

Fall 2015

# The impact of interactive music therapy on the pediatric oncology population

Kristin Moon Orrigo  
*James Madison University*

Follow this and additional works at: <https://commons.lib.jmu.edu/honors201019>



Part of the [Alternative and Complementary Medicine Commons](#)

---

## Recommended Citation

Orrigo, Kristin Moon, "The impact of interactive music therapy on the pediatric oncology population" (2015). *Senior Honors Projects, 2010-current*. 6.

<https://commons.lib.jmu.edu/honors201019/6>

This Thesis is brought to you for free and open access by the Honors College at JMU Scholarly Commons. It has been accepted for inclusion in Senior Honors Projects, 2010-current by an authorized administrator of JMU Scholarly Commons. For more information, please contact [dc\\_admin@jmu.edu](mailto:dc_admin@jmu.edu).

# INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

The Impact of Interactive Music Therapy on the Pediatric Oncology Population

A Review of the Literature

---

An Honors Program Project Presented to  
The Faculty of the Undergraduate  
James Madison University  
School of Nursing

---

in Partial Fulfillment of the requirements for the Degree of Bachelor of Science

---

By Kristin Moon Orrigo

December 2015

Accepted by the faculty of the Department of Nursing, James Madison University, in  
partial fulfillment of the requirements for the Bachelor of Science Degree.

FACULTY COMMITTEE:

HONORS PROGRAM APPROVAL:

---

Project Advisor: Deborah Gleason  
Ph. D., R.N., C.P.N.P., Professor, Nursing

---

Bradley Newcomer, Ph. D.,  
Director, Honors Program

---

Reader: Erika Metzler Sawin, Ph.D, R.N.  
Professor, Nursing

---

Reader: Chris Fasching Maphis, M.S.N., R.N.-BC, F.N.P.-BC  
Professor, Nursing

---

**This work is accepted for presentation, in part or in full, at James Madison  
University on December 17<sup>th</sup>, 2015.**

**Table of Contents**

1. Dedication	3
2. Acknowledgements	4
3. Foreword	5
4. Abstract	6
5. Methods	7
6. Interactive and Integrative Therapies	8
7. Interactive Music Therapy	10
8. Symptom Relief: Pain and Anxiety. A Review of the Literature	13
9. Healthcare and Family Perspectives	21
10. Qualitative Research	24
11. Child Identity Development	28
12. Limitations	29
13. Conclusion	30
14. Table 1: A Review of the Research	31
15. Bibliography	33

**Dedication**

To: James Orrigo

The man who is behind the music and laughter that inspired this project. The work you do makes the world a better place, one child at a time.

**Acknowledgements**

From the bottom of my heart, THANK YOU to my honors advisor and reader Erika Metzler Sawin for pushing me to take on an Honors project. Our long conversations and brainstorming sessions inspired much of the topic and end result. Thank you to Deborah Gleason, my main project advisor, for serving as an incredible role model and allowing me a generous amount of patience, kindness, and heartfelt advice. Thank you to my reader Professor Chris Fasching Maphis, for your input and expertise on the topic of holistic therapy. I would like to extend my deepest gratitude to my friends, family, and husband for all of the encouragement and support over the past two years.

## **Foreword**

I will present the results of this literature review to the nursing department on December 17<sup>th</sup>, 2015. During my presentation, I will explain the process that sparked my passion for interactive music therapy. Over the past year, I have been working with James Orrigo, a music specialist who is based in Boston, Massachusetts. He works one-on-one with children in oncology units creating a song, drawing pictures, and animating the song so that the child can have their own music video. The child can share the video to the hospital, and allow other children in similar situations to become uplifted by the music video as well. As of July 2015, we successfully implemented the “Outside the Music Box” program into Award Winning Hospital: Tufts Floating Children’s Medical Center in Boston, MA. Many families have reached out to James and written heartfelt letters on the impact his service made on their child and the entire family. James has since captured the attention of non-profits as well as the Google sponsored App: Toontastic, and is exploring the potential opportunities of expanding his hospital program nationwide.

