

## Research Article

# The Value of Music Therapy in the Expression of Emotions in Children with Cancer

Román-Carlos Rodríguez-Rodríguez <sup>1</sup>, Ana Noreña-Peña <sup>1</sup>,  
Teresa Chafer-Bixquert <sup>2</sup>, Javier González de Dios <sup>3,4</sup>, Ana Isabel Gutiérrez García <sup>1</sup>,  
and Carmen Solano Ruiz <sup>5</sup>

<sup>1</sup>Nursing Department, Health Sciences Faculty, University of Alicante, Alicante, Spain

<sup>2</sup>Sculpture Department, Faculty of Fine Arts, Polytechnic University of Valencia, Valencia, Spain

<sup>3</sup>Paediatrics Department, General University Hospital of Alicante, Alicante, Spain

<sup>4</sup>Department of Paediatrics, Miguel Hernández University, Alicante, Spain

<sup>5</sup>Nursing Department, University of Alicante, Alicante, Spain

Correspondence should be addressed to Ana Noreña-Peña; [ana.norena@ua.es](mailto:ana.norena@ua.es)

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**Background.** Children with cancer are subjected to aggressive tests and treatments that can affect their emotional states. Studies available in the academic literature analyse the effect of music therapy on the emotions of these patients are scarce. **Objectives.** The objective of this study was to explore and transform the emotional responses that may arise with the application of music therapy (MT) in children with oncological pathology. **Methods.** The methodology of this study was based on the participatory action research approach. Semistructured interviews were conducted with 27 children with cancer who participated in 65MT sessions. Interviews were also conducted with their families. **Results.** We conducted a thematic analysis using MAXQDA software. Three main categories emerged from this process as follows: (1) expression: children with cancer stated that MT made it easier for them to express their emotions, with indirect benefits to families; (2) participation: patients showed interest in the sessions; and (3) experiences: MT was valued and created a positive environment. The results of this research demonstrate the positive transformative power MT had on children with cancer in terms of their emotions. **Conclusions.** Positive results were achieved through MT that encouraged the expression of emotions by children with cancer and favoured and improved their moods. In addition, it also encouraged social interactions in the hospital and helped the children to better cope with their illness through self-awareness. Their families also benefited. Therefore, we encourage healthcare professionals to support the use of MT in paediatric oncology settings.

## 1. Introduction

According to World Health Organization (WHO) data, approximately 400,000 new cases of cancer are diagnosed in children every year all over the world [1]. Survival in developed countries exceeds 80% due to advances in diagnostic techniques and treatments. However, in underdeveloped countries, it is less than 30% [2] because cases are considerably underdiagnosed, especially in South Asia and sub-Saharan Africa [3]. Cancer, and its diagnosis in children, is a difficult situation, not only because of the experience of

having to undergo invasive tests and aggressive treatments that sometimes cause these patients a significant burden of physical pain [4], but also because of their ignorance of exactly what is happening around them; the concern of their parents; and separation from their daily lives, friends, and school environment [5, 6]. All of these changes undoubtedly have repercussions on their emotions, feelings, and state of mind and this conditions their quality of life.

In the context of paediatric oncology, music therapy (MT) is an intervention with very strong international recognition and is included in the Society for Integrative

Oncology [7] and National Centre for Complementary and Alternative Medicine [8] recommendations. Previous research has indicated how MT can significantly impact the emotional aspects of treatments, such as fear and anxiety, in children with terminal cancer [9]. In this sense, the relationship between music and emotions has been studied for decades by researchers in the field of MT, psychology, and neuroscience, among other disciplines. Music moves us in a very deep way [10] and emotional responses can appear even after repeated exposure to music [11]. Although different studies on music and emotions have been carried out over several decades [12], more recent work has started to focus on the relationship between these two factors. For example, functional neuroimaging studies of music and emotion have shown that music can modulate activity in brain structures known to be crucially involved in emotion such as the amygdala, hypothalamus, hippocampus, insula, nucleus accumbens, orbitofrontal cortex, and cingulate cortex [13]. Given the effectiveness of MT, other studies have shown how it helps reduce anxiety in children with cancer, both when undergoing painful procedures and during the process of their disease [14–17], as well as during radiotherapy [18] and chemotherapy treatments [19, 20].

Other work indicates that MT helps children with cancer to control their fear, anxiety, and pain when undergoing bone marrow aspiration [21]. MT also helps them to release fear and improves communication with families [22], facilitates positive experiences of emotions, and distracts patients from fear or pain [23]. Hence, the scientific evidence available in the field of MT applied to children with cancer shows that emotional expression, among other parameters, is vital both to patients and their families [24]. Finally, most of these studies concluded that MT is an effective tool to alleviate the negative effects of paediatric oncology treatments. From the point of view of music therapists, there is also the clinical perspective that singing, listening to music, and improvisation can be useful for managing and expressing emotions [25].

Other studies that analysed and/or explored the general effects of MT in children with cancer in different phases of stem cell transplantation [23, 26] found that MT can help these patients to overcome their anguish, identify personal strengths, disconnect from the situation, and improve relationships with others, among other benefits. In addition, research that evaluated physiological parameters showed a reduction in heart rate [27]. Nonetheless, still very few studies have addressed the effects of MT on the expression of emotions in children with cancer [14, 17].

