Effectiveness of Music Therapy in Reducing Anxiety in Cancer Patients: Systematic Review

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Efetividade da Musicoterapia na Redução da Ansiedade de Pacientes Oncológicos: Revisão Sistemática

Efectividad de la Musicoterapia en la Reducción de la Ansiedad en Pacientes con Cáncer: Revisión Sistemática

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Abstract

Introduction: Cancer is a disease that involves extensive emotional, physical and social suffering, which favors the appearance of various morbidities, including anxiety. Complementary therapies, such as music therapy, have been studied as alternatives to an approach to anxiety. **Objective:** To conduct a systematic review of the literature and determine the effectiveness of music therapy to reduce anxiety of oncologic patients. **Method:** The research was conducted in six databases including MEDLINE/PubMed, SciELO, Scopus, CINAHL, Cochrane and Web of Science without restriction of date, gender, ethnicity or cancer types. It were included only randomized controlled trials that evaluated anxiety as one of the outcomes, as well as those using music therapy as an intervention, involving a sample with adult individuals diagnosed with cancer. The exclusion criteria were studies where music therapy was not performed by a skilled professional, without control group, studies not fully available, that associated patients with diseases other than cancer and which included in the experimental group another intervention instead of music. **Result:** A total of 1909 studies were found, of which eight were eligible. The majority of the studies have demonstrated benefits of music therapy for anxiety. **Conclusion:** Music therapy is effective in reducing the anxiety of people with cancer. However, more studies with new methodologies and further details about the intervention are necessary to confirm the results.

Key words: Music Therapy; Anxiety/therapy; Neoplasms.

Resumo

Introdução: O câncer é uma doença que envolve extenso sofrimento emocional, físico e social, o que favorece o aparecimento de diversas morbidades, incluindo ansiedade. Terapias complementares, como a musicoterapia, têm sido estudadas como alternativas para a abordagem da ansiedade. **Objetivo:** Revisar sistematicamente os estudos e determinar a efetividade da musicoterapia na redução da ansiedade de pacientes oncológicos. **Método:** A pesquisa foi realizada em seis bases de dados incluindo MEDLINE/PubMed, SciELO, *Scopus*, CINAHL, Cochrane e *Web of Science*, sem restrição de data, sexo, etnia ou tipos de câncer. Foram incluídos somente ensaios clínicos randomizados que avaliaram a ansiedade como um dos desfechos, bem como os que utilizaram a musicoterapia como intervenção e que envolveram amostra com indivíduos adultos diagnosticados com câncer. Foram excluídos os estudos em que a musicoterapia não foi realizada por um profissional especializado, não foi proposto grupo controle, não foi disponibilizado o estudo na integra, associaram pacientes com outras doenças além do câncer e incluíram no grupo experimental outra intervenção além da música. **Resultado:** Foram encontrados 1.909 estudos, sendo oito elegíveis. A maioria dos estudos demonstrou benefícios da musicoterapia na ansiedade. **Conclusão:** A musicoterapia é efetiva na redução da ansiedade de pessoas com câncer. No entanto, mais estudos com novas tecnologias e mais detalhes sobre a intervenção são necessários para a confirmação dos resultados.

Palavras-chave: Musicoterapia; Ansiedade/terapia; Neoplasias.

Resumen

Introducción: El cáncer es una enfermedad que implica extensión emocional, física y social, lo que favorece la aparición de diversas morbilidades, incluida la ansiedad. Las terapias complementarias, como la musicoterapia, se han estudiado como alternativas al enfoque de la ansiedad. **Objetivo:** Revisar la literatura sobre la efectividad de la musicoterapia para el tratamiento de pacientes con trastornos de ansiedad y cáncer. **Método:** La investigación se realizó en seis bases de datos, incluyendo MEDLINE/PubMed, SciELO, *Scopus*, CINAHL, Cochrane y *Web of Science*, sin restricciones de fecha, género, etnia o tipos de cáncer. Se incluyeron solo ensayos controlados aleatorios de estudios que evaluaron la ansiedad como uno de los resultados, así como el uso de la musicoterapia como una intervención y la participación de una muestra con individuos adultos diagnosticados con cáncer. Los estudios en los que la musicoterapia no fue realizada por un profesional especializado, no se propuso un grupo de control, no se disponía de un estudio completo, se asociaron pacientes con enfermedades distintas al cáncer y se incluyó otra intervención además de la música en el grupo experimental. **Resultados:** Se encontraron 1.909 estudios, de los cuales ocho fueron elegibles. La mayoría de los estudios han demostrado los beneficios de la musicoterapia en la ansiedad. **Conclusión:** Esta revisión sistemática concluyó que la musicoterapia es efectiva para reducir la ansiedad de las personas con cáncer. Sin embargo, se necesitan más estudios con nuevas tecnologías y más detalles sobre la intervención para confirmar los resultados.

