INTEGRATIVE REVIEW

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Influence of music therapy on anxiety in women with breast neoplasia in the preoperative period: an integrative review

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RESUMO

Objetivo: Analisar a influência da musicoterapia para o controle da ansiedade em mulheres com câncer de mama no período pré-operatório. **Método:** Revisão integrativa desenvolvida entre 2021 e 2022 nas bases de dados CINAHL, PsycINFO, Embase, Lilacs, Pubmed, Scopus, Web of Science e busca manual na literatura cinzenta. **Resultados:** Inicialmente, encontraram-se 70 artigos, 59 nas bases supracitadas, e 11 na literatura cinzenta. Excluíram-se textos duplicados, sendo os demais avaliados quanto ao título e resumo e, posteriormente, leitura integral, chegando ao número final de sete artigos; cinco ensaios clínicos randomizados, e dois ensaios clínicos quase-experimentais. Observou-se, então, redução na ansiedade após aplicação da terapia musical durante o período pré-operatório, tanto em pacientes que realizaram cirurgias, como naquelas que realizaram biópsias cirúrgicas. **Conclusão:** Incluir musicoterapia nos cuidados pré-operatórios demonstrou resultados benéficos. Entretanto, apesar de promissores, trabalhos sobre este tema são escassos, sendo necessários mais estudos dentro dessa temática.

Descritores: Ansiedade; Musicoterapia; Período pré-operatório; Neoplasias de mama.

ABSTRACT

Objective: To analyze the influence of music therapy on anxiety control in women with breast cancer during the preoperative period. **Methods:** An integrative review conducted between 2021 and 2022, utilizing the CINAHL, PsycINFO, Embase, Lilacs, PubMed, Scopus, Web of Science databases, and a manual search in the grey literature. **Results:** Initially, 70 articles were identified, 59 from the aforementioned databases and 11 from the grey literature. After removing duplicate texts, the remaining articles were evaluated based on their titles and abstracts, followed by full-text reading, resulting in a final selection of seven articles: five randomized clinical trials and two quasi-experimental clinical trials. A reduction in anxiety was observed following the application of music therapy during the preoperative period, both in patients undergoing surgeries and those undergoing surgical biopsies. **Conclusion:** Including music therapy in preoperative care showed beneficial results. However, despite the promising findings, research on this topic is scarce, indicating a need for more studies in this area.

Descriptors: Anxiety; Music therapy; Preoperative period; Breast neoplasms.

RESUMEN

Objetivo: Analizar la influencia de la musicoterapia en el control de la ansiedad en mujeres con cáncer de mama durante el período preoperatorio. **Método:** Revisión integrativa desarrollada entre 2021 y 2022 en las bases de datos CINAHL, PsycINFO, Embase, Lilacs, Pubmed, Scopus, Web of Science y búsqueda manual en la literatura gris. **Resultados:** Inicialmente, se encontraron 70 artículos, 59 en las bases mencionadas y 11 en la literatura gris. Se excluyeron los textos duplicados, y los restantes fueron evaluados según el título y el resumen y, posteriormente, lectura completa, llegando al número final de siete artículos: cinco ensayos clínicos aleatorizados y dos ensayos clínicos cuasi-experimentales. Se observó una reducción en la ansiedad después de la aplicación de la terapia musical durante el período preoperatorio, tanto en pacientes que se sometieron a cirugías como en aquellas que realizaron biopsias quirúrgicas. **Conclusión:** Incluir musicoterapia en los cuidados preoperatorios mostró resultados beneficiosos. Sin embargo, a pesar de ser prometedores, los trabajos sobre este tema son escasos, siendo necesarios más estudios en esta área.

Descriptores: Ansiedad; Musicoterapia; Periodo preoperatorio; Neoplasias de la mama.

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Introduction

The preoperative period encompasses the moments leading up to the surgical procedure, involving various stages of patient preparation. The aspects addressed during this stage are individualized for each case but typically include the assessment of pre-existing health conditions, the location and extent of the intervention, prior medication use, among others. Therefore, this is considered an extremely important time for good hospital and clinical practice, involving the care of a multidisciplinary team, as unfavorable conditions that occur during this period can negatively impact the entire course of treatment[1].