Therefore, the main objective of this current work was to explore the emotional responses arising in children with cancer and to transform these reactions using MT interventions. We used the participatory action research (PAR) approach as a methodological reference framework, and recorded any emotional transformation present in our participants after the MT sessions. The PAR model was very applicable to the research we wanted to conduct because it includes the different stages patients must pass through when experiencing the process of emotional change. More specifically, this type of change is achieved through

continuous feedback from all the different study phases, allowing us to obtain positive results in terms of improving the emotional states of our patients.

## 2. Methods

*2.1. Research Design.* The epistemological approach of this research meant that its character was sociocritical in nature. Therefore, the voices of the participating children were privileged in this research given that their voices not only constituted their opinion but were also weighted with emotional constructs within the context of their illness [28]. The PAR method is most strongly linked to critical theory because it seeks transformation through thoughtful action and dialogue [29]. Thus, this qualitative study was based on a PAR design, following the model by Susman and Evered [30], which aims to record a process of analysis of the situation, identification of problems, and elaboration of planned action strategies that are carried out and systematically submitted for observation, reflection, and change, which involves both the researchers and participants. Figure 1 explains the different phases of the PAR model used in this study.

The PAR not only proposes an approach, reflection, and criticism of the social reality of the context under investigation, but also requires a more inclusive research process that allows the actions of its participants to promote self-change, in which all of their potential is deployed, and where each one of them enacts their own reality [31, 32]. The potential of PAR in the field of health research is evident [33] and so we considered it useful in the exploration and transformation of emotional responses in children and adolescents with cancer as mediated by MT. These findings could also perhaps help health professionals in their interactions with children with cancer.

*2.2. Research Methods.* This research was conducted in five phases according to the PAR paradigm, as explained in Figure 1. In the first phase, a diagnosis was made in order to make decisions about the study and justify the methodology used. To achieve this, a scoping review on the use of MT in paediatric oncology patients (both children and adolescents) was carried out prior to the intervention [17]. This review allowed us to note the psychoemotional needs identified in children with cancer as reported in the academic literature, leading us to conclude that MT can offer the possibility of emotional transformation. In the second phase, action was planned. First, we acquired approval for the study by the Ethics Committee at the University of Alicante (Spain) and the Paediatric Oncology and Haematology Unit team in the General Hospital of Alicante (Spain). Then, we held informative meetings about the study with this aforementioned team of healthcare professionals, and jointly decided upon the inclusion and exclusion criteria for the work.

In the third phase, we implemented the intervention in the previously mentioned Paediatric Oncology and Haematology Unit. This involved creating and performing the MT sessions, including audio and video recording them,

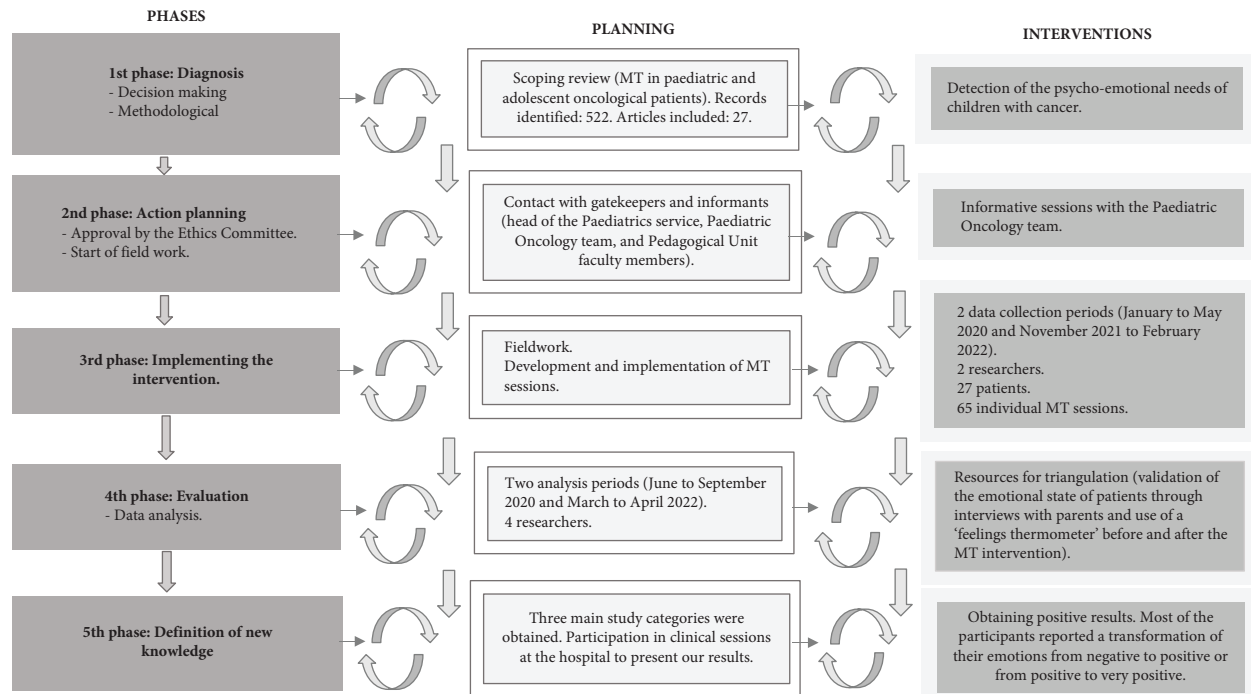


FIGURE 1: Study scheme of the cyclical process of research and action (Susman and Evered [30], adapted for this study). MT =music therapy.

