



Outcomes and experiences of an online Balance-Space music therapy intervention for cancer patients: A mixed methods study

Tal-Chen Rabinowitch^{a,*}, Ayelet Dassa^{b,1,3}, Aya Shwed Sadot^{c,4}, Avigal Trincher^{c,4}

^a The school of Creative Arts Therapies, University of Haifa, Israel

^b Department of Music, Bar-Ilan University, Israel

^c Consciousness & Soft Logic Research Laboratory, Tel-Aviv University, Israel

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ABSTRACT

Coping with cancer requires both physical and emotional fortitude, and various intervention programs attempt to address these needs. Since the outbreak of the COVID-19 pandemic, many interventions have transitioned from live to online settings. Balance-Space is a music therapy intervention, which includes listening to original composed music, followed by an open discussion. Participants with a cancer diagnosis were randomized to either an online group music listening intervention or an online group meditation intervention. Both activities were followed by a group discussion led by two music therapists. A mixed methods study was employed and included both quantitative measurements of distress, anxiety, and pain and a qualitative analysis of the group discussion in the music intervention group. We found a significant reduction in participants' perceived pain levels following the music intervention when compared to the meditation intervention. This result was supported by qualitative content analysis, which revealed how music evoked physical reactions and affected the participants' experience of pain. There were no significant differences in participants' perceived distress levels and perceived anxiety levels between the two groups. These preliminary results are encouraging and support the need for further exploration of online music therapy interventions as a non-pharmacological treatment for cancer patients.

Introduction

Coping with and enduring cancer requires a great deal of physical, emotional, and mental fortitude on behalf of the cancer patients. Interventions aimed at strengthening cancer patients' emotional and physical strength are common and have been extensively employed in hospitals and community centers (e.g. Daniels & Kissane, 2008; Fawzy, 1999; Stevinson et al., 2004; Warth et al., 2020; Xavier et al., 2020). Music has been shown to have a positive effect on alleviating symptoms, side effects, and enhancing the quality of life and resilience of cancer patients (e.g. Chirico et al., 2020; Hilliard, 2003; Mondanaro et al., 2021; O'Callaghan & Magill, 2016; Rossetti et al., 2017).

Specifically, music has been shown to have a positive effect on three dimensions, which will be examined in the current work: distress,

anxiety, and perceived pain. A large meta-analysis study that was conducted on the effect of music therapy and music medicine interventions on cancer patients showed that these interventions have a positive effect on patients' anxiety levels, depression, and a pain-reducing effect (Bradt et al., 2016). Possible underlying mechanisms for why music listening could reduce distress, anxiety, and perceived pain relate to music's role in enhancing relaxation while serving as an effective distraction from focusing on the pain, the distress, and the anxiety (Ventura et al., 2012). In addition, music listening has been shown to have positive effects on individuals' physiological responses, such as a decrease in blood pressure, heart rate, respiration rate (Fancourt et al., 2014), which, in and of itself, could contribute to a reduction in both the physiological and psychological aspects of anxiety, distress, and pain. Music listening relaxation techniques, such as progressive muscle relaxation and

* Correspondence to: The School of Creative Arts Therapies, University of Haifa, Haifa 3498838, Israel.

E-mail addresses: trabinowi@univ.haifa.ac.il (T.-C. Rabinowitch), ayelet.dassa@biu.ac.il (A. Dassa), ayabalancespace@gmail.com (A.S. Sadot), avigalflute@gmail.com (A. Trincher).

¹ Equal contribution.

² The School of Creative Arts Therapies, University of Haifa, Haifa, 3498838, Israel.

³ Faculty of Humanities, Department of Music, Bar-Ilan University, Ramat-Gan 5290002, Israel.