## **Abstract**

It is an unfortunate truth that a child with cancer will experience pain or anxiety during their battle with illness. Research shows that Interactive Music Therapy is extremely effective at the bedside of hospitalized pediatric cancer patients in reducing pain (Thrane, 2013; Huang, Good, Zauszniewski, 2010; Potvin, Bradt, Kesslick, 2015; Naylor, Kingsnorth, Lamont, McKenever, 2011; Tanriverdi, Aydemir, 2013) and anxiety (Callaghan, Dun, Baron, Barry, 2012; Thrane, 2013; Potvin et al., 2015; Docherty, Cherven, Stegenga, Ferguson, Roll, Stickler, Haase, 2012; Robb et al., 2008; Kemper, Bouhairie, Martin, Woods 2008; Tanriverdi, Aydemir, 2013). In cancer centers, the demand is quickly growing for adjunctive therapies to support sick children (Barry, O'Callaghan, Wheeler, Grocke, 2010). The purpose of this project is to review and evaluate current evidence surrounding the use of interactive music therapy for pediatric oncology patients. Implications of the research and methods for implementing holistic and interactive nursing care will be explored.

## **Methods**

While researching interactive music therapy and pediatric oncology, the databases utilized were PubMed, Proquest, and Consumer Health Complete (EBSCO). Criteria included the search terms: pediatric health, complementary therapy, interactive music therapy, pediatric oncology patients, pain and anxiety related to cancer in children, pediatric pain, pediatric anxiety, cancer & children & music, pediatric cancer and alternative therapies, music and cancer and kids, symptom relief, pain and anxiety, pediatric oncology, parental perspectives of music therapy. No articles before the year 2007 were reviewed, with the exception of one extremely relevant article from 2000. International articles were included. Table 1 summarizes results from relevant research studies in regards to interactive music therapy and pediatric oncology.

## **Interactive and Integrative Therapies**

There are many types of interactive therapies and integrative interventions among professionals. Thrane (2013) describes integrative interventions as types of therapy that serve both patient and family healthcare needs. Types of integrative therapies include virtual reality, mind-body techniques, creative arts therapy, manipulative practices, biofield therapies, and traditional healers.

Creative arts therapy (CAT) is reviewed in Thrane's study of patients between the ages of 2-21 receiving chemotherapy. Creative arts therapy includes imaginative interaction, an exchange between a professional therapist and a child that allows room for the child's ideas and imagination to determine the course of the session. In a randomized control study, the quality of life of pediatric patients was evaluated by putting 16 children with brain cancer in six one-hour sessions with a CAT instructor. As noted in Table 1, a significant decrease in pain per patient is reported. A second, non-randomized trial was conducted for any type of cancer patient. The children in the trial self-reported a decreased level of pain ( $P = .006$ ). The author writes that the results are "encouraging evidence," and that they "validate the effectiveness of integrative modalities for children with cancer in coping with pain and anxiety during cancer treatment and the painful procedures that are a part of treatment" (Thrane, 2013, p. 328).

A beneficial aspect of integrative therapy is its flexibility. Each child is different and therefore responds differently. With the goal of therapy being positive distraction, a good interactive therapist has the ability to pick up on verbal and non-verbal cues by the child, and thereby tailor a positive personal interaction for

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

the patient. Increasing a child's mood or feeling of well-being can make a substantial impact on the patient, family and friends. Nurses can play a role here as well. Many integrative therapies, especially CAT, can be exhibited by the nurse and taught to the parents. Thrane suggests that this can support children during painful procedures.

## **Interactive Music Therapy**

One example of integrative therapy is interactive music therapy, where music can be used as a tool to connect with patients and spark creative and positive thinking. Music has long been termed the universal language because of its unique ability to transcend barriers. Whether they are cultural, demographic, socioeconomic, age or illness-related differences, music has a way of bringing connection and relief to those in need. Throughout the ages, music has been known for bringing light in dark times. As far back as 3000 BC, Classical Chinese music was thought to bring health and longevity. In Ancient Greek times, hymns were sung at the bedside of ill patients to promote healing. By the 18<sup>th</sup> century, most physicians believed there was curative power in music (O’Callaghan et al., 2007). Even today, 10 out of 10 of the U.S. News Best Children’s Hospitals offer interactive music therapy programs. The best children’s hospitals in the nation understand the overwhelming benefits of an active music program for their patients.