followed by semistructured interviews with both the patients and their parents. This was done during two data collection periods (January to May 2020 and November 2021 to February 2022), with the MT sessions being conducted online in the second period. Constant assessment was carried out by two researchers throughout this phase: the first author (an accredited music therapist) conducted the MT sessions (65 individual MT sessions) with 27 patients. In turn, the second researcher conducted the interviews with the patients and their parents after each MT session and during the sessions, made nonparticipant observations and field notes with subjective impressions and annotations in a diary.

In the fourth phase, data evaluation was performed during two analysis periods (June to September 2020 and March to April 2022) by 4 researchers. To triangulate the data, we used the following resources: (1) we conducted interviews with the parents to validate the emotional states of the patients; (2) we used data from the patients' use of the feelings thermometer before and after the MT intervention; and (3) video recordings made of all the sessions which allowed us to verify patient gestures and emotional expressions during the MT sessions. Finally, in the fifth phase, the new knowledge obtained was categorised by defining three main categories: (1) expression, (2) participation, and (3) experiences. Showing positive results related to the transformation of the patients' emotions.

**2.3. Sampling and Participants.** The participants were selected through theoretical-intentional sampling [34]. The team of healthcare professionals at the Paediatric Oncology and Haematology Unit at the General Hospital of Alicante,

Spain, provided data on the patients who were eligible to participate in this study and in the MT sessions. A total of 30 children were invited to take part in this work, of which 27 of them and their respective parents signed the informed consent to participation; the three who did not sign their consent declined because of their clinical status.

To define the population under study in this research, we considered the definition of childhood given by the Convention on the Rights of the Child, which defines it as "every human to the age of 18, unless, under the law of the State, he has attained his age of majority earlier" [35]. The inclusion criteria included children with cancer aged between 6 and 18 years who voluntarily agreed to participate. The exclusion criteria included children with cancer who could not participate in the study because of a physical or clinical problem that prevented them from completing the proposed activities.

**2.4. Procedure.** We used a range of techniques to collect and analyse information in this work. The data were collected through (A) MT sessions in which children with cancer were able to play musical instruments, sing, and improvise; these interventions were the same in all the participants. (B) Interviews carried out after each MT session with all the patients (27 children) and their parents (23 parents). The interviews conducted with both the parents and the participants lasted 10 to 15 minutes each. The children participated in semistructured interviews recorded on audio in which they were asked questions about what had caused them to sing, listen to songs, and play musical instruments. They were also asked what that moment had been like for them and how they felt about the activity. In addition, we

asked if they would like to do something else in the MT sessions such as compose songs and play other musical instruments.

We also conducted semistructured audio-recorded interviews with the parents in order to triangulate all the information collected. These were completed to understand their perception about how singing, listening to songs, and playing musical instruments had affected their children and their opinions on the experiences of their children. Furthermore, we asked the parents if they would add anything else to the MT sessions. (C) Given that this work was based on the PAR fundamentals, we used a ‘feelings thermometer’—a visual tool from the Office of Children’s Mental Health [36] consisting of five images (anger, frustration, worry, sadness, and joy), which is provided in annex I. Each child was given a copy of this instrument so that they could point out how they were feeling both before and after the session. This allowed us to corroborate our observations and obtain results about the emotional transformation experienced by each participant. In order to validate the emotional transformation process, we also made video recordings of the MT sessions. We were able to extract some image captures from the videos that also allowed us to visually verify the changes in emotions experienced by the children before and after the MT sessions (Figure 2).

**2.5. Music Therapy Intervention.** Given that we were conducting MT interventions, to improve the transparency and specificity of the notifications of the interventions and to adequately understand and interpret the study results, all of the data and MT session reports were recorded according to the proposal from Robb et al. [37]. The recommendations of this proposal refer to seven different components of music-based interventions: (A) intervention theory, (B) intervention content, (C) intervention delivery schedule, (D) interventionist, (E) treatment fidelity, (F) setting, and (G) unit of delivery. In this study we used recreational, receptive, and improvisational MT methods [38], which consisted of playing percussion instruments, keyboard, improvising, singing, and listening to songs, among others. Table 1 details all the criteria for the MT interventions used in this study.

A total of 65 sessions were held in two periods, the first between January and May 2020 and the second from November 2021 to February 2022. They were all individual MT sessions undertaken in the patient’s room or in the day hospital. On average, the participating children received two or three MT sessions each, 21 of which were held online. Data saturation was reached around the beginning of the second data collection period. However, to ensure the quality of the study and our commitment to the participants, we continued collecting data until the end.