⁴ Consciousness & Soft Logic Research Laboratory, Tel-Aviv University, P.O. Box 39040Aviv 6997801, Israel.

imagery techniques, were found to ease side effects for cancer patients during treatment procedures and helped them to cope with symptoms such as tension, pain, and anxiety (Stanczyk, 2011). The Bonny Method of Guided Imagery and Music (BMGIM) in music therapy utilizes music listening to elicit imagery and emotional expression and has been useful with cancer patients in improving mood and quality of life (Burns, 2001).

Online music interventions for cancer patients

Since the outbreak of the COVID-19 pandemic in 2020 (World Health Organization, 2021) many interventions comprising treatment for cancer patients have transitioned from live to online settings (Jacobs et al., 2021; Lopez et al., 2021; Wang et al., 2020). Among other interventions, many musical interventions have been conducted online, using either Zoom or other online meeting platforms such as Skype, TeamViewer, etc. Indeed, during a pandemic, when the consequences of contracting a dangerous virus are serious, it is of utmost importance to minimize cancer patients' live interactions with other individuals in order to reduce infection rates. To date, there is evidence that playing music and engaging in musical interaction via online meeting platforms is problematic due to the challenge of synchronizing the sounds from all ends simultaneously (see for example Onderdijk et al., 2021). However, online meeting platforms can be excellent for engaging with music in an aural form, simply by listening to it. Very few studies have been conducted on online music therapy in general (Brault & Vaillancourt, 2022; Brunick, 2021; Cephas et al., 2022; Cole et al., 2021; Deogharia, 2020; Molyneux et al., 2020; Rodriguez, 2022) and most of them discuss the advantages, disadvantages, and complexity in running online music therapy sessions. Clearly, online music therapy is something that needs to be done but requires more learning, experience, expertise, and online meeting platforms that are more sophisticated than what is currently available. To the best of our knowledge, only one recent study reported positive feedback from cancer patients following a participation in a telehealth outpatient oncology music therapy group. Participants were engaged in various activities such as song sharing, lyric themes discussion, and music-assisted relaxation techniques following live music. During the pandemic, the participants reported that the music therapy group provided crucial social connection and support (Folsom et al., 2021).

Further studies should explore the impact of online music therapy for cancer patients. Specifically, the current study tested the feasibility and potential of an online group listening session on reducing cancer patients' anxiety, distress and pain levels through an intervention that included both music listening and a follow-up verbal discussion with two trained music therapists. Our projection is that the online music therapy intervention would be the most effective in reducing the patients' anxiety, distress and pain levels.

Balance-Space music therapy intervention

Balance-Space is a music therapy intervention during which participants listen to original music in a quiet and calm setting followed by a verbal mindful sharing that focuses on the mind and body experience in the here and now. Balance-Space was developed by two certified music therapists with 10 years of experience working with cancer patients. The aim of the intervention was to create a musical and physical womb-like space to promote a safe and soothing feeling, restore tranquility in a state of emotional overflow, and to reduce pain. The originally composed music (see Methods) was created by the music therapists, and it is based on a combination of electronic and acoustic instruments with a rich melodic line that creates a musical journey. The use of low frequencies and binaural beats enables the body to resonate with the music and experience deep relaxation, meditation, and resting states.

The current study

The aim of this mixed methods study is to learn about the experiences of cancer patients following an online Balance Space music therapy intervention. We conducted a one-phase design and collected quantitative and qualitative data during the same timeframe and with equal weight using the triangulation design and following the convergence model. The convergence model represents the traditional model of a mixed-methods triangulation design, in which different but complementary data is collected on the same topic and the different results are converged during the interpretation phase (Creswell & Plano Clark, 2007). For each part of the study we matched the specific suitable design: For the quantitative part, we used a control group in order to compare the chosen parameters and used questionnaires to test the influence of Balance-Space online music therapy intervention on the level of distress, anxiety, and pain (pre-post intervention). Concurrent with this data collection, qualitative content included the sharing discussion following the music intervention. The sharing discussion is part of the Balance-Space music therapy intervention, and qualitative content analysis was used to further understand the main topics discussed by participants. Both quantitative (numeric) and qualitative (text) data were used to obtain different but complementary data on the topic, and to gain an in-depth understanding of the participants' experience.