Palabras clave: Musicoterapia; Ansiedad/terapia; Neoplasias.

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INTRODUCTION

Cancer is a disease that involves extensive emotional, physical and social suffering[1]. The pessimistic vision of the prognosis, the vulnerability of the patient and the possibility of relapse favor the appearance of several morbidities, including anxiety[2,3]. Anxiety is considered the anticipation of the future threat characterized by feelings of apprehension, tension, incapacity to relax and behavior of caution and evasion. This disorder can negatively influence how to cope with the disease and the required adherence to the treatment, as, for example, to the medication and going to the radiotherapy sessions[4], and can become chronic, negatively influencing the side effects of the treatment[4] and interfering in the life, predisposing to other diseases[5]. In the last years, complementary therapies as music therapy have been studied as alternatives to address anxiety[6].

The American Association of Music defined music therapy as a practice based in evidences where certified music therapists use music with specific therapeutic objectives[6] and individualized goals[7]. Several techniques can be used to match the patient's needs, preferences and assessment of the music therapist[8]. The objective is that the music provokes a distracting effect, pushing the patient's focus away from negative stimuli to anything agreeable and encouraging[9]. Some studies investigated the effect of music therapy in anxiety, however, the results were conflicting[10-14]. It was not found any systematic review that specifically approached the effect of music therapy in the oncologic patient's anxiety. In this sense, the objective of the present study is to review systematically the studies and determine the effectiveness of music therapy in the reduction of the anxiety in oncologic patients.

METHOD

This review included randomized clinical trials of patients with cancer who submitted to music therapy to treat anxiety. The study followed the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) and is registered at PROSPERO (CRD42019119636).

The search was conducted in six databases including MEDLINE/PubMed, SciELO, *Scopus,* CINAHL, Cochrane and Web of Science, without restriction of date, gender, ethnicity or types of cancer. The strategy of search utilized the descriptors obtained in the Medical Subject Headings (MESH) of the National Library of Medicine with the combination of the key-words and the following Boolean operators *("Therapy, music" OR "music" OR "music therapy" OR "music intervention" OR "complementary therapies" OR "alternative therapies" OR "integrative therapies") AND ("anxiety" OR "social anxiety") AND ("clinical trial" OR "randomized controlled trial" OR "intervention study" OR "trial") AND ("Neoplasms" OR "Neoplasm" OR "neoplasia" OR "neoplasias" OR "tumors" OR "tumor" OR "Cancer" OR "Cancers" OR "Malignant" OR "Malignancy" OR "Malignancies" OR "Carcinoma").*

As recommended by Cochrane Collaboration Handbook, only randomized clinical trials that evaluated the anxiety as one of the outcomes, utilized music therapy as intervention and involved sample with individuals diagnosed with cancer were included. The studies where music therapy was not conducted by a skilled professional, without control group, whose full text was unavailable, associated patients with diseases other than cancer and another intervention in addition to music included in the same experimental group were excluded.

The articles were selected by two authors after a sequential reading of the title, abstract and full text, always in that order. The list of references of the articles was searched to find possible additional studies. Duplicate studies were removed. The following data were extracted and inserted in an Excel standard form: author, date, title, sample, type of cancer, objective of the study, sample size (n), age (years), groups, duration (weeks), frequency, intervention, outcome measures and conclusion of the author. No filter was utilized for date, type of study or language.

The quality of the studies was classified by two independent investigators who conducted the evaluation with PEDro Scale and Cochrane risk of bias for all the studies included in this review. All the authors were blinded for the evaluations and discrepancies were resolved by a third investigator.