**2.6. Ethics.** The protocol of this study was approved by the Ethics Committee at the University of Alicante, Spain (reference: UA-2019-06-12). The project was undertaken, at all times, following the ethical principles set out in the Declaration of Helsinki of 1975 and its 1983 amendments, including the request for informed consent from all the

participants. In accordance with Spanish data protection legislation (Organic Law 3/2018 on the Protection of Personal Data and Guarantee of Digital Rights), all the records and corresponding informed consents to participation were stored safely by the principal investigator and could only be identified by the assigned case number.

**2.7. Data Analysis.** Analysis of the transcribed interviews and all the additional reflections was completed through a thematic analysis [41]. The initial analysis was performed by the first author and encompassed three iterative phases: (1) codes were created inductively to represent text segments, (2) similar codes were grouped into subcategories, and (3) similar subcategories were grouped into categories. We used MAXQDA software for this analysis. The other authors revised the initial analysis to check the validity and qualitative reliability of the categories and subcategories [42] by reading the interviews and results analysis to support or extend the emerging findings. This comparative analytical process was continued until all authors accepted the representation of the findings. In addition, to guarantee the quality of our study, we also considered the four aspects of trustworthiness (credibility, dependability, confirmability, and transferability) set out by Lincoln and Guba [43].

The validity and reliability of the work were guaranteed by data triangulation and saturation, using different techniques to collect information and study data, conducting interviews with children and parents, videotaping MT sessions, using the emotion thermometer to directly and verbally validate the data collected from the children, and by recording the most significant facts in a field diary, thereby achieving a sufficient, dense description of the study phenomenon. To promote the comfort of the participants, the semistructured interviews were performed at the times and places they suggested. The children’s relatives provided feedback on the data collected and continuous analyses were planned. Once these data were collected, they were analysed and returned to the hospital so that some of the areas could be explored in more detail by conducting new MT sessions [43, 44].

To maintain the credibility of our study, in addition to the aforementioned points, we conducted a rigorous data collection and analysis process. For example, the participants validated the emotional changes we had noted after each MT session by using the emotions’ thermometer. The credibility of the data in this study was guaranteed by continuously comparing it throughout the coding and categorisation process and by including music therapists, paediatricians, and researchers with experience in qualitative studies in the research team performing the analyses [45]. Confirmability was maintained through the data coding and interpretation by creating a record of all the data, allowing for a clear audit process. In addition, the accuracy of the analysis process was assured by asking several researchers familiar with this qualitative research analysis method and not participating in the study to verify the content of some of the interviews and the extracted codes. Moreover, we also considered the limitations of the research. Transferability



FIGURE 2: The feelings thermometer used before and after the music therapy sessions. MT = music therapy.

was ensured by providing a complete description of the theme, as well as the characteristics of the participants and examples of the children's statements and expressions [46].

### 3. Results

Sociodemographic and clinical data about the participating children were collected (Table 2), and in addition, socio-demographic data about their parents were also collected (Table 3). The analysis gave rise to 25 codes with 8 sub-categories and 3 categories (Table 4). Category 1 arose from (a) the different emotional responses and changes and increases in emotions in the children with cancer after MT, (b) recognition of these emotions by their families, and (c) the indirect benefits of MT sessions to families. In turn, category 2 arose from (a) the participation of children with cancer in MT sessions, (b) their musical tastes and preferences, and (c) their interest in MT sessions. Finally, category 3 arose from (a) the satisfaction of children with cancer with the MT sessions and (b) the interactions between families, patients, and music therapists. Taken together, our research findings indicated that the interventions proposed by applying the PAR framework gave rise to positive results. The participating children managed to transform their emotions and we verified their experiences of MT based on their own words and descriptions. Likewise, the phases of the PAR plan helped us to record our findings. We showed that the resources offered by MT benefited both children and their parents in terms of greater well-being and quality of life during difficult times such as the hospitalisation period. The eight

groups of subcategories were condensed into the three categories described below.

**3.1. Category 1: Expression.** Children with cancer reported that MT made it easier for them to express their emotions, with changes and increases in emotion. Positive emotions were present in all the MT sessions, where children with cancer were able to sing, listen to music, improvise, and play musical instruments, and they described these emotions in the interviews. For example, a 10-year-old girl who participated commented, "Listening to this song made me happy," a 12-year-old girl said, "I felt happy when I played the percussion," a 10-year-old girl commented, "Listening to this song made me happy, and an 11-year-old boy said, "I was very happy with the music."

The changes and increases in emotion were reflected both in the interviews conducted after each MT session and through the feelings thermometer used before and after the MT session interventions [36]. The participants indicated their emotional state through the thermometer before and after the MT sessions. For instance, a 10-year-old girl pointed to the "happy" image and after the session she indicated that she was "super happy." Another 11-year-old girl pointed to the "angry" image before the session and the "happy" image after the session. In addition, in the interviews, the children with cancer described changes and increases in emotion during the MT sessions. A 9-year-old girl indicated, "before listening to the song I was sad, and after listening to it I am happy," a 13-year-old girl said, "I am much better than before (the MT session)," a 7-year-old girl commented, "before singing I was sadder, now (I'm) better,"

TABLE 1: Criteria for MT interventions.