Method

Ethical considerations

The study was ethically approved by the Institutional Review Board at Bar-Ilan University (application # E.MUS.2019-1).

Participants

Participants were 30 Israeli adults (28 females, 2 males; age range = 26–80 years; mean age = 54.3 years; SD = 11.5 years) recruited via social media in special interest Facebook groups related to cancer patients. Once participants agreed to participate in the study, they were allocated by a simple random assignment to either a music or control group. Each group comprised smaller sub-groups, which ranged from 3 to 9 participants per sub-group. Altogether, 14 participants underwent the music intervention, and 16 participants underwent the control intervention.

All of the participants had a current diagnosis of cancer and were either under or between treatments (i.e., chemotherapy, bone marrow, biological, etc.). The most common main diagnosis was breast cancer ($N = 15$), whereas other types of cancer were spread among the participants. Almost half of the participants (43%) were not currently working due to the illness, 20% were retired, and the rest were working either part- or full-time. In addition, 76% of the participants had an academic education, whereas 24% of the participants had a high-school education, with no academic education. Exclusion criteria from the study were having a hearing impairment, a cognitive deficit, or a psychiatric diagnosis.

We also collected information regarding the participants' day-to-day use of music (not related to the intervention) in calming and reducing pain due to their illness and we created an overall measure of day-to-day music usage for these purposes, ranging from 1 (no music usage) to 4 (high music usage). Ratings of day-to-day music usage were very similar between the music ($M = 2.8$, $SD = 0.93$) and control ($M = 2.6$, $SD = 0.65$) groups, $p = .54$.

Procedure

Individuals who responded to the social media ad were asked to complete a brief questionnaire regarding their illness and provide basic contact information. A member of the research team then contacted the

respondents, told them about the study and what it would entail and verified that they were eligible to participate. Once they agreed to participate, participants completed a written informed consent and were officially enrolled in the study. Participants were then randomized into either a music or control group, and were notified of the day and time of the session and received a Zoom link. Each session began with participants completing the questionnaires (see *Measures*), continued with the intervention (either music or control; see *Interventions*) and ended with participants completing questionnaires again following the intervention. Since the questionnaires were completed online, a member of the research team who did not take part in the actual intervention and was not onsite was available to answer questionnaire-related queries by phone or e-mail throughout the process.

Interventions

Participants were asked to prepare a comfortable and quiet space in which they could lie down and listen. Each intervention was one hour long and included an introduction regarding the experience ahead. The music therapists encouraged the participants to observe and accept any feelings, thoughts, or physical pain that emerge.

Music

The music intervention was developed in order to create a space that would enable its participants to connect and be mindful about their body, their breathing, their feelings, etc., in a group setting. Before the session, participants received a link to the musical track so they could listen to the music without interference. The originally composed music was based on a combination of very low frequencies and a rich melodic line. The use of low frequencies was selected as it has been shown to contribute to relaxation by slowing the heart rate (Halbert et al., 2018). In addition, the music was edited using binaural beats, in order to synchronize the brain waves in the specific regions of the Alpha, Theta and Delta waves, which are all related to experiencing deep relaxation, meditation, and resting states (Cooper, 2021; Lee-Harris et al., 2018; a sample of the music used in this study could be found in the [supplementary materials](#)). Each participant played the musical track on their own (30 min), yet simultaneously. The musical track began with brief instructions that focused on breathing and muscle relaxation along with the delicate sound of the music featuring a melodic line in the flute (4 min), which then continued without words until the end of the musical track. After the music listening part, participants were invited to share their experiences in the group format. The 30-minute discussion was conducted by both music therapists who avoided any interpretations but used comments or questions to help participants to self-observe their experience and current feelings. The music therapists acknowledged difficult feelings, helped participants to connect their physical state with their feelings, and encouraged them to observe their current state. During the listening part, the participants chose whether to turn off the video or not, but during the discussion they all joined with video. The music therapists kept the video open and were present throughout the session.