A music therapist is required to attain at least an undergraduate degree in music therapy. Additionally, 1200 hours of formal clinical training is required before they are eligible to sit for the national exam. Once they obtain the credentials, and are Music Therapist Board Certified (MT-BC), they begin their work in a wide variety of settings (Hart, 2009). Despite all of this training, many therapists claim that there is much to learn “on the job.” Often times, working with children may be discouraging because the child may appear uninterested. The next week, however, the therapist may get a call asking for them to come back for another session. This is known as being vicariously engaged (O’Callaghan et al.,

2013). Sometimes, the children have difficulty expressing how much they are truly enjoying the interaction.

When an infant observes musical instruments, therapists state that the child can transform from appearing distressed to acting more confident. The positive effects of this passive music therapy are seen clearly when the infant sits up, rocks back and forth, smiles, and begins making hand movements. O'Callaghan et al. writes that the parents may make a comment such as, "this is the first time they've smiled today!" Nonverbal body language indicates that the child goes from a tense position to an open, friendly and engaging position. In contrast, active music therapy involves an interaction between therapist and child that provides room for the child to determine the course of the session through their ideas and imagination. The key point is that the child's non-illness identity is acknowledged, which is crucial to the healing process. A music therapist who interacts well with a child allows the child freedom of expression and a brief escape from an intimidating hospital environment. Pediatric patients often have little input over their hospital schedule, as their sleep, visiting time, meal schedule, and medical treatments are largely predetermined. When an interactive musician comes into the room and lets the child choose from a variety of instruments, music types, and activities, the child enters a new world of empowerment. The emotional support that stems from such a process is invaluable.

Active Music Engagement (AME) intervention, a type of interactive music therapy used in a randomized control trial conducted by Robb et al., is based on a model that includes 3 essential elements. First, the intervention uses music-based activities to foster a predictable environment and allow the child autonomy. Second,

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

the child is given flexibility through live music. Third, a music therapist facilitates an activity that keeps the child's decisions central (Robb et al., 2008). All of these elements are combined to allow the sick child to self-regulate their emotions and response to the stressful situation. AME interventions were compared to two other therapies, passive music listening and passive audiobook listening. As shown in Table 1, the results of this study, which includes 83 participants between the ages of 4 and 7, were positive for two coping behaviors (active engagement and face affect). The hypothesis that AME would produce a greater positive facial affect and active engagement than music listening and audio storybooks is supported. The child is offered ample opportunity to explore and play in an active and interactional environment, and therefore AME is deemed more powerful than the two passive therapies used in the study. Active Music Engagement is a form of interactive music therapy that can improve patient's mood and even relieve cancer related symptoms. The following section covers topics related to symptom relief associated with pediatric cancer pain and anxiety related to cancer.

**Symptom relief: Pain and Anxiety. A Review of the Literature in terms of  
Interactive Music Therapy**

Table 1 includes a summary of interactive music therapy and symptom relief for pediatric cancer patients suffering from pain and anxiety. Prolonged pain and stress in children is particularly harmful and may result in stagnation of development and a withdrawal from their environment. Pain control is difficult with children, especially as there has not been the same amount of research on pain management for pediatric patients as there has been for adults (Mathews, 2011). An overwhelming amount of research indicates that interactive music therapy promotes a positive self-image and healthy relationships, a decreased intake of analgesics (Huang et al., 2010), and perhaps most importantly: interactive music therapy is associated with a sense of normalcy and hope in a chaotic hospital environment (O' Callaghan et al., 2013).

Pain is harmful to any individual, but especially to a child. When unrelieved, it leads to depression, hopelessness, anxiety and fear. Further, according to Robb et al. (2000), it deprives a child of their fundamental needs of independence, competence, and relatedness to others. Pain specific to cancer is the result of painful treatments and the growing tumor. The human body reacts to the foreign body with necrosis, edema, tissue inflammation, and other destructive biochemical changes. (Huang et al., 2010). Common causes of chronic cancer pain are metastases in the bones and compression of neurons. Analgesics are prescribed for the relief of pain, but there are many setbacks to this method. Firstly, they do not always provide full pain relief. Secondly, patient tolerance can occur when a patient heavily relies on

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

pain medication. Patient tolerance occurs when there is a need for increased dosages in order to adequately manage pain, and can happen to patients who use pain medication repeatedly. Many studies show a decrease in analgesic consumption in patients involved in music therapy (Huang et al., 2010).