Furthermore, it is not only physical and biological factors that impact the body's response. An increase in anxiety levels is commonly observed during this stage, which can negatively affect both the immediate postoperative period and overall recovery. Therefore, it is important to highlight that individuals with exacerbated anxiety symptoms may more frequently experience hemodynamic instability and have a higher risk of cardiovascular and cerebrovascular events. Additionally, it is worth noting that women tend to exhibit anxiety more frequently during these moments, making them more susceptible to potential postoperative complications[2].

This elevation is even more pronounced in oncological surgeries. Therefore, this work focuses on breast cancer, as it is the most common malignant neoplasm globally among women. The choice of treatment varies according to the stage of the disease and the type of tumor, as well as taking into account the patient’s overall condition, age, pre-existing conditions, and preferences. Consequently, the therapeutic approach may include surgical interventions, radiotherapy, hormone therapy, or biological therapy (targeted therapy), in addition to the use of complementary therapies[3].

It is well-known that a cancer diagnosis brings about various consequences. In addition to coping with the pain and discomfort resulting from the treatment and the disease itself, patients also face physical, psychological, and social changes. Because breast cancer is a highly stigmatized condition, the diagnosis directly impacts issues such as self-esteem, sexuality, and the loss of femininity, along with other detrimental effects on the body that can exacerbate anxiety[4].

However, some measures can be adopted by professionals involved in the patient's care to minimize anxiety. Both pharmacological and non-pharmacological treatments can be used. In this review, the focus was chosen to be on Integrative and Complementary Practices (PICS). PICS are treatments based on traditional knowledge that utilize therapeutic resources to prevent or treat certain diseases, such as depression and hypertension, with Brazil being a global reference in this field. Examples of PICS include aromatherapy, biodance, music therapy, and homeopathy. However, despite the contribution of this field to health prevention and promotion, as well as to the treatment and relief of symptoms, it remains an underexplored area in terms of care provided to oncology patients[5].

Among the PICS, music therapy is highlighted in this review due to the fact that musical perception involves various brain structures, which can influence and evoke emotions, potentially remodeling physical, cognitive, emotional, and social aspects. Musical stimuli can shape physiological systems, for instance, by altering respiratory rhythm and blood circulation, encouraging aspects of the muscular system, and changing pain resistance due to its multiple uses, proving to be a relevant possibility in combating fear and anxiety[6].

Given the epidemiological importance of breast neoplasms, especially in women, combined with the fact that PICS are still not widely integrated into oncology care, this integrative review was developed to analyze what the national and international literature provides regarding the use of music therapy for anxiety control in women with breast cancer during the preoperative period.

Methods

This article was conducted as an integrative review, based on the application of Evidence-Based Practice (EBP). The guiding research question aimed to determine the available evidence regarding the relationship between music and anxiety in women with breast cancer during the preoperative period, developed using the "PICOT" strategy, which stands for "P" for population, "I" for intervention, "C" for comparison, "O" for outcome, and "T" for time. In this research, the acronym was utilized as follows: P - women with breast cancer; I - music therapy; C - not applied; O - reduction of anxiety; and T - preoperative period.

The inclusion criteria for selecting publications were scientific articles published in any language and period, whose titles included the terms "breast cancer," "music therapy," "anxiety," and "preoperative," and that were available in full text. Exclusion criteria were studies that did not address the concept relevantly to achieve the research objective, such as those evaluating anxiety reduction through methods other than music therapy or those that did not provide sufficient data; studies conducted with patients under 18 years old; duplicate studies; letters to the editor; and abstracts published in conference proceedings.

Searches were conducted between September 2021 and February 2022 in the following databases: CINAHL, PsycINFO, Embase, LILACS, PubMed, Scopus, and Web of Science, as well as in the grey literature. The following controlled descriptors from Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH), in both Portuguese and English, were used: "Ansiedade" (Anxiety); "Musicoterapia" (Music Therapy); "Neoplasias de mama" (Breast Neoplasms); "Período pré-operatório" (Preoperative Period), associated with each other using the Boolean operator "AND."