Control

The control intervention had the same structure as the music intervention: 30 min of listening to a guided meditation soundtrack, followed by a 30-minute open discussion, led by the same two certified music therapists. The guided meditation soundtrack had a soft voice guiding the participants on how to relax their bodies and enter a meditative state. We specifically chose a similar intervention, known to have an effect on reducing distress, anxiety, and pain, and inducing relaxation (e. g. Jain et al., 2007; Zeidan et al., 2010), to try and isolate the musical contribution as much as possible in this research design. The discussion that followed gave participants a chance to share their experiences and impressions after the meditation part with the other group members and the therapists. The music therapists intervene in the same format as in

the music group (a sample of the guided meditation soundtrack used in this study can be found in the [supplementary materials](#)).

All sessions were video recorded with the participants' permission.

Measures

Background information

Demographic questionnaire (pre-intervention only): The Demographic questionnaire included questions regarding the participants' gender, age, employment status, and illness. **Music questionnaire** (post-intervention only): The Music questionnaire included questions regarding the participants' use of music and how music can affect their coping with the illness, including pain management. The scale went from 1 (no use of music) to 4 (very frequent use of music).

Dependent variables

The NCCN Distress Thermometer (pre- and post-intervention; O'Donnell et al., 2013): The NCCN Distress Thermometer is a distress management screening measure, which aims to measure the level of distress among cancer patients. The thermometer measures subjective ratings of distress on a 0 (no distress) to 10 (acute distress) scale and has acceptable test-retest reliability ($r = 0.800$, $P = .000$; Tang et al., 2011). **The Spielberger State-Trait Anxiety Inventory – Short-form (STAI; pre- and post-intervention; Marteau & Bekker, 1992)**: The STAI short-form is a 6-item questionnaire aimed at measuring situational anxiety on a scale of 1 (not at all) to 4 (extremely), has acceptable reliability, and produces scores that are similar to scores produced using the full-form across subject groups in different clinical populations (Marteau & Bekker, 1992). **The Visual Analogue Scale (VAS; pre- and post-intervention; Bond & Pilowsky, 1966)**: The VAS measures subjective ratings of pain using a visual horizontal line ranging from 1 (no pain) to 10 (acute pain) and has a test-retest reliability coefficient of .80 (Jensen, 2003). All three questionnaires were translated to Hebrew (participants' language) by a native speaker of both languages and then translated back by another expert individual to make sure the translation was done correctly. They were then validated and piloted by a small group of participants to make sure they are easy to understand and that the meaning of the questions corresponds to the meaning of the original questionnaires.

Scoring and data analysis

Dependent variables

For each of the three dependent variables, for both the pre- and post-intervention questionnaires, per participant, we calculated the score of the measure according to the original scoring procedure. As a first step in the analysis, we used a t-test to compare between the music and control pre-intervention results in all three variables to make sure there were no prior significant differences between the two groups. Subsequently, for each of the three measures, we calculated the percent change between the pre- and post-intervention scores, averaged it for each group and then compared between the two groups (with a t-test). We chose the percent change as an outcome measure as it embodies what we were seeking to explore in this study: The impact of the intervention on the participants' dependent variables between the beginning and end of the intervention session in a way that would be comparable between the three variables (hence the use of percent change instead of change scores). The analyses were parametric and based on a normal distribution assumption. All three variables had a skewness level in the range of $-0.45 - 1.49$ and a kurtosis level in the range of $-0.75 - 5.3$. Acceptable levels of skewness in order to prove a normal distribution are considered to be between -2 and $+2$ (George & Mallery, 2010), and acceptable levels of kurtosis in order to prove a normal distribution are considered to be between -7 and $+7$ (Byrne, 2010).