It is important to educate healthcare providers on an acceptable standard for incorporating both pharmacologic and alternative methods of pain reduction. If a nurse believes that a child may benefit from interactive music therapy, they should activate the hospital specific pathways to contact a music specialist or therapist. Many hospitals employ Child Life Specialists, who are responsible for ensuring that each patient receives patient specific and complementary therapies. Findings indicate that this therapy can decrease the need for pain medication; however analgesic medication remains the primary source of pain relief. Nurses play a pivotal role through the assessment of adequate dosage and efficacy and their incorporation of music therapy along with pain medication can provide many benefits to the patient. If pain remains after an adequate dosing, then the nurse can suggest music along with the medication. The patient may have a preference for other alternative therapies, such as sports, imagery, or meditation (Huang et al., 2010).

The assessment and treatment of pain in children is particularly challenging for a few reasons. First, with pain being a fairly subjective sensation, youth of the same age will differ in their sensitivity and awareness of pain itself. Secondly, there is less research published on pediatric patient pain management than management of adult patient's pain (Mathews, 2011). When pediatric pain is untreated, it can lead to long-term psychological problems. Pain is left untreated in children for a few

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

reasons. The child may deny pain for fear of disappointing their caregiver, or have a fear of needles. Also, children may not understand the concept of pain as well as an adult would, and therefore have trouble verbalizing their sensations. For the child, pain can result in the avoidance of social activities, a high level of pain-related anxiety, and feeling unable to relate to other children their age. A common cause of pediatric pain is pain related to disease, such as cancer (Mathews, 2011). It is essential that pediatric cancer patient's stress and pain be reduced, especially while they are in the hospital. According to Robb et al., when a child is placed in an environment with prolonged stress, they may withdraw and become exceptionally introverted in their coping mechanisms. Interactive music therapy in the hospital is an outlet that can reduce internal effects of chronic pain. An acceptable music environment is one that engages and interacts with the child, and can be explained with a motivational and encouraging perspective. As the child seeks mastery over their setting, they are more likely to gain independence and form secure relationships (Robb et al., 2000).

A 2015 article by Potvin, Bradt and Kesslick explores the effects of music therapy on the symptoms of thirty cancer patients. A board-certified music therapist provided 30-45 minute music therapy sessions at a time. Results were compared to those from a control trial where the same patients participated in passive music therapy by sitting and listening to music from an iPod for the same amount of time. Exit interviews conducted by a doctoral art therapy student assessed the patient's experience with the two sessions. Nearly all of the participants reported an increased level of relaxation. Cancer patients are known for having difficulty with anxiety, and relaxation is a notable achievement. It is

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

crucial that the reader understands that music therapy should never be labeled as “only” a relaxing experience. Interactive music therapy fosters many meaningful emotions, realizations, and coping mechanisms. Words that are commonly heard from participants include: “increased motivation, calm, peaceful, soothing, increased connectivity, spiritual, faith, religion, memories.” The atmosphere of companionship and camaraderie decreases feelings of isolation and loneliness and “normalizes” the environment. One patient stated, “It made me feel more at peace, like things are going to get better” (Potvin et al., p. 12, 2015). Symptoms are a subjective experience, and treatment management must be dynamic enough to encompass the many physical, emotional, and mental effects of the disease. The authors write that music therapy is a unique healing tool due to its ability to help patients move through problems, gain coping skills, dignity, and meaning.

Huang, Good, and Zauszniewski performed a randomized control trial in 2010 to research the effects of music on cancer pain. There were 126 participants with cancer pain. The participants were divided into 2 groups: the experimental listened to music while the control group stayed in bed. This study determined that music was extremely helpful for pain, as 30 minutes of music “provided 50% relief in 42% of the music group compared to 8% of the controls.” Individuals in the experimental group averaged a lower pain level of 1.5 on a 0-10 scale (Huang et al., 2010). They also discovered that patients in this sample strongly preferred familiar, culturally appropriate music.