*A: Intervention Theory*

In the past, MT has been used to offer help to children cancer to reduce their anxiety, improve their self-esteem and social relationships, and as a means of support to treat emotional factors related to their oncological treatment, among others

To date, very few studies have addressed the effects of MT on the expression of emotions in children with cancer. Therefore, in this work we carried out MT sessions with the aim of opening channels of communication and emotional expression. We explored our results to try to discover whether MT can help these patients express their emotions

*B: Intervention Content*

Previous research has revealed that children with cancer should have access to their preference of music as well as materials for making music [39, 40]. In this work, both the music used for the singing and listening activities (musical pieces of pop, rock, classical, and deep house styles, among others), and the musical instruments for performing live music were selected by the patients

Live music was performed by both the patient and music therapist while an mp3 player and a speaker were used to play the recorded music. The volume was controlled by the music therapist and the level ranged between 30 and 50 dB (decibels)

Percussion instruments were used in the improvisation activities (djembe, drum, bongo, woodblock, claves, tambourines, and body percussion). A keyboard was also used. The main improvisation method used was free improvisation. In addition to interacting with the patient, the music therapist focused on sustaining the musical improvisations with the aim of welcoming musical improvisations by the patients so that they could have the possibility of freely expressing their emotions

*C: Intervention Delivery Schedule*

A total of 65 sessions were held with a frequency of once a week between January and May, 2020, and November 2021 and February 2022; 27 sessions were conducted in patient rooms in the hospital, 17 sessions were carried out in the day hospital, and 21 sessions were implemented online; 16 patients received 2 sessions, and 11 received 3 sessions. Each session lasted between 30 and 45 minutes

*D: Interventionist*

The interventions were conducted by a qualified music therapist (first author) with the collaboration of the second author

*E: Treatment Fidelity*

Treatment adherence was guaranteed in every session because the protocols of each completed activity (singing, listening to music, musical improvisation, and playing musical instruments, among others) was correctly followed, adapting the session to each patient. After each session, the video recordings of the work were analysed to discover more about the details of the session. In addition, the music therapist that led the sessions has had a long professional career as a musician

*F: Setting*

Because the sessions completed in the patients' rooms were individual, they were sufficiently private. The ambient noise levels were low. The sessions that took place in the day hospital were also private because an additional room was requested in which we held the sessions. The sessions carried out online were also private and were well accepted by the patients and were adapted to the most appropriate time for the patient. We made some technical adaptations such as adjusting the delay when playing musical instruments online or altering the audio quality during the sessions. We used different platforms, software, and tools to facilitate these adaptations

*G: Unit of Delivery*

All the sessions were carried out between the patient and the music therapist as individual sessions and the patient's relatives were invited to participate whenever the patient wanted them to

Robb SL, Carpenter JS, and Burns DS. Reporting guidelines for music-based interventions. *J Health Psychol.* 2011; 16(2):342-352. doi: 10.1177/1359105310374781 [37]

MT = music therapy.

a 17-year-old girl indicated, "listening to the songs bought up many emotions and helped me with my illness," and a 6-year-old girl commented, "with music, I am super happy."

The results of the parental recognition interviews with the families also described the benefits of the MT sessions for their children. A father of an 8-year-old boy said, "I noticed that after the MT session there was a positive emotional change in my son," a father of a 10-year-old girl commented, "after singing, the anger I had (felt) changed to happiness," a mother of a 12-year-old girl said, "she has a lot of fun playing the percussion," a mother of a 9-year-old girl commented, "...she was sad and after listening to her favourite song, she became happy," a mother of a 14-year-old boy said, "this makes them happy. They forget where they are (when in the MT sessions)," and a mother of a 12-year-old girl said of her daughter, "before listening to the songs, she was sad and after I saw that she was happy."

The interviews with the parents also suggested that the MT sessions had indirect benefits to families because parents saw their children in an emotionally well state. A mother of a 10-year-old girl commented, "she is usually sad, but when she starts playing the piano here, she gets very excited, and that makes me happy too." A father of a 7-year-old girl said, "after seeing her sad, to see her now happy after singing, it makes me happy too." A mother of a 6-year-old girl commented, "I was very happy to see her improvise on the piano." A father of a 13-year-old boy said, "seeing him so happy with music makes me cheer up too."

By observing the videos of the MT sessions, we were able to corroborate that during the sessions, the children constantly showed changes in their facial expressions in relation to their emotions, with expressions of joy at the end of the interventions being constantly shown in all the images we collected (Figure 3). Moreover, these gestures were combined with verbalisation of the participant's interest in each of the proposed activities. Gestural expressions of

TABLE 2: Sociodemographic and clinical characteristics of the children and adolescents with cancer included in this work.