RESULTS

It were encountered 1,909 studies and in the end, 1,493 after the elimination of the duplicates. After reading the title and abstract, 47 articles remained that were read in full. Of these, 39 were eliminated because of the following motives: 14 studies[15-28] were unavailable in full; in ten[29-38], the intervention was not conducted by a professional music therapist; seven[39-45] had no control group; in six[46-51], the experimental group received another intervention together with music; and in two[52,53], the experimental group had another disease in addition to cancer. Therefore, as demonstrated in Figure 1, eight articles remained for qualitative analysis.

It were included eight studies that analyzed the effects of music therapy about the anxiety of participants with cancer. The studies presented between 33 to 68

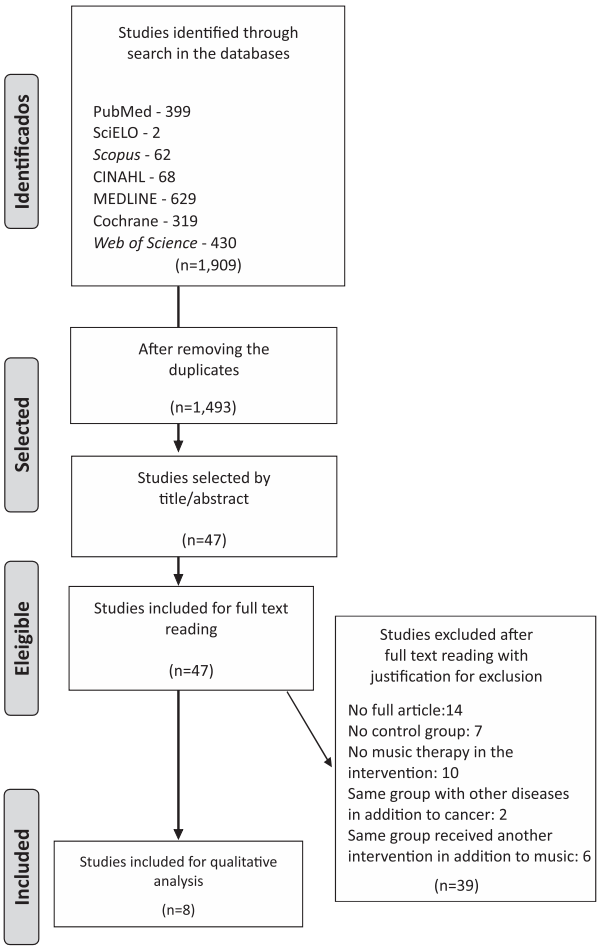

Figure 1. Study Flowchart – Model PRISMA

participants exposed to music hearing that were published from 2003 to 2017[10-14,54-56] and 788 participants in total (including GE and GC). Three studies[14,54,55] evaluated the anxiety with the instrument State Trait Anxiety Inventory, two studies[11,13] evaluated with Hospital Anxiety and Depression Scale (HADS), one study[10] with Profile of Mood States (POMS), one study[12] with Global Anxiety-Visual Analogic and one study[56] with Visual Analogic Scale (VAS) (Table 1).

Two types of mechanisms to offer music were identified: hearing music with earphones[11,12,54,55] and hearing live music[10,13,14,56]. Most of the studies analyzed selected music based in the patient's preferences[10-12,14,56]. Four studies[10-12,55] described the music utilized as "relaxing", 'calming", "stimulating"; two[54,56] utilized instrumental music and two[12,13] did not describe the type of music utilized.

The duration of the musical intervention was described in six studies[10,11,13,54-56], varying from 20[13] to 90 minutes[11]. In two studies, the duration of the musical intervention was described as compatible with the time of the procedure that was being performed[12,14]. The frequency of the sessions of music therapy was of one session[54], two sessions per day[55], two sessions per week[13,56], varying the time according to each patient[10] and without details about the number of sessions conducted during the intervention[11,12,14].

Music hearing was evaluated during radiotherapy[11,14], chemotherapy[13,54], surgery[12,55] and transplantation[10,56].

The study sample consisted mainly of participants with breast cancer, but patients with hematologic, lung, head and neck cancer were involved as well.

