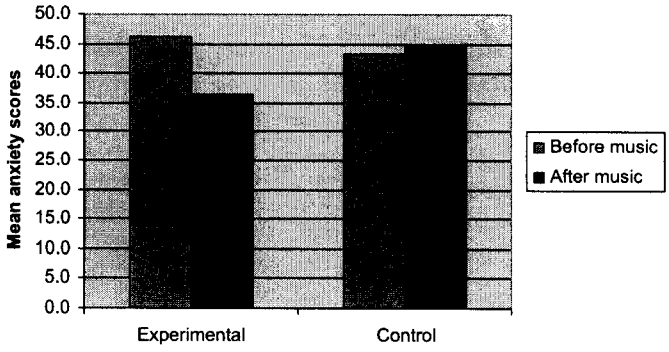

FIGURE 2. Means score pretest and posttest of the anxiety state (STAI-Y2) in experimental and control groups.

The results suggest that demographic and clinical variables are not factors that significantly affect anxiety levels.

DISCUSSION

This study confirms the positive effects that music has on cancer patients.[9] This is the first study conducted in Italy on women with breast cancer, and it is an initial attempt at examining the effectiveness of music for the reduction of anxiety related to chemotherapy. The data analysis suggests that the anxiety levels are moderate—46.2 in the treatment group and 43.4 in the control group. These values (range from 40 to 59) are regarded as moderate anxiety levels according to Spielberger.[16] The level of state anxiety compared with that of trait anxiety shows that chemotherapy is an unpleasant and stressful situation for breast cancer patients. Anxiety is a problem for women waiting for a chemotherapy cycle, and it can influence the patient's quality of life. The experimental group showed a significant reduction in the anxiety state. Musical intervention is thought to reduce people's anxiety and physiological arousal directly and enhance the patients' sense of well-being and control.

Anxiety and depression have also been shown to exacerbate cancer pain.[18] On the assumption that there is a close relationship between pain and anxiety,[19] modifying one modality through the administration of musical intervention also modifies the other modality, and this suggests that giving pain and anxiety relief enhances relaxation.

The results of this study encourage the use of musical intervention in nursing practice to help breast cancer patients. The nurse providing the therapy must, however, be qualified, trained, and motivated. Musical intervention can be performed anywhere, as (1) it does

not require costly, technologically advanced equipment, (2) it is noninvasive, and (3) it does not interfere with patients' privacy. A major limitation in the study was the small number of subjects in the sample. Another limitation consists in the fact that the study does not investigate the intermediate and long-term effects of musical therapy.

CONCLUSION

Anxiety for chemotherapy treatment could improve the quality of life of breast cancer patients. Nursing intervention with musical therapy can promote anxiety reduction. The treatment is noninvasive and inexpensive and can easily be applied in an oncological setting.

REFERENCES

1. Snyder M, Lindquist R. Issues in complementary therapies: how we got to where we are. *Online J Issues Nurs.* 2001;6(2):1.
2. Richardson MA, Sanders T, Palmer JL, Greisinger A, Singletary SE. Complementary/alternative medicine use in a comprehensive cancer center and the implications for oncology. *J Clin Oncol.* 2000;18(13): 2505–2514.
3. National Center for Complementary and Alternative Medicine. What is CAM? http://nccam.nih.gov/health/whatiscam/overview.htm#. Accessed April 24, 2008.
4. Crocetti E, Crotti N, Feltrin A, Pontom P, Geddes M, Buiatti E. The use of complementary therapies by breast cancer patients attending conventional treatment. *Eur J Cancer.* 1998;34(3):324–328.
5. Crotti N, Feltrin P, Ponton P, Musso M. la ricerca del benessere tra medicina ufficiale e medicina alternativa. *Quaderni di cure palliative.* 1996;4:287–290.
6. Molassiotis A, Fernandez-Ortega P, Pud D, et al. Use of complementary and alternative medicine in cancer patients: a European survey. *Ann Oncol.* 2005;16:655–663.
7. Ashbury FD, Findlay H, Reynolds B, McKerrarcher K. A Canadian survey of cancer patients' experiences: are their needs being met? *J Pain Symptom Manage.* 1998;16:298–306.
8. Tascilar M, de Jong FA, Verweij J, Mathijssen RHI. Complementary and alternative medicine during cancer treatment: beyond innocence. *Oncologist.* 2006;11:732–741.
9. Cassileth BR, Vickers AJ, Magill LA. Music therapy for mood disturbance during hospitalization for autologous stem cell transplantation: a randomized controlled trial. *Cancer.* 2003;98(12):2723–2729.
10. Wang SM, Kulkarni I, Dolev J, Kain ZN. Music and preoperative anxiety: a randomized, controlled study. *Anesth Analg.* 2002;94:1489–1494.
11. Benson H, Beary J, Carol M. The relaxation response. *Psychiatry.* 1974;37:37–46.
12. Quattrin R, Zanini A, Buchini S, et al. Use of reflexology foot massage to reduce anxiety in hospitalized cancer patient in chemotherapy treatment: methodology and outcomes. *J Nurs Manag.* 2006;14:96–105.
13. McCaffrey R, Locsin RC. Music listening as a nursing intervention: a symphony of practice. *Holist Nurs Pract.* 2002;16(3):70–77.
14. Bugbee ME, Wellisch DK, Arnott IM, et al. Breast core-needle biopsy: clinical trial of relaxation technique versus medication versus no intervention for anxiety reduction. *Radiology.* 2005;234(1):73–78.
15. Bressi C, Invernizzi G, Zirulia V. *Disturbi d'ansia.* Milano, Italy: Masson; 2002:619–629.
16. Spielberger CD, Gorsuch RL, Lushene R, Vagg PR, Jacobs GA. *The State-Trait Anxiety Inventory.* Palo Alto, CA: Consulting Psychologist Press; 1983.
17. Spielberger CD, Sarason I. *Stress and Anxiety: A Sourcebook of Theory and Research.* New York, NY: Hemisphere; 1986.
18. Lee KA, Kieckhefer GM. Measuring human responses using visual analogue scales. *West J Nurs.* 1989;11:128–132.
19. Welch-McCaffrey D. Cancer, anxiety, and quality of life. *Cancer Nurs.* 1985;8:151–158.