27 children with cancer		
Ages, <i>n</i> (%)	6 years	1 (3.70%)
	7 years	2 (7.40%)
	8 years	3 (11.11%)
	9 years	3 (11.11%)
	10 years	5 (18.51%)
	11 years	4 (14.81%)
	12 years	2 (7.40%)
	13 years	2 (7.40%)
	14 years	2 (7.40%)
	15 years	1 (3.70%)
	16 years	1 (3.70%)
	17 years	1 (3.70%)
Gender, <i>n</i> (%)	Male	12 (44.44%)
	Female	15 (55.55%)
Diagnoses, <i>n</i> (%)	Acute lymphoblastic leukaemia B	8 (29.62%)
	Acute myeloid leukaemia	4 (14.81%)
	Ependymoma	4 (14.81%)
	Ewing's sarcoma	3 (11.11%)
	Medulloblastoma	3 (11.11%)
	Neuroblastoma	2 (7.40%)
	Rhabdomyosarcoma	1 (3.70%)
	Non-Hodgkin's lymphoma	1 (3.70%)
Place of residence, <i>n</i> (%)	Langerhans cell histiocytosis	1 (3.70%)
	Alicante	27 (100%)

TABLE 3: The sociodemographic characteristics of parents of children with cancer.

23 parents		
Ages, <i>n</i> (%)	28 years	1 (4.34%)
	29 years	2 (8.69%)
	30 years	3 (13.04%)
	31 years	3 (13.04%)
	34 years	6 (26.08%)
	36 years	2 (8.69%)
	37 years	3 (13.04%)
	38 years	2 (8.69%)
	39 years	1 (4.34%)
Sex, <i>n</i> (%)	Male	9 (39.13%)
	Female	14 (60.86%)
Marital Status, <i>n</i> (%)	Married	21 (91.30%)
	Separated	2 (8.69%)
Place of residence, <i>n</i> (%)	Alicante	23 (100%)
	Educational level, <i>n</i> (%)	University graduate
Secondary education		8 (34.78%)
Primary education		3 (13.04%)
Employment status, <i>n</i> (%)	Active employment	20 (86.95%)
	Unemployed	3 (13.04%)

abstraction were also observed, mainly when using improvisation methods. During the intervention, this allowed us to verify that MT was benefitting them because these

gestures indicated that they had had to activate mechanisms at a cognitive level, implying that they were inspired by the songs and music and felt moments of hope, understood as calm, within its process.

3.2. *Category 2: Participation.* Regarding participation in the MT sessions, the children and adolescents with cancer were able to express their preferences of both the musical pieces (songs) and musical materials (musical instruments) that would be used. We asked the participants about these two aspects in the interviews, and one 13-year-old girl commented, "I really like to improvise with percussion." A 15-year-old girl said, "with Adele's song, I get excited to sing, it's one of my favourites." Another 6-year-old girl commented, "the piano is my favourite instrument, I like to play it." A 17-year-old girl commented, "the song Fool's Overture by Supertramp is one of my favourites."

Children with cancer also described their interest in the MT sessions; a 14-year-old boy indicated, "music is very important to me." Another 9-year-old girl said, "what we do here with music is very good." It seems that music and MT could also reflect the social and emotional development of the patients. In other words, the connection with music seemed to allow them to reinforce positive aspects of their own personality, with the participants also reporting that the music had had emotional benefits such as a release of energy, hope, and companionship. A 17-year-old girl said, "music offers me different feelings, it allows me to release my energy and it is my great companion."

The descriptions mentioned above indicate how MT is a tool which requires the active participation of the recipients. The music in these spaces becomes a support

TABLE 4: Categories and subcategories identified from the documents.

Categories and subcategories codes	
Expression	Positive emotions Happiness Interest Inspiration Hope Increased emotion Change in emotion Parental acknowledgment Indirect benefits at the family level Positive emotional changes in their children Music therapist assessment Mood
Participation	Musical and material preferences Listen to songs Singing Musical improvisation Play percussion instruments Interest in music Release of energy Companionship Support
Experiences	Satisfaction with the MT sessions Well-being Positivity Disconnect from the situation Interaction Social relationships Memories evoked Fun Positive environment with interaction between families, patients, and the music therapist

MT = music therapy.





(a)



(b)



(c)



(d)



(e)



(f)

FIGURE 3: Continued.

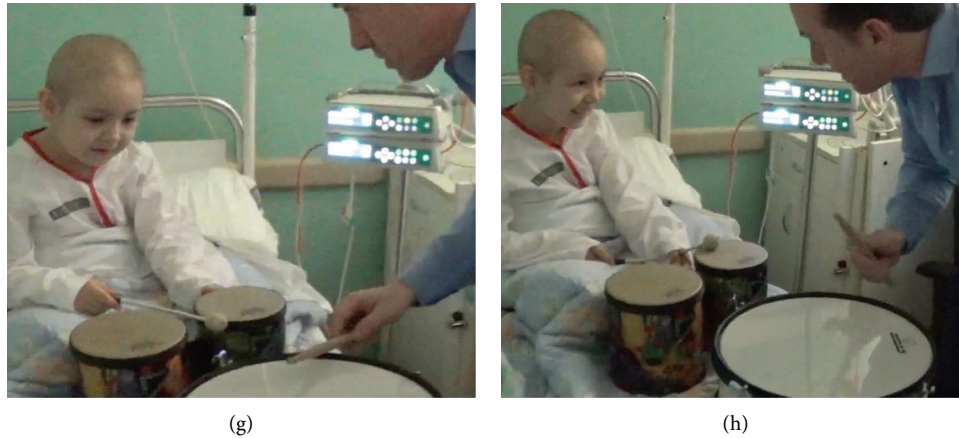


FIGURE 3: Video captures of before and after music therapy sessions: (a) the active MT technique (before playing), (b) the active MT technique (after playing), (c) the active MT technique (before playing), (d) the active MT technique (after playing), (e) the receptive MT technique (before listening to music), (f) the receptive MT technique (after listening to music), (g) the active MT technique (before playing), and (h) the active MT technique (before playing). MT = music therapy.

system that opens up channels of communication and encourages camaraderie between patients and their families, as well as with the music therapist themselves.