RESULTS

Apparently, how the music choice was made, either by the patient or the therapist, did not influence the results, as there were significant effects of the music in the anxiety in both forms of choice. Among the studies that found significant results, in two, music was selected according to the patient preference[14,57], in two, selected by the music therapist[54,55], and in one[12] according to the patient's preference and the music therapist. Consequently, musical preference did not cause impact in the benefits of music therapy in the treatment for anxiety.

Seemingly, the type of execution, live or pre-recorded, did not influence the effects of music therapy for anxiety, since among the studies that found effects in anxiety, two[54,55] were with pre-recorded music, two with live music[14,56] and one with music recorded and live. In relation to the time of music offered, the variation ranged from 30[56,57] to 60 minutes[55] of musical intervention in the studies with significant effects.

Music therapy was effective for the reduction of anxiety in several moments of evaluation: radioterapy[14], chemotherapy[54], surgery[12,55] and transplantation[56].

The risk of bias of the articles included was detailed in Figures 2 and 3.

In the studies evaluated, the main reason to receive a high risk of evaluation of bias was the lack of blinding. The blinding of the participants is quite complex in music therapy studies and because of this, it is difficult that these studies happen to be scored with low or moderate risk of bias, even if they have addressed properly all the other risk factors (for example, randomization, concealed allocation etc.).

It is worth noting that some studies failed to provide enough information about the risk of bias. It is not clear, however, if this was because of incomplete translations or lack of details in the original reports of the study.

Of the eight studies selected, two were scored 7 and six, were score 6 in PEDro Scale, demonstrating good methodological quality of the studies evaluated (Table 2)[58].

Table 1. Characteristics of the studies included

Author/ year	Title	Sample n	Diagnosis of the sample	Moment of the intervention	Performance of the music	Instrument of assessment	Intervention	Results
Cassileth et al., 2003	*Music therapy for mood disturbance during hospitalization for autologous stem cell transplantation: a randomized controlled trial*	Total=62 GE n=34 GC n=28	Hematologic Cancer (non-Hodgkin lymphoma, Hodgkin lymphoma, multiple myeloma)	During hospitalization for autologous stem cell transplantation	Live music	*Profile of Mood States*	GE: session of music therapy Type of music: musical preferences and clinical problems Duration: 20 to 30 min GC: Standard care	No significant changes in anxiety. GE had score 28% lower in the combined scale of anxiety/depression (p 0.065), total mood, significant improvement (p 0.01) in GE in relation to GC
Clark et al., 2006	*Use of preferred music to reduce emotional distress and symptom activity during radiation therapy*	Total=63 GE n=35 GC n=28	Cancer of several types and various locations	During radiotherapy	Music recorded playing through earphone connected to the tape recorder	*Hospital Anxiety and Depression Scale*	GE: session of music therapy Type of music: preferred music styles of the patients identified by the music therapist for relaxation or distraction Duration: 90 min GC: Usual care	Anxiety and anguish reduced in GC, but without significant result. The only significant correlation was between the use of music and suffering (r=0.48, p=0.02), indicating more use of music, more reduction of suffering related to the treatment
Lin et al., 2011	*A randomized controlled trial of the effect of music therapy and verbal relaxation on chemotherapy-induced anxiety*	Total=98 GE n=34 GC n=34 Relaxation n=30	Breast, lung cancer and other	During chemotherapy	Music recorded, heard through earphone connected to the MP3 player	*State Trait Anxiety Inventory*	GE: session of music therapy Type of music: 1. preparation – nature sounds; 2. relaxation – meditation and nature sounds; 3. hearing of instrumental music and nature Duration: 60 min GC: received routine nursing care	The musical intervention during the chemotherapy protocol of 30 minutes has significant effects in the reduction of anxiety in patients with elevated anxiety pre-chemotherapy (p=0.028)
Li et al., 2011	*Effects of music therapy on anxiety of patients with breast cancer after radical mastectomy: a randomized clinical trial*	Total=120 GE n=60 GC n=60	Breast cancer	During post-operation of radical mastectomy	Music recorded –heard through earphone connected to the MP3 player	*State Trait Anxiety Inventory*	GE: session of music therapy twice a day, once in early morning and the other, in the evening and routine nursing care Type of music: 202 music pre-selected by professionals after the patients have chosen their preferences - Duration: 30 min GC: only routine nursing care	Anxiety scores of GE were significantly lower than GC in each one of the three post-tests (p<0.0001)