To identify and implement the descriptors and alternative terms, a preliminary search was conducted in PubMed to identify relevant articles on the topic. The text words contained in the titles and abstracts of relevant articles and the indexed terms (MeSH) used to describe the articles were identified to develop a comprehensive search strategy. Following this step, the descriptors were adapted according to the specifications of each

information source.

After conducting the database searches, the studies were imported into Web Endnote for the removal of duplicate references. Subsequently, they were transferred to the Rayyan platform for the title and abstract screening by two independent reviewers based on the eligibility criteria. A blinding tool available on the Rayyan platform was used, allowing the reviewers to select articles independently, thereby reducing bias and ensuring impartiality in the selection process according to the inclusion criteria for further full-text review.

Conflicts were resolved by a third reviewer. The eligible studies were read in full for data extraction, with each author of this review independently collecting the data of interest. A data collection instrument was used, which included the title, authors, year, research design, level of evidence, and results found. These data were evaluated through a descriptive analysis. The study inclusion process is presented in Figure 1 and followed the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[8].

Figure 1 illustrates the flowchart of the study selection process that comprised the sample for this review.

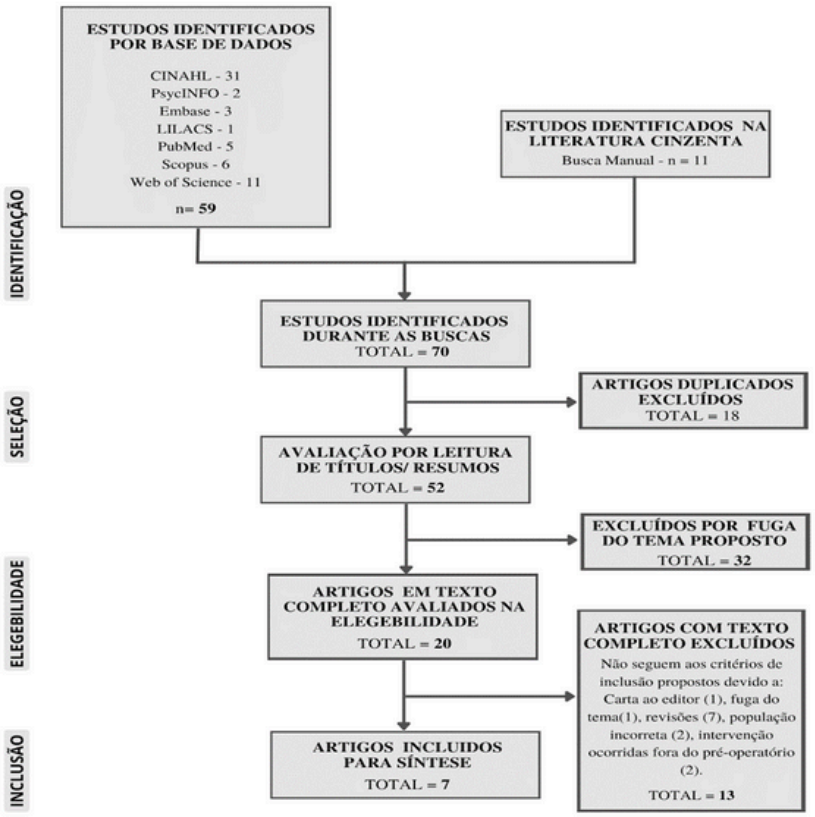

Figure 1 - Flowchart of Article Selection.

Results

Initially, 70 articles were identified—59 from the previously mentioned databases and 11 from the grey literature search. After the removal of duplicate titles, which were excluded using Web Endnote, the number of studies to be evaluated was reduced to 52. These remaining studies were then assessed for their relevance to the proposed topic based on their titles and abstracts, resulting in 20 articles. The articles in this final group were read in full by

the authors, and, considering the aforementioned eligibility criteria, a final selection of seven articles was made.