**3.3. Category 3: Experiences.** Satisfaction with the MT sessions was also described in the interviews by children with cancer. In this sense, an 11-year-old girl commented, “I feel good, and I have fun in this class with music,” a 16-year-old boy indicated, “I really like to participate in these sessions,” a 13-year-old girl said, “this experience with music is very good,” a 17-year-old girl commented, “I have a lot of fun improvising with percussion,” and another 15-year-old girl indicated, “I feel a lot of freedom when I listen to songs in these classes.”

There were constant interactions between families, patients, and the music therapist in the MT sessions. At all times, the music therapist tried to connect and welcome the patients through music to help them express their emotions with confidence. The participants mentioned this as, for example, one 16-year-old boy commented, “I really like playing the percussion with you (the music therapist).” Similarly, an 8-year-old girl said, “when we play together (with the music therapist) I concentrate more.” In addition, the parents were also integrated into the sessions whenever the patients wanted them to be, thereby creating a very positive environment. An 11-year-old boy said, “I like singing this Ed Sheeran song with my mum, it brings back good memories.” A 7-year-old girl commented, “I like seeing my dad play here with me, I like percussion.” An 11-year-old boy said, “I like to sing the songs with my mum and dad.”

All the children participating in this study said their experiences of the MT sessions were positive because they had allowed them to disconnect from their situation, through interaction, for example, with musical instruments. This allowed them to have fun and improve their well-being during the hospital stay. Likewise, in older children, at a cognitive and emotional level, it helped them

to evoke positive memories and they recognised that they were comfortable with their interactions with the music therapist.

## 4. Discussion

The objective of this study was to explore and transform the emotional responses that may arise with the use of MT in children with oncological pathologies. It is important to consider that paediatric oncology patients suffer from emotional disorders [47].

In this work, we showed that MT helps children with cancer to express their emotions. In this sense, we could compare this finding with research conducted by a paediatric Intensive Care Unit which aimed to involve patients in making music to help them express their emotions and construct interpersonal relationships [48]. This work showed that MT positively influenced the children’s states, both physically and emotionally, thereby improving their state of well-being. In the same way, a study by [49] conducted in adult cancer patients found that MT sessions helped patients with emotional expression, fun, creativity, and symptom management.

Also of note, research by Ekman [39] indicated how emotional expression arises involuntarily and emotions provoked universal facial expressions. In our study, in our analysis of the recorded videos of the MT sessions, we also observed facial expressions of emotions in children which seemed to indicate joy, as well as changes of emotion from anger to joy and from sadness to joy, and in turn, an increase in positive emotions such as joy.

The emotional repercussions suffered by the families of children with cancer have been widely demonstrated in the academic literature [40]. Our current findings also describe the indirect benefits of MT interventions to families, including an improvement in the emotional state of relatives. Likewise, MT studies in populations with cancer have widely indicated the importance of these interventions because they

can positively impact the lives of both patients and families [17, 18].

In our research, we found that the parents were satisfied with the MT sessions conducted with their children, leading them to provide positive responses in the interviews. They indicated the emotional benefits they had noted in their children during the MT sessions and said their children had had a more positive attitude, had disconnected from their clinical situation, paid more attention, and communicated better with them after MT. These results are also consistent with a study by Docherty et al. [50] that pointed out that parents of adolescents with cancer described several emotional benefits of MT in their children such as a decrease in the symptoms of anguish, a greater sense of control, and connection with others, among others.

In our study, the participants were offered the possibility of choosing their musical preferences in terms of both the music and musical instruments used in the sessions, which produced great participation and interest in the sessions as a result. Of note, we found MT research in paediatric oncology that had not given their participants the power to choose the music used in the sessions, which we believe may be the reason they did not obtain the expected benefits similar to the ones we report here [16]. At the same time, O'Callaghan et al. [51] and other authors such as Robb et al. [52] have pointed out that children with cancer should have access to the songs and musical instruments they prefer.

The important value of music for children with cancer was also evident in our study. In addition to the benefits in terms of emotional well-being, music was able to help them disconnect from their clinical situations and provide cognitive and social support, among other benefits. These findings coincide with the meta-ethnography of Perkins et al. [53], which concluded that music could support mental well-being by satisfying individual needs, achieving this by helping to manage and express emotions, facilitating personal development and connections with others, providing respite, and helping to transport us to another place where we can forget about worries.