to be continued

Table 1. continuation

Author/ year	Title	Sample n	Diagnosis of the sample	Moment of the intervention	Performance of the music	Instrument of assessment	Intervention	Results
Palmer et al., 2015	*Effects of music therapy on anesthesia requirements and anxiety in women undergoing ambulatory breast surgery for cancer diagnosis and treatment: a randomized controlled trial*	Total=201 Live music n=68 Music recorded n=68 GC n=65	Breast cancer	During pre-operatory and intra-operatory of breast surgery	Live music and recorded, hearing through earphone connected to MP3 player	*Global Anxiety - Visual Analog*	Live GM: pre-operatory – live music selected by the patient GM recorded: Intra-operatory – music recorded, selected by the therapist Duration: Time of the procedure GC: preoperatory – usual care; intra-operatory – protectors, noise blockers	Significant reduction of anxiety in the groups of live music and recorded music compared to GC of usual care ($p<0.001$) No significant difference in the comparison of live GM and recorded music
Tuinmann et al., 2016	*The effects of music therapy in patients with high-dose chemotherapy and stem cell support: a randomized pilot study*	Total=66 GE n=33 GC n=33	Hematologic cancer (non-Hodgkin lymphoma, Hodgkin lymphoma, multiple myeloma, testicle cancer and leukemia)	During chemotherapy	Live music, active (play music and sing) or receptive (hear music), methods according to the therapeutic necessities	*Hospital Anxiety and Depression Scale*	GE: session of music therapy twice a week Type of music: intervention was not planned or standardized Duration: 20 min GC: standard treatment (professional care by physicians and nurses)	Reduction of anxiety was not significant ($p=0.722$) In both groups, anxiety score diminished. As the mean score of both groups did not exceed the cut-off, these findings are not clinically relevant
Dóro et al., 2016	*Music therapy improves the mood of patients undergoing hematopoietic stem cells transplantation (controlled randomized study)*	Total=100 GE n=50 GC n=50	Hematologic cancer	At the infirmary with patients submitted to hematopoietic allogeneic stem-cells transplantation	Live music. Patient and therapist perform and sing pre-chosen music with instruments, improvise music spontaneuously using their voice, instruments or both	*Visual Analog Scale (VAS)*	GE: session of music therapy twice a week Type of music: chosen by the therapists, popular songs that are part of the patient's socio-musical-cultural identity and songs of the preference of the patient Duration: 30 min GC: standard treatment	Statistically significant reduction of anxiety ($p<0.001$)
Rossetti et al., 2017	*The impact of music therapy on anxiety in cancer patients undergoing simulation for radiation therapy*	Total=78 GE n=39 GC n=39	Breast cancer and head and neck cancer	Radiotherapy	Live music	*State Trait Anxiety Inventory*	GE: session of music therapy Type of music based in the patient's preference, stimulating and relaxing music Duration: Time of the procedure GC: standard treatment with verbal instructions and in video	Significant reduction of the anxiety of the individuals of GE ($p<0.0001$)

Captions: GC: group control; GE: group experimental; GM: group of music

DISCUSSION

Most of the studies evaluated suggest that the musical intervention reduces the anxiety of persons with cancer in several moments of the treatment, which concurs with findings of the literature that address the effect of music for the reduction of anxiety in radiotherapy[27,30,34], chemotherapy[47,49,59,60], in addition to effects on anxiety in pre and post operation phases[61]. One of the possible explanations for this fact is that music hearing can reduce the secretion of catecholamines in the regulation of the autonomic functions and improve the physiological responses as respiratory frequency, cardiac frequency, blood pressure, body temperature and muscle tension, which causes effects in the relaxation and reduction of anxiety[61].