The publication dates span a period of 21 years, with the earliest from 2001 and the most recent from 2022, including studies from 2011, 2012, 2015, 2018, and 2019. Regarding methodology, the majority of the studies were randomized clinical trials (n = 5; 71.43%), with only one other methodology present: non-randomized clinical trials (n = 2; 28.57%). All seven studies were classified according to evidence levels, as per Melnyk and Fineout-Overholt, and were categorized as level II studies [9].

Among the articles where the average age of the participants was reported, it was observed that the trials were conducted with adult women, with an average age of 55.05 years, and the lowest reported average age was 47 years.

Furthermore, regarding the sample sizes of the non-randomized clinical studies, there was a variation of ten participants, with the smallest study comprising 20 participants and the largest 30. In contrast, the randomized studies showed a variation of 172 participants, with the study with the fewest patients having 29 and the largest having 201.

In Table 1, presented below, the main characteristics of the articles included in this review are provided, along with the title of the work and the names of the authors. This allows for better visualization of the information collected for the reader.

Table 1- Synthesis of the Articles Included in the Research Regarding Title, Authors, Year, Study Design, Objective, Population, Intervention, Results, and Level of Evidence. Minas Gerais, Brazil, 2022.

Nº	Title	Authors	Year	Study Desing	Objective
1	Aromatherapy Plus Music Therapy Improve Pain Intensity and Anxiety Scores in Patients With Breast Cancer During Perioperative Periods: A Randomized Controlled Trial(10)	Deng, Chao et al.	2022	Randomized Clinical Trial	Evaluate the use of music and/or aromatherapy in women with breast cancer in the pre- and postoperative period to reduce anxiety and pain.
2	Clinical Hypnosis and Music In Breast Biopsy:A Randomized Clinical Trial(11)	Sánchez-Jáureg, Teresa et al.	2019	Randomized Clinical Trial	Evaluate the effects of music and hypnosis on anxiety, depression, optimism, and stress in women undergoing breast biopsy.
3	Women Awaiting Breast Biopsy Effect of Music on Anxiety of (12)	Haun M; Mainous O; Looney SW.	2001	Non-randomized study	Investigate the role of music on the anxiety levels of 20 patients in the preoperative period of breast biopsy.
4	Effects of aroma therapy and music intervention on pain and anxious for breast cancer patients in the perioperative period(13)	Xiao Y, et al.	2018	Randomized Clinical Trial	Investigate the effect of aromatherapy and music on anxiety and pain in breast cancer patients during the perioperative period.

(Continuation)

Nº	Title	Authors	Year	Study Desing	Objective
5	Effects of Music Therapy on Anesthesia Requirements and Anxiety in Women Undergoing Ambulatory Breast Surgery for Cancer Diagnosis and Treatment: A Randomized Controlled Trial(14)	Palmer JB et al.	2015	Randomized Clinical Trial	Investigate the effect of live and recorded music therapy in the preoperative period on the degree of anesthesia, anxiety levels, recovery time, and patient satisfaction in women undergoing surgery for breast cancer diagnosis or treatment.
6	Influence of Music on Pain and Anxiety Resulting from Surgery in Patients with Breast Cancer (15)	Pinto Júnior FE et al.	2012	Randomized Clinical Trial	Evaluate the influence of music on anxiety and pain in breast cancer patients who underwent surgery.
7	Perioperative Music and Its Effects on Anxiety, Hemodynamics, and Pain in Women Undergoing Mastectomy(16)	Binss-Turner PG et al.	2011	Non-randomized study	Evaluate the changes resulting from the use of music during the perioperative period on mean arterial pressure, anxiety, pain, and heart rate in women diagnosed with breast cancer undergoing mastectomy.