Likewise, music and MT can provide support to children with cancer during adverse experiences, helping them with the process of their disease [54]. In turn, MT was also able to help adolescents with cancer cope with thoughts and behaviours related to their stage of maturity and development [55]. It is noteworthy that the children with cancer said that the MT sessions allowed them to have fun and provided them with a sense of well-being within their emotional state. Attempts were made to complete the MT sessions with varied recreational, receptive, and improvisational methods [38] consisting of singing, playing musical instruments, and improvising, among others. This led to pleasant moments for the patients. Other studies such as the one by Barry et al. [56], which tried to create a MT CD (MTCd), have shown that children with cancer experience MT sessions as attractive and fun activities and experiences.

The children interacted with the music therapist in all the sessions, with the parents sometimes also joining in. This interaction is important because the mission of music therapists, among others, is to try to continuously connect

with patients and thus, allow them the possibility of expressing their emotions through music. The results of previous studies such as the one by Uggla et al. [23] also corroborate the vital importance of the patient-music therapist interaction. This aforementioned study aimed to explore how the participants and parents experienced the interactive processes of MT interventions with oncological children undergoing haematopoietic stem cell transplantations. They demonstrated that the relationship between the patients and the music therapist favoured the well-being of the family-child/adolescent binomial during their hospital stay.

Regarding the administration of MT during the COVID-19 pandemic, the study by Agres et al. [57] reported that music therapists had various points of view about online sessions. These included their lack of training to conduct online sessions, with some highlighting that they preferred face-to-face sessions, while others were in favour of online MT sessions. In our study, we were able to carry out online MT sessions without any major inconveniences. We made some technical adaptations such as adjusting the delay when playing musical instruments online or altering the quality of the audio during the sessions. These adaptations that were facilitated by the platforms, software, and tools we had employed. In our experience, conducting the sessions online at the height of the COVID-19 pandemic was interesting because the patients could interact with us without having to wear a mask, which made it easier for us to collect data from their facial expressions.

Finally, by choosing to take a PAR approach to this research, the children with cancer participated in their own intervention. This allowed them to explore and transform their emotions, helping them to create a desirable future in which their emotional liberation was possible. It is also important to note that cancer strongly impacts the emotional, physical, and psychosocial well-being of children with this disease [58]. Our findings shed light on the possibilities offered by MT to help promote emotional expression among paediatric cancer patients. This current work also suggests the importance of MT to also favour the work of health professionals and their relationships with patients.

*4.1. Limitations and Strengths.* This study focused on exploring and transforming the emotional responses of children with cancer, with all of the MT sessions being carried out at the individual level. Of note, the patients were also in different phases of treatment and their ages were heterogeneous. Strength of the study may have been that we measured the emotional state of the patients before and after the intervention in all the MT sessions by employing the feelings thermometer. In addition, recording the MT sessions on video allowed us to extract themes and report upon the most salient observations in this work. Interviews were also conducted with the patients and their parents immediately after each MT session, with another strength of this research being that these data were obtained simultaneously.

**4.2. Future Research.** Although the findings of this study represent a useful report on the value of MT in the expression of emotions in children with cancer, it would be interesting to carry out future research that specifically involves the perception of health professionals about the experience of patients when they receive MT. In addition, another future line of research would be to continue exploring how MT benefits the quality of life of patients, given that it is a channel of communication and knowledge about their emotional states which can favour interaction between professionals and patients. It will also be important to continue conducting research that can improve specific MT programmes, including the possibilities for online and face-to-face interventions, in order to scale up MT interventions in hospitals.

## 5. Conclusions

MT is an important component to help children with cancer to express their emotions which also provides them with the possibility of personal autonomy, and promotes self-knowledge and transformation of their mood, thus improving their quality of life. Their parents can also indirectly benefit from MT by observing emotional improvements in their children after the MT sessions. It is noteworthy that the children in this work could choose their favourite songs and musical instruments, which facilitated their participation and interest in the MT sessions.

The application of the PAR approach in this research allowed the eventual transformation of negative to positive emotions in children, in whom we observed, for example, a greater sense of joy and hope. This point is important because oncological diseases can have substantial repercussions at the personal, family, social, and emotional levels. These findings also allowed us to propose future lines of research, for example, with the aim of deepening this work to discover how healthcare professionals would evaluate the utility of MT and its applicability in complex environments such as in the Paediatric Oncology Service. As in other studies, we showed that the relationship between the music therapist and children with cancer and their families during MT sessions represents a means of support to help them better cope with cancer.

## Data Availability

The data that support the findings of this study are available upon request from the corresponding author. The data are not publicly available because of privacy or ethical restrictions.

## Conflicts of Interest

The authors declare that they have no conflicts of interest.

## Authors' Contributions

R.R. contributed to methodology, was responsible for research and data collection, performed formal analysis, and prepared the original draft. A.N. prepared the original draft,

was responsible for data collection, reviewed and edited the manuscript, was involved in study supervision, and performed formal analysis. T.C. prepared the original draft, and reviewed and edited the manuscript. M.C.S contributed to methodology, performed formal analysis, was responsible for data conservation, and was involved in study supervision. A.G. conceptualised the study, contributed to methodology, performed formal analysis, and reviewed and edited the manuscript. J.G. conceptualised the study, and reviewed and edited the manuscript.

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