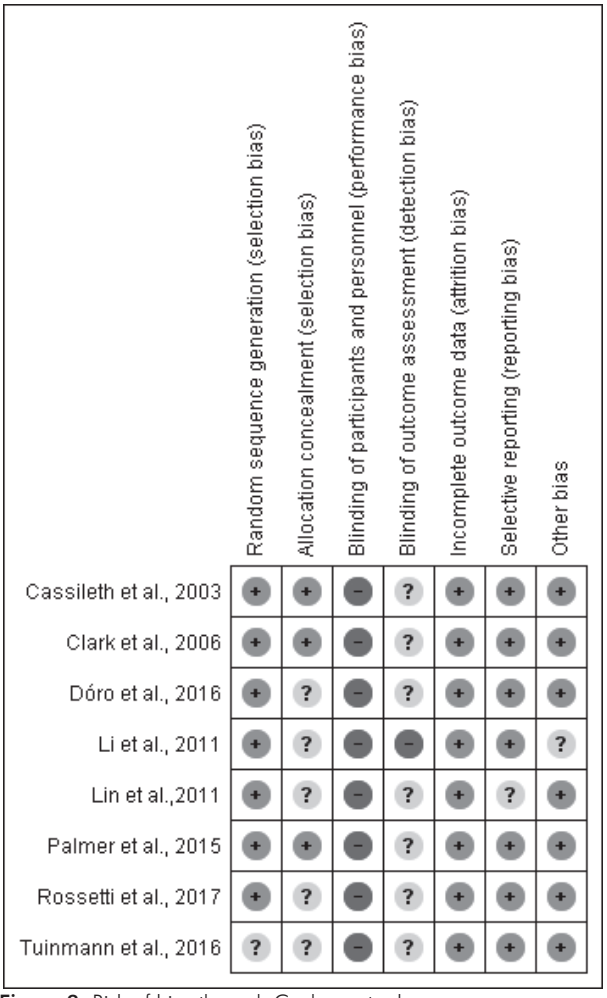

Figure 2. Risk of bias through Cochrane tool

The studies that did not present significant effect of music therapy on anxiety justify the results because of the non-presentation of enough high level of anxiety in the beginning of the study. Therefore, it is important to report the differentiation between being anxious and be anxious, which was not discussed in the studies. Anxiety is a complex clinical condition that can be divided in state anxiety and trait anxiety. The state of anxiety is defined as a transient emotional activity according to momentaneous conditions experienced by the individual, appearing moments of tension and apprehension consciously perceived that can vary in intensity. As for trait anxiety, is how the individual usually reacts in situations of the daily life stress and that are perceived as threatening, the trait is stable, permanent, varying according to each person[62]. Therefore, the sample of the studies could have been better classified considering these aspects. Studies report that patients with higher levels of anxiety or anguish respond more favorably to music therapy than patients with lower level of suffering, consequently the lack of homogeneity of the groups according to the level of anxiety may have influenced the lack of significance of some results[11].

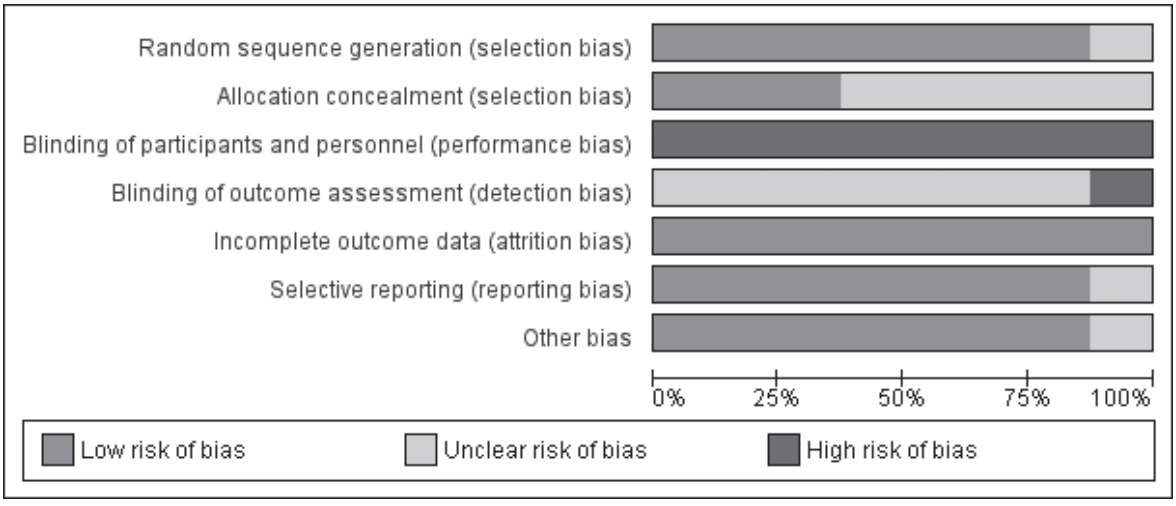

Figure 3. Summary of bias risk through Cochrane tool

Table 2. Evaluation of the methodological quality of the studies included in the review analyzed with the PEDro Scale