Nº	População	Intervenção	Resultados	Nível de Evidência
1	n = 160 Average Age: 54.2 years	Patients in the experimental group were encouraged to choose five of their preferred songs from a pre-selected list of 40 on an MP3 player and listen for 30 minutes through headphones one hour before surgery. Anxiety was assessed 30 minutes before surgery (T1) and 4 hours after extubation (T2).	Significant reduction in anxiety in the experimental group after the musical intervention compared to the control group ($p < .001$, -3.25 +/- 1.17).	II
2	n = 170 Average Age: 47 years	The music group used an MP3 player and headphones to listen to music for 17 minutes. Anxiety was assessed at three different time points: before the intervention, after the 17-minute intervention, and after the completion of the biopsy).	Significant reduction in anxiety in the experimental group after the musical intervention compared to the control group ($p < .001$, $n^2p = .07$).	II

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Nº	População	Intervenção	Resultados	Nível de Evidência
3	n = 20 Average Age: Not reported	The experimental group listened to a selection of "new age" music for 20 minutes. Anxiety was assessed before the intervention and after the 20-minute intervention.	Significant difference between the two groups in anxiety scores after the musical intervention (p = .002), indicating a reduction in pre-biopsy anxiety in patients who received the musical intervention.	II
4	n = 100 Average Age: Not reported	Patients in the experimental group selected a preferred song from a list of pre-selected music, which was played repeatedly for 30 minutes; half an hour before surgery and immediately after awakening from anesthesia. Anxiety was assessed 30 minutes before surgery (T1), 30 minutes after awakening from anesthesia (T2), and 4 hours after extubation (T3) using the VASA scale.	Significant reduction in anxiety in the intervention group compared to the control group (p < 0.05), with a decrease observed in T2 and T3.	II
5	n = 201 Average Age: 59.4 ± 15.7 years	Patients in the experimental group with live music listened to a live performance of a song of their choice or a recorded version of their choice through headphones, both for five minutes in the preoperative period. Anxiety was assessed before and after the five-minute musical intervention.	Both the recorded music group (-0.448 [-0.576 to -0.320]) and the live music group (-0.492 [-0.686 to -0.298]) showed a reduction in anxiety levels compared to the CG, with no significant difference between the two music groups.	II
6	n = 29 Average Age: Experimental Group 61 ± 12 years; Control Group 55 ± 16 years	A session of a predetermined music track was played for 25 to 40 minutes in the preoperative period using an MP3 player and headphones approximately one hour before the procedure.	The CG had an average score of 43 points (31-66), higher than the experimental group, which had an average of 36 points (20-52).Anxiety in the experimental group decreased from 36.8 points before surgery to 32.2 points after the intervention (a reduction of 12.5%) (p < 0.0001).	II
7	n = 30 Average Age: 56.63 years	Patients listened to pre-selected music genres on iPods for 4 hours during the preoperative, intraoperative, and postoperative periods. Anxiety was assessed upon entering the operating room (T1) and in the recovery room. (T2).	Reduction in anxiety, mean arterial pressure (MAP), and pain in the women of the experimental group compared to the control group. In the CG, anxiety increased by 7.8 points from T1 to T2, while in the experimental group, it decreased by 10.8 points from T1 to T2.	II

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Discussion

Although Integrative and Complementary Practices (PICS) are widely used techniques, with music therapy being one of the most well-known, its application in the preoperative period remains underutilized. Consequently, many studies that have sought to observe the effects of this technique have combined it with other non-pharmacological approaches, such as acupuncture, hypnosis, or aromatherapy [10,11,13] , or have focused on other symptoms, such as pain[10,15,16]. This is due to the limited theoretical knowledge currently available regarding the use of music therapy to reduce anxiety during the preoperative period in breast cancer patients.

Additionally, studies that evaluated the use of this therapy not only in patients undergoing surgeries for neoplasm treatment but also in those undergoing surgical biopsies were selected. This is because, at the time of biopsies, there is already the possibility of an unfavorable diagnosis, leading to significant psychological consequences for the patients.