A 2008 article by Robb et al. investigates the effectiveness of music on children in a unique way. Rather than have the child report their pain or anxiety, the researcher measured positive facial affect and active engagement. This type of

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

research is helpful because it eliminates the problem stated earlier; that children may fear disappointment from the caregiver and falsely report decreased pain or anxiety. Children ages 4-7 were analyzed to discover the immediate effect of Active Music Engagement. Robb et al. writes that individual music engagement improves three aspects of a hospital environment that are harmful to a child: unpredictability that stems from a chaotic hospital, a threatened independence due to coercive procedures, and possible neglect from parents or care providers who struggle with emotional availability. During AME, the child is in a supportive and predictable environment that they have full control over. This atmosphere is one that fosters independence, confidence, and healthy coping for the parent and child.

A great deal of evidence-based research is found in a 2011 systemic review by Naylor et al. on the effectiveness of music in pediatric healthcare. By systemically reviewing randomized control trials published between the years of 1984 and 2009, researchers found seventeen studies that support the relevance of music in pediatric healthcare. The studies included 575 participants in total, with 50% male and 50% female, and a heavy emphasis on elementary aged children and adolescents. The article reviews the effectiveness of music therapy on acute and chronic illness, social skills, and symptomatology. Synthesized data of two randomized control trials reveals an increase in nonverbal communication for developmentally disabled hospitalized children during music therapy (Naylor, et al., 2011). The two trials did not reveal a change in verbal communication for children with development disorders; however, findings show that music therapy does increase verbal and nonverbal communication in pediatric patients without development disorders. When evaluated with a painful migraine, music therapy allows for a more

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

immediate, lasting relief compared to medications (Naylor, et al., 2011). This systematic review reveals a few limitations within current research on music therapy and pediatric oncology. First, many of the sample sizes of these studies are small, allowing for a larger margin of error. Multiple interventions and numerous measurement techniques are some other factors that put studies at a high risk for procedural error. For example, statistics show that musical interventions led by Certified Music Therapists yield more significant results than those led by uncertified researchers or health professionals. Despite this truth, a number of studies allowed uncertified researchers to perform musical interventions. In a future study, the researcher should reduce room for error by strictly allowing music therapists to deliver the therapy. In any trial, the measurement of long-term results is an excellent way to discover effectiveness of an intervention. None of the seventeen studies included an assessment of the long-term impact of music therapy. Naylor et al. concludes that an increase in methodological rigor is absolutely necessary to prove the effectiveness of music therapy. Because Naylor delivered this conclusion in 2008, evaluation of more recent data is in order. As previously noted, Thrane conducted a systemic review in 2013 covering the effectiveness of integrative therapies for pediatric oncology patients suffering from pain and anxiety. Her conclusion, after analyzing the current body of research that discusses the integration of music therapy in pediatric hospital settings, is much more supportive. After performing a full text review of 25 articles, she systematically chose 12 studies that included randomization, had a control group, and measured pain and anxiety. Analytical results support the implementation and effectiveness of integrative and interactive modalities such as music for pediatric oncology

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

patients in dealing with pain and anxiety (Thrane, 2013). Distraction techniques such as music and interactive play, Thrane explains, immerse the child's mind in a more positive way than if they were playing video games. There are clinical implications for this unique therapy. Nurses who are able to embrace alternative therapy techniques can empower their patients and patient's families, increase their sense of well-being, and assist them in controlling pain and anxiety levels (Thrane, 2013).

## **The Healthcare and Family Perspectives**

It is crucial that the researcher of music therapy and its effect on pediatric oncology patients investigates the perspectives of those indirectly impacted. Important viewpoints to consider include those of the healthcare providers, parents, and the child.

Attitudes of staff members affect the parent's response, the provision of the therapy in the unit, and the availability of music therapy for the patients (Kemper et al., 2006). The researcher must determine if the staff serves as a barrier or a launching pad for the therapy. A survey conducted by authors Kemper, Bouhairie, Martin and Woods in 2008 evaluates the attitudes of staff members in two different settings, a neonatal intensive care unit (NICU) and a pediatric outpatient hematology oncology unit (PEDS HEME/ONC). Staff member's perspectives are significant to note because they may contain less bias than data received from music therapists themselves. A question to ask doctors and nurses is: medically speaking, do you notice any change in the patient? When asked this question through a survey, 70% of respondents agreed music could help relieve pain. 100% of PEDS ONC staff agreed with the statements "Music can improve mood," and "music can lift spirits and boost energy and vitality." Generally speaking, medically trained personnel view music therapy in a positive light. PEDS ONC staff in this particular study wrote that music could benefit the patient if it matches the musical preferences of the child.