Qualitative analysis of the discussion

Fourteen participants underwent the music intervention in two

online groups. Following the music listening part, a discussion was conducted by the music therapists as part of the intervention format. Each participant was given the opportunity to share their feelings and thoughts. The therapists instructed the group members to avoid commenting in order to allow each participant to immerse in her own space. Participants were encouraged to share even if it was just by saying one word regarding their current state. They were encouraged to address their bodily sensations, or any image that came to mind. Audio recordings of the discussions were transcribed and prepared for analysis. Qualitative analysis was used to gain a deeper understanding of the participants' experience following the music intervention. A systematic qualitative content analysis was conducted by the researcher in a step-by-step process first creating content analytical units by identifying recurring topics (such as: physical reactions; feelings of pain; state of consciousness), which was then formed into categories. The categories emerged from the raw data and were revised as part of the analysis process during which the researcher re-visited the text (Kohlbacher, 2006). To validate the categories the researcher used a peer debriefing process (Janesick, 2015). The transcription was first sent to the music therapists who facilitated the groups, each were asked to independently code the original transcript and add their comments and ideas. Their comments were sent back to the researcher and were then discussed in a joint meeting. This process helped to detect whether or not the researcher over-emphasized an idea or missed a crucial point. The transcription was then sent as well to an outsider professional reader in order to have an independent view from a professional that had no knowledge regarding research aims and procedure. A qualified clinical social worker who specializes in working with cancer patients added her comments and ideas. Finally, the researcher integrated all comments and revised the categories accordingly. The file with the revised categories was presented to the research team for their final comments and approval.

Results

We will begin by outlining the quantitative results, which will be followed by the qualitative results. We shall then collapse the two in the Discussion section.

The NCCN distress thermometer

In the NCCN Distress Thermometer, participants were asked to rate their level of distress. The higher the result, the more distress the participant is currently experiencing. To ensure that the groups did not experience different distress levels before the intervention took place, we compared the results of the pre-NCCN question between groups. There was no significant difference in distress levels between the two groups prior to the start of the interventions ($M_{music} = 4.7, SD_{music} = 2.1; M_{control} = 4.6, SD_{control} = 2.7; t(28) = .1, p = .92$; see Table 1). Even though both groups showed lowered levels of distress following the session, there was no significant difference in participants' distress percent change following the music intervention when compared to the control intervention ($M_{music} = -46.9\%, SD_{music} = 24.9\%; M_{control} = -24.8\%, SD_{control} = 47.1\%; t(28) = -1.6, p = [T 0.061$ -tail; Fig. 1).

In the STAI-6 short-form, participants were asked to rate their level of situational anxiety in a 6-item questionnaire that focuses on being currently calm, tense, upset, relaxed, content, and worried. The STAI-6

Table 1

Averages and standard deviations for the music and control groups in the NCCN Distress Thermometer in both pre- and post-intervention.

NCCN Distress Thermometer.	Pre-intervention	Post-intervention
Music	M= 4.7; SD= 2.1	M= 2.5; SD= 2.2
Control	M= 4.6; SD= 2.7	M= 3.0; SD= 2.3

The Spielberger State-Trait Anxiety Inventory (STAI-6) – Short-form

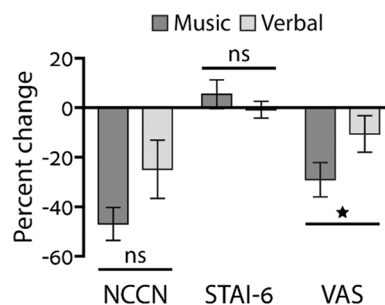


Fig. 1. Percent change of the NCCN Distress Thermometer (NCCN; left hand side), the Spielberger State-Trait Anxiety Inventory (STAI-6; middle) and the Visual Analogue Scale (VAS; right hand side) between the beginning and end of the intervention. * $p < .05$. Error bars = ± 1 standard error.