Author/year	1	2	3	4	5	6	7	8	9	10	11	Total
Cassileth et al., 2003	1	1	1	1	0	0	0	1	1	1	1	7
Clark et al., 2006	1	1	1	0	0	0	0	1	1	1	1	6
Dóro et al., 2016	1	1	0	1	0	0	0	1	1	1	1	6
Li et al., 2011	1	1	0	1	0	0	0	1	1	1	1	6
Lin et al., 2011	0	1	0	1	0	0	0	1	1	1	1	6
Palmer et al., 2015	1	1	1	1	0	0	0	1	1	1	1	7
Rossetti et al., 2017	1	1	0	1	0	0	0	1	1	1	1	6
Tuinmann et al., 2016	1	1	0	1	0	0	0	1	1	1	1	6

Captions: 1 Eligibility criteria, 2 Random allocation, 3 Concealed allocation, 4 Baseline Comparability, 5 Blind subjects, 6 Blind therapists, 7 Blind assessor, 8 < 15% of desistance, 9 Intention to treat analysis, 10 Comparison between groups, 11 Point estimates and variability.
Note: Criterion 1 is not considered for the final score because it is an item that assesses the external validity[58].

In four[12,14,54,55] of the five studies that presented significance of the effect of music therapy, females were the majority of the sample. It is known that nearly 25% to 35% of the women with cancer will develop anxiety and/or depression in some stage of the treatment[63]. In that line, it is necessary to understand the aspects that can favor such difference among genders, since the literature addresses the relation between breast cancer with substantial presence of emotional disorders[33,64-66]. The results of one of the studies included in this review[55], with sample formed by 120 patients exclusively females brought that the pre-test of the state anxiety demonstrated that the majority of the patients had moderate and severe anxiety indicating that it is a frequent psychological disorder in women with cancer. The major part of the sample of the articles included was formed by patients with breast cancer, one of the most incident in females. In this type of cancer, the main treatment is surgery, when the breast can be removed totally or partially. Having the breast affected by the disease and mutilated by the treatment can interfere in the female identity, provoking intense psychological suffering, which is greater than of the disease per se, because causes alteration of the body image, generates emotional fragility, low self-esteem, fear of rejection and compromised interpersonal and social relationship[67]. Reports demonstrate high prevalence of anxiety during at least two years after the diagnosis, in each one of five women with breast cancer[3]. New revisions that analyze studies with separate samples of women and men can confirm better the association of the effectiveness of music therapy in both genders.

Most of the studies analyzed selected music based in the patient's preferences[10-12,14,56]. One of the studies[12] included in this review reported that familiar tunes or preferred by the patient would be more beneficial, explaining that this happens once the symptoms of anxiety exacerbate, most of all when what is expected is different from what actually happens. Consequently, provide what is expected and known (the preferred music) can stimulate the response to the relaxation through the activation of the parasympatic branch of the autonomous nervous system. However, the results of this review showed that music therapy was effective in managing the anxiety, whether the music was chosen by the patient or not.

Music is a complex and subjective form of treatment, which justifies the high heterogeneity of the interventions reported in the studies included. In this context, some non-standard variables may have influenced the statistical effect of the studies as: no difference between the effect of the music and the effect of the music therapist as well as different clinical environments, types of intervention, instruments utilized, moments of the evaluation, duration of the intervention, duration of the benefits and type of music selected, which hamper the comparisons. In addition, the description of the music in different terms needs interpretation that universalizes the interventions. This reinforces the necessity of more objective and specific approach with proper description of the musical intervention as a form to facilitate the reproducibility of the studies in the clinical practice.

CONCLUSION

Music therapy is effective in the reduction of anxiety in persons with cancer. However, more studies with new technologies and more details about the intervention are necessary to confirm the results.

CONTRIBUTIONS

All the authors contributed substantially to the conception and planning of the study, gathering and interpretation of data, wording and/or critical review and final approval of the version published.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

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