In 2013, Tanriverdi and Aydemir distributed a survey to 402 oncologists from the Turkish Society of Medical Oncology. Of the 112 who responded to the online

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

survey, 30% of the physicians regularly recommend musical therapy for their patients. Additionally, 55% of doctors agree with the statement: “I recommend music therapy to prevent anxiety in patients with cancer.” Quality of life is an important factor to consider, as it can affect the patient’s compatibility with treatment and chance of recovery (Tranriverdi, Aydemir, 2013). Thirty-seven percent of the doctors strongly believe that the therapy can be helpful in reducing irritating symptoms of treatment, such as nausea and vomiting, and thereby increasing their quality of life.

A heightened depression and anxiety level in cancer patients increases the need for alternative medicines and therapies. Patients can lose faith in science and their ability to pay and therefore be hesitant to accept anti-depressants or anxiolytics. Tanriveredi and Aydemir point out that music therapy is free of side effects, low cost, and very easily available.

Why isn’t music therapy universally embraced by hospitals across the nation? Kemper, et al. writes that cost, music’s effect on patients and types of music to play should be further investigated. Cost does not have to be a barrier to implementing music therapy in hospitals. Musically inclined, outgoing volunteers can come into the hospital environment and perform informal music therapy by writing songs and playing instruments with the child. Kemper’s research points out that the complexity of music leads to a complex effect on patients that has yet to be studied (Kemper et al., 2006). This leads the researcher to look to one of the greatest resources for measuring long-term effects of music therapy, the parents. A 2013 article by Docherty et al. investigates the helpfulness and meaningfulness of music therapy by holding open-ended interviews with the parents between 100 to

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

160 days after their child's Bone Marrow Transplant (BMT). With a sample of 113 patients between the ages of 11 and 24, researchers compared effects of a therapeutic music video (TMV) to an audio-book control group. A music therapist worked one-on-one with each patient during six 1-hour sessions. Members well trained in qualitative methods performed interviews, sometimes lasting as long as an hour. They asked parents open ended questions such as, "Tell me about your experience," and "What are your thoughts and feelings?" When analyzing the results, researchers began by evaluating the parent's perception of helpfulness to their child. One parent responded that the therapy offered her son an "escape route" from the pain, and allowed him to go to a different world. One dad, when speaking of his daughter's experience, commented that the therapy allowed her to be present, unlocked her sense of humor and helped her to enjoy quality family time. One grandmother relayed that the therapy was "a terrific way for him and I to interact." A mother of a 16 year old girl explained that her daughter became isolated from her Facebook friends because she was embarrassed about not having any pictures to post. After the music therapy video was created, her daughter lit up, and couldn't wait to share with her friends what she had been doing. The mother was relieved because her daughter "began that contact with them again and just broke that isolation process" (Docherty et al., p. 174, 2013). Benefits from this therapy seem endless, as the parent enjoys a sense of pride, a stronger connection and a lasting legacy from their child. It was also reported that the therapy promoted positive coping, fostered communication and positive relationships, and an overall better adaptation to their illness. Parents viewed their child's involvement in music therapy as a way for them to "rise above transplantation-associated distress"

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

(Docherty et al., p. 177, 2013). Adolescents with cancer report feeling “more dependent” on their parents compared to their peers. Immunosuppression and neutropenia robs adolescents of most of their autonomy. Offering this patient population a structured, meaningful project allows autonomy through decision making. The individual has the opportunity to decide who will be in their video, what music will be used, what topics will be addressed, and who is allowed to view the video. Researchers were able to complete an in-depth examination of each patient because of the small sample size of the study. Although the small sample limits comparisons in parental roles, it is the reason that researchers were able to collect such an extensive amount of data on each patient (Docherty et al., 2013).