score ranges from 6 to 24 and the higher the score, the higher the level of anxiety according to the measure. To ensure that the groups did not experience different anxiety levels before the intervention took place, we compared the scores of the pre-anxiety questionnaire between groups. There was no significant difference between the two groups in anxiety levels prior to the start of the interventions ($M_{music} = 14.3, SD_{music} = 2.3; M_{control} = 14.7, SD_{control} = 1.4; t(28) = -.58, p = .57$; see Table 2). Contrary to our prediction, there was no significant difference in participants' anxiety percent change following the music intervention when compared to the control intervention ($M_{music} = 5.4\%, SD_{music} = 21.5\%; M_{control} = -.0.8, SD_{control} = 13.6\%; t(28) = .96, p = [T 0.171$ -tail; Fig. 1).

The visual analogue scale (VAS)

In the VAS short-form, participants were asked to rate their level of pain. The higher the result, the more pain they are currently experiencing. In order to ensure that the groups did not experience different pain levels before the intervention took place, we compared the results (in percentages) of the pre- pain question between groups. There was no significant difference between the two groups in pain levels prior to the start of the interventions ($M_{music} = 3.6, SD_{music} = 2.8; M_{control} = 4.2, SD_{control} = 3.0; t(28) = -.05, p = .61$; see Table 3). As predicted, there was a significant difference in participants' pain percent change following the music intervention when compared to the control intervention ($M_{music} = -29.1\%, SD_{music} = 26.03\%; M_{control} = -10.6\%, SD_{control} = 29.5\%; t(28) = -1.8, p = [T 0.041$ -tail; Fig. 1.).

Qualitative analysis of the open discussions

A qualitative content analysis of the participants' open discussions following the music intervention revealed their feelings and thoughts and allowed us to learn more about their experience following the music intervention. From the content analysis process (described above), three main categories emerged. The following paragraph will introduce each category, including some examples of participants' remarks to illustrate and explain:

- 1. Music evoked physical reactions and affected the experience of pain.** Comments on physical pain were dominant in the participants' reactions. Participants talked about the adverse effects of their medical treatments such as sleeping problems, alongside a desire to

Table 2

Averages and standard deviations for the music and control groups in the STAI-6 short-form in both pre- and post-intervention.

STAI-6 short-form	Pre-intervention	Post-intervention
Music	M= 14.3; SD= 2.3	M= 14.7; SD= 1.5
Control	M= 14.7; SD= 1.4	M= 14.5; SD= 2.1

Table 3

Averages and standard deviations for the music and control groups in the VAS short-form in both pre- and post-intervention.

VAS short-form	Pre-intervention	Post-intervention
Music	M= 3.6; SD= 2.8	M= 2.2; SD= 1.6
Control	M= 4.2; SD= 3.0	M= 3.6; SD= 2.8

feel good and avoid pain. All participants extensively addressed music's direct effect on their physical reactions during listening. Some mentioned that while listening they felt the desire to move or dance and some described specific physical pains that emerged and disappeared during the session. Here are some examples: "There were rhythms in which I felt the places that hurt me and there were those that did not. Now nothing hurts me" (participant # 1); "Suddenly I had these kinds of aches in my stomach" (participant # 3); "I almost fell asleep, it's rare. I barely fall asleep and have trouble sleeping" (participant # 6); "The music tells a story and I flow with it and imagined myself dancing and moving my legs without any feelings of pain" (participant # 7); "I started feeling nauseous and while listening it disappeared" (participant # 11).