Music therapy before surgical treatment:

A randomized study[10],conducted a randomized study to evaluate the effect of music, along with aromatherapy, on reducing anxiety and pain levels in women during the pre-surgical period. The study randomly divided 160 patients into four groups of 40 women each: a control group, an experimental group with aromatherapy, an experimental group with music therapy, and an experimental group with both interventions. Anxiety and pain levels were assessed using a visual analog scale. In the group with the musical intervention, a reduction of 3.25 points in anxiety levels was observed when comparing two distinct moments: before (moment 1) and after the intervention (moment 2). The initial value was 5.65, while the post-intervention value was 2.40. The other interventions also showed similar results; however, the control group experienced only a slight reduction, from 6.03 to 5.30. No significant reductions in pain were observed. The data were collected in both the preoperative and postoperative periods, which may be a variable to consider.

In the Brazilian study [15], the authors evaluated the potential influence of music on anxiety and pain in 29 patients with breast neoplasms who were scheduled for surgery between 2008 and 2010. These patients were exposed to a 25 to 40-minute session of the song "The Four Seasons" approximately one hour before the procedure using an MP3 player. The IDATE (State-Trait Anxiety Inventory) was used to assess anxiety levels, alongside physiological variables: oxygen saturation (SatO2), respiratory rate (RR), heart rate (HR), blood pressure (BP), mean arterial pressure (MAP), and temperature (T). The results showed an average of 36.8 points before the intervention and 32.2 points after the application of the music, indicating a reduction of about 4.6 points (12.5%) in the anxiety levels of the patients in the experimental group. Regarding the physiological variables, no significant changes were observed. The same study also evaluated the impact on pain, finding a slight reduction of approximately 0.27 points in the experimental group.

In turn, an international study[16] , evaluated the effects of music therapy during the perioperative period on mean arterial pressure, anxiety, heart rate, and pain were evaluated in 30 women diagnosed with breast cancer who underwent mastectomy. The women, with an average age of 56.63 years, were divided into a control group and an experimental group. The women in the experimental group listened to pre-selected music genres on iPods for 4 hours during the preoperative, intraoperative, and postoperative periods. The variables were collected when the patients entered the operating room (T1) and in the recovery room (T2). Anxiety levels were assessed using the STAI scale, mean arterial pressure and heart rate were monitored using the HP M3000A, and pain was measured using the VAS scale. The results indicated a significant reduction in anxiety levels, mean arterial pressure, and pain in the intervention group compared to the control group. However, no significant difference was observed in heart rate. Anxiety in the control group increased by 7.8 points from T1 to T2, while in the experimental group, it decreased by 10.8 points from T1 to T2.

In the study conducted to investifate the the effects of aromatherapy and music therapy on anxiety and pain were investigated in 100 breast cancer patients during the perioperative period[13] . The patients were divided into four groups: a control group, an aromatherapy group, a music therapy group, and a combined intervention group. In the music therapy group, the women chose a preferred song from a list of pre-selected music, which was played repeatedly for 30 minutes before surgery and for 30 minutes after awakening from anesthesia. Anxiety and pain were assessed 30 minutes before surgery (T1), 30 minutes after awakening from anesthesia (T2), and 4 hours after extubation (T3). Anxiety levels were evaluated using the VASA scale, and pain levels were measured using the Numerical Rating Scale (NRS) for pain intensity. The results indicated an increase in pain levels after the surgical procedure, with a more significant reduction observed in T3 in the experimental groups. Anxiety levels also experienced a significant reduction in the experimental groups compared to the control group, particularly at T2 and T3, although no significant difference was found between the different interventions.

Music therapy before biopsies:

A biopsy is a procedure that routinely forms part of the diagnostic and treatment protocol in oncology, providing crucial anatomopathological data that directly influences the management of the condition. This entire context can often lead to an increase in anxiety levels[12] . Among the seven studies, three mentioned interventions before the performance of surgical biopsies[11,12,14].

In the study by, an investigative on the influence of music in 20 patients, divided into an experimental group and a control group[12]. The intervention involved "new age" music played for 20 minutes, with anxiety levels assessed before and immediately after the proposed intervention. The results demonstrated a significant reduction in anxiety. The STAI scale, combined with vital function markers (systolic and diastolic blood pressure, heart rate, and respiratory rate), was used to measure anxiety. Patients in the intervention group showed an average of 32.8 points after the intervention (initial score 45.3), while the control group's score only slightly decreased from 47.9 to 46.6 points.