## **Qualitative Research**

Having a child sick with cancer leaves many parents feeling helpless. Especially when their child has to go to radiation alone, many parents feel the burden of their child's fear. Radiation is sometimes given to children 5 days a week, and the patient is forced to sit in large, uncomfortable immobilization devices. This procedure is awkward by nature, and because the child must be isolated it can be very scary for them. In 2010, music therapist Barry realized that there was very little research published on the discomfort of a child during their first radiation treatment and decided to act. Barry began working with the child using interactive software to create a CD, and then playing the CD for them when the child went into radiation for the first time. When this was compared with a control group of children that did not create a CD before radiation, the results were overwhelming. Sixty-seven percent of the children without therapy turned to social withdrawal as their coping mechanism, compared to 0% of the children in Barry's CD creation group. Barry et al. explains that this method works due to its fun, engaging, and developmentally appropriate nature (Barry et al., 2010). Among other benefits, this type of interactive therapy may decrease sedation needs, offer positive memories for the child, and save staff time. Qualitative analysis revealed that the main themes in this study were intrapersonal benefits, distraction and cognitive restructuring. The anticipation of listening to their CD was an even more powerful distraction tool for the children than expected. After the study was completed, the children were asked if they would recommend this therapy to other children, all said yes. One child even stated, "Yep. I would. I think it's very helpful... keeps you happy and if you make it

funny, it distracts you. I almost had to stop myself from laughing” (Barry et al., 2010).

Parents may unknowingly thwart the therapy session by viewing it as “trivial” or “nonsense” (O’Callaghan et al., 2013). However, if they are educated about the significant therapeutic benefits, the parents may better understand that a child who exhibits a sense of mastery and creativity is showing resilience and mental health (O’Callaghan et. al). A nurse can play a role by explaining to the parent that research shows that active music engagement decreases outward signs of distress and anxiety, increases communication and mood, and improves the overall function of the immune system (Robb, 2000).

According to an article published in 2013 by O’Callaghan et al., benefits of music therapy include a more positive self-image, a feeling of peace, a healthy relationship with the therapist, and perhaps most importantly: music therapy is associated with a sense of “normalcy and hope.” This article qualitatively discusses the perspectives of four music therapists on the relevance of music for pediatric oncology patients under the age of fourteen. During a focus group seminar, the music therapists discussed their work within the pediatric oncology unit. The question was posed: “what is the relevance of music in the lives of children 0-14 years old with cancer?” The therapists provided interesting insight as well as personal accounts of interactions with the children. One therapist explained that a patient is more likely to be interested in music therapy if they have a background in music. An excellent music therapist is one who is able to make music relevant to the child regardless of the child’s background. Some therapists look for a “key” to unlocking the child’s interest. For instance, one professional had an experience with

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

a child who was undergoing a painful procedure during the session. Distraction was difficult for the therapist. The mother casually mentioned that the child had responded positively to the drums in the past. Luckily, the therapist had a set nearby. Once he got the young boy to experiment with the drums, he had him hysterically laughing and asking for another session soon. The therapist remembers this session positively, especially because the mother called the dad into the room because they hadn't seen their child smile in weeks.

There are many beautiful stories to be found within qualitative research papers on interactive music therapy for kids. Like this one, for example, "A 2-year-old girl, who had loved music therapy sessions, became withdrawn and slept most of the day after a BMT, except during music therapy when she sat up, smiled, and vocalized to songs like "Old McDonald." When she'd had enough, she waved goodbye. Her mother would then comment to the music therapist: "Well that's the last we'll see of her until you're next in (O'Callaghan et al., p. 135, 2013)." Music therapists are generally thought to bring in an exciting energy that reaches children in a unique way. By enhancing a positive hospital atmosphere, the child and family are given a special memory, and the staff is given the opportunity to discuss something other than work-life.

O'Callaghan writes about a six-year-old named Camilla, to whom music therapy was crucial to the healing process after getting a brain tumor removed. She had music therapy while in recovery during an inpatient stay at the hospital. After being released, her parents noted difficulty concentrating and paying attention. Once she was enrolled in music lessons, she had fewer problems learning and an increased confidence level. "Learning music may combat late effects of cancer

treatment” (O’Callaghan et al., 2013, p. 137). The interaction involves multifaceted components that allow the child to make the experience their own, contributing to a greater sense of identity.

### **Child Identity Development**

Identity development is an adaptive task throughout adolescence and mid-childhood (O'Callaghan, 2013). Music aids in helping children connect with others and can even act as a security blanket.