- 2. Music helped get through emotional difficulty and achieve relaxation.** Some participants referred to the process they went through while listening to the music and described how different parts of the music evoked feelings of pain and difficulty but later on how other parts evoked positive feelings and they managed to feel relaxed. The transition through difficulty was not easy, especially for two of the participants who described a process of emotional stress, painful thoughts, and strong feelings. During the sharing and following the therapists' verbal intervention they explored their experience. This introspection led to more calm and relaxed feelings. Here are some examples: "The long sounds took me to mountains and ravines [...] then was replaced by other music that created a feeling of darkness in me [...] Then the music that felt pleasant returned and I was calm" (participant # 1); "It's hard for me to be with my thoughts. When I heard the music, I had a lot of thoughts about the past and what I was dealing with and the things I have to cope with. Now there is silence. Maybe it cleared my head" (participant # 8); "The music triggered an emotional flooding. I really wanted to cry. It did not do me good, but now I am calmer" (participant # 9).
- 3. Music induced an altered state of consciousness.** Most participants reported that the music helped them float and drift away. They described how the music allowed them to let go and brought them to an altered state of consciousness. Here are some examples: "I surrendered. I felt like I was embarking on a journey. I closed my eyes and felt like I was floating. At some point I couldn't understand why I did not feel my body at all. [...] I felt a feeling of hope and inner happiness" (participant # 3); "I went into a different state of consciousness. I was not here. I remember nothing" (participant # 4); "I felt like I was flying" (participant # 7); "I lay down and drifted into dreams. I saw things I wish for myself" (participant # 10).

Discussion

An online music therapy intervention program, Balance-Space, has been shown to reduce pain levels in cancer patients, significantly more so than following an experience of guided meditation. Levels of distress were also reduced following both interventions but changes in anxiety levels did not differ between the two groups following the two interventions.

It is encouraging that the Balance-Space intervention, which is non-pharmacological and non-invasive, was able to reduce pain levels for cancer patients. Both groups, the music and the control, started out with moderate pain levels (i.e. >2-6, *Sze et al., 2000*; measured by the VAS short-form, see method) during the pre-intervention measurement ($M_{\text{music}} = 3.6$, $M_{\text{control}} = 4.2$) but the music group pain levels dropped

significantly more ($M_{\text{music}} = 2.2$) when compared to the control group ($M_{\text{control}} = 3.6$; see [Table 3](#)).

Distress levels were reduced following the music and control interventions but there was no significant difference in percent change (measured by the NCCN distress thermometer, see Method) following the music intervention when compared to the control intervention, even though the pre- to post-difference was more pronounced for the music ($M_{\text{music}} = 4.7$ pre vs. $M_{\text{music}} = 2.5$ post) when compared to the control group ($M_{\text{control}} = 4.6$ pre vs. $M_{\text{control}} = 3.0$ post; see [Table 1](#)) and the music group reached an average score of 2.5 post intervention. According to [Cutillo et al. \(2018\)](#), an NCCN distress thermometer score of 3 is possibly the optimal cutoff score where healthcare providers need to identify adult cancer patients' levels of distress as high. Since both groups reported high levels of distress at the pre-intervention measurement, only the music group dropped to a low distress level following the intervention while the control group remained right around the cutoff.

There were no differences between the music and control groups for the pre- and post-anxiety level measurements (measured by the STAI-6 short-form, see Method), where both groups maintained a score of around 14 both before and after the interventions ($M_{\text{music}} = 14.3$ pre vs. $M_{\text{music}} = 14.7$ post; $M_{\text{control}} = 14.7$ pre vs. $M_{\text{control}} = 14.5$ post; see [Table 2](#)). Since a score of 12 was previously used as a cutoff for high anxiety levels ([De Vries & Van Heck, 2013](#)), we can assume that the participants' anxiety levels were high before, throughout, and following the interventions.

These results were supported by the qualitative content analysis of the sharing discussions in the music groups and can offer insight into their experiences. Pain was a dominant topic in the discussions and all participants extensively addressed music's direct effect on their physical reactions during listening. Some reported experiencing severe pain, which was evoked by specific parts of the music, but also a state of relaxation other parts of the music evoked. The subsequent sharing following the listening experience helped broaden participants' perception of pain: It helped them see that it is not just a matter of pain or relief but rather a state in which music can help and support the observation of both physical and mental pain. In a way, the experience provided them with an opportunity to endure their pain in the here and now. Thus, it seems that this type of music therapy intervention program might transform the way participants deal with pain.