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Respiratory rate also improved in the intervention group, with a reduction from 17.6 to 16.4 breaths per minute, compared to the control group, which saw an increase from 17.6 to 18.4 breaths per minute).

Meanwhile, the effect of music therapy was analyzed in 201 patients, with an average age of 59.4 ± 15.7 years, divided into two experimental groups and one control group[14]. In one experimental group, the intervention was performed through a live performance of the patient's chosen music, while in the second group, the intervention involved listening to a recorded version of the patient's chosen music; both interventions lasted five minutes. Anxiety was assessed before and after the five-minute musical intervention in the preoperative period using the GA-VAS (Global Anxiety-Visual Analog Scale). The results showed that in the experimental group with live music, there was a reduction of 27.5 points, while in the group with recorded music, the reduction was 26.7 points, leading to decreases in anxiety levels of 42.5% and 41.3%, respectively.

Other study avalieted the effects of music on anxiety levels, as well as on depression, optimism, and stress, were evaluated in a group of 170 women[19]. The assessments were conducted at three different times: before the intervention, immediately after the music therapy session, and after the biopsy was completed, using a visual scale. The researchers observed a reduction in anxiety levels both when comparing the data obtained before the intervention with those obtained immediately afterward in the control group, and when comparing the experimental group with the control group in the preoperative period. In addition to music, also explored other psychological factors, indicating a comprehensive approach to managing patient anxiety during the biopsy process[11].

The results of this review are in alignment with the existing literature regarding the effects of music therapy as an alternative method for reducing anxiety in breast cancer patients[17-21]. Previous studies have demonstrated that music has a positive effect on anxiety, serving as an effective tool for its reduction by lowering cortisol levels, also known as the stress hormone, and promoting both mental and muscular relaxation[7,22,23].

Furthermore, music therapy also has the ability to stimulate the production of dopamine and serotonin, neurotransmitters associated with happiness and well-being[7]. Given the various positive effects of music on the body, it is possible to infer that its use as a method to reduce anxiety in women with breast cancer in the preoperative setting is supported by the literature, despite the limited number of studies specifically addressing this topic.

However, this review has some limitations. One major limitation is the publication period of the studies, as there is a 21-year gap between the most recent and the oldest studies included. Additionally, two studies reviewed did not provide sufficient information that could have been used in this review. Furthermore, among the studies found, only one was conducted in Brazil, which limits the generalization of the results to the national context. Therefore, further research with more representative samples is needed to gain a more comprehensive understanding of the topic and to support the favorable indications for using this technique.

Conclusion

This study has enabled the synthesis of knowledge regarding music therapy and its effects on anxiety in women with breast cancer during the preoperative period, indicating that music therapy can be an effective way to minimize anxiety levels during this time.

It is hoped that the results of this study will support healthcare professionals in making clinical decisions that focus on providing individualized and high-quality care to patients undergoing this treatment. This approach aims to offer greater comfort, reduce stress, and increase safety in therapy by opting for a non-pharmacological practice with no side effects, whose positive results can be observed rapidly.

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Author Contributions

Salgado, RC participated in: Research conception and design, data collection, data analysis and interpretation, statistical analysis, funding acquisition, manuscript writing, critical revision of the manuscript for intellectual content. Oliveira, APL participated in: Research conception and design, data collection, data analysis and interpretation, statistical analysis, funding acquisition, manuscript writing, critical revision of the manuscript for intellectual content. Freire, BSM participated in: Critical revision of the manuscript for intellectual content. Costa, ICP participated in: Critical revision of the manuscript for intellectual content. Costa, ACB participated in: Research conception and design, data collection, data analysis and interpretation, statistical analysis, funding acquisition, manuscript writing, critical revision of the manuscript for intellectual content.

Conflict of Interest

The authors certify that no commercial or associative interest presents a conflict of interest regarding the manuscript.

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