A very interesting simultaneous process occurred while listening to the music. Some participants reported an abrupt physical pain, but they were able to endure the pain and reach relaxation. They reported reaching a space with no boundaries where they could float and experience themselves in an altered state of consciousness. Supportive music and imagery interventions allow patients to engage in a broad range of emotions, from positive feelings to distress, therefore, the music therapist's presence is important ([Burns et al., 2018](#)). In our study it seems that the music therapists' presence supported the participants and enabled them to open up and share their experiences despite the online setting and the fact that it was a one-session format. Although each participant listened to the music on their own, they were in sync with other group members and with the music therapists who were present and listening simultaneously. Offering a supportive and safe approach to cancer patients using meditation and guided imagery elements for more sessions in a group format was reported as beneficial and helped to focus on wellness ([Dimiceli-Mitran, 2015](#)). Cancer patients, who may experience great difficulty while coping with physical pain, emotional distress, and anxiety, may tend to expend a lot of effort to regain control and avoid any pain or difficult feelings. Such repressive emotion regulation as a coping mechanism may be associated with health risks. For example, higher repression was found as significantly associated with higher diastolic blood pressure among breast cancer patients ([Giese-Davis et al., 2008](#)). The Balance-Space experience allows the patient to let go and surrender, create a space where emotional and physical pain can exist and be expressed in a secure space, eventually leading to a

more balanced state. Since emotion regulation can minimize the deterioration of the physical and psychological wellbeing among cancer patients (Conley et al., 2016), the suggested music therapy intervention can help in (re-)achieving these goals.

Limitations

The study's sample size is limited because of the difficulty in recruiting cancer patients and having them all participate on the same day and time as a group. We had multiple last-minute cancellations and it seems to be challenging to plan ahead of time. Future research in this area should include a larger sample size. In addition, since the study was conducted in a virtual platform via Zoom, we did not have a way of estimating whether and to what extent the participants indeed experienced the vibrations as part of the music listening experience. It is also possible that the virtual format kept older adults or individuals without comfortable access to technological devices or internet from participating. Future research should include a robust way of employing as well as estimating this virtually.

Future research and conclusions

The reality of COVID-19 introduced many changes in the psychosocial support system for cancer patients, mainly in creating new virtual platforms for social, physical, and emotional support. Some of these changes and platforms will continue to serve the cancer patient community also in the post-COVID-19 era, as they may entail some important advantages, such as the luxury of receiving care in the home environment where it is possibly more comfortable and safer than going to hospitals or clinics to receive care and raising the chances of contracting a virus or an infection of some sort. The Balance-Space music therapy intervention program seems to be effective in reducing pain. It could therefore be assumed that the program will also be effective when experienced in a live setting rather than in a virtual mode. Future research should also look not only at the phenomenon itself, but rather at the mechanisms and processes that underly the positive effects, as well as separate the different parts of the intervention (e.g., music listening, discussions, group activity) in terms of their specific contribution to the positive effects: How is music so effective at reducing pain? What role do the discussions play in creating a positive effect? Would the effect be the same if the intervention was conducted individually rather than in a group?

The Balance-Space music therapy intervention program for cancer patients presented in this paper was implemented virtually and exhibited positive effects on the wellbeing of these patients, especially on their experienced pain levels. This study is the first to show its effectiveness. The program features a highly structured setting that could be implemented elsewhere following guidance. Future studies should determine whether its effectiveness is sustained when the program is implemented in a live rather than in a virtual setting and what are the underlying mechanisms and processes to these effects. We hope that this program continues to help cancer patients cope with the many stressors and challenges accompanying the disease and help them to feel better and healthier.

Data Availability

Data will be made available on request.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.aip.2023.101998.

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