According to Robb et al., when a child is placed in a stressful environment, they will often times react by withdrawing, also known as disengaging. Disengagement becomes damaging when the child makes it into a habit that forms into a permanent coping strategy. On the other hand, a higher level of child engagement in a supportive environment fosters a love for learning and initiating activities. It is vital that the therapist expresses genuine interest and excitement when they are with the child (Robb, 2000). When the child is affirmed with positive feedback, they gain an increased self-worth and confidence. Robb describes the biggest challenge in finding an impactful intervention as finding something that will overpower the “emotional and behavioral reactions to stress so that engagement can be initiated and maintained” (Robb et al., 2008, p. 700). Why do music based interventions meet the challenge? According to Robb et al., an extensive body of research establishes the effectiveness of music in altering mood and decreasing anxiety. Also, it is a powerful distraction tool that actually increases social interaction and family communication.

## **Limitations**

A full list of limitations from the 13 trials reviewed is seen in Table 1 below. Generally speaking, many trials were limited by a small sample size (Docherty et al., 2013; Barry et al., 2010; Kemper et al., 2008; Thrane, 2013; O’Callaghan, Sexton, Wheeler, 2007) children feeling too unwell to participate (Barry et al., 2010), possible bias (Callaghan et al., 2012; Kemper et al., 2008; Naylor et al., 2011; Robb et al., 2014.; Barry et al., 2010), a lack of a consistent measuring system (Naylor et al., 2011; Kemper et al., 2008), and a foundation of research based on clinical recall (Callaghan et al., 2012, Robb et al., 2014).

## **Conclusion**

To a sick child, interactive music therapy offers familiarity, engagement, and structure among a chaotic and mundane hospital routine. It touches their soul and offers a brief picture of normalcy. Research supports that this therapy allows mental and physical healing through distraction, self-expression, relationship building, humor, catharsis, and a sense of achievement. All children suffering with a chronic disease, such as cancer, should have access to this sort of healing therapy.

Healthcare providers act as patient advocates, and as such have the opportunity to recognize the need for such a unique complementary therapy. Nurses in particular play a crucial role through the assessment of adequate pain medication dosage and patient response, and their incorporation of music therapy with the pain medication can provide benefits such as relief of pain and anxiety. Healthcare providers should push for interactive music therapy in their hospitals because the goal of health is not merely focusing on preserving life, but also quality of life.

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

**Table 1: A Review of the Literature on the effects of Interactive Music Therapy on Pediatric Oncology Patients**

Author (Year) and LOE	Intervention	Sample	Outcomes Assessed	Results	Limitations
Callaghan, Dun, Baron, Barry (2012) LOE I: systemic review	Pediatric Oncology Music Therapy	7 pediatric oncology music therapy studies	Facial affects, engagement, play, well-being, empowerment & indirect improvement of child's family, child's HRV.	Music therapy was associated with an improvement in engaging behaviors, positive well-being comments, a drop in anxiety, and contributes to a more "normal" environment in the hospital.	Questionable validity of clinical memory recall. Possible bias from music therapists.
O'Callaghan, Sexton, Wheeler (2007) LOE VI	Music therapy freely given to radiation patients in the waiting room	N=60 patients under age 14 Currently undergoing radiation	Expression, psychological improvements	Benefits included explorative sound creation, respite from the stress of waiting, emotional expression & psychological and physical improvements.	Lack of control group. Small sample size. Lack of quantitative data.
Thrane (2013) LOE I	Integrative therapy	164 articles, 25 that include full-text review	Pain and Anxiety	Integrative interventions are effective for pain and anxiety in children during their cancer treatment.	Sample sizes of studies were relatively small.
Kemper, Hamilton, McLean, Lovato (2008) LOE IV: Prospective Cohort Study	Music Therapy	N=63 leukemia patients under the age of 18	SNS activity, measured by heart rate variability and cardiac inter beat interval	The results were not as expected, as the music resulted in decreased parasympathetic activity. The patients may have been unhappy sitting still and listening to unfamiliar music.	Possible subjective bias. Ceiling effect. Limited time with each patient (only 20 min). Small sample size.
Huang, Good, Zauszniewski (2010) Level II: randomized clinical trial	Music therapy	N= 62 experimental group (rested in bed) N= 64 control group (listened to music)	Pain	Participants who listened to the music for 30 minutes experienced significantly less cancer pain. Because the participants were older, they may have been more comfortable sitting while listening to music.	Older patient population
Potvin, Bradt, Kesslick (2015) Level II: RCT	Interactive music therapy & music medicine	N=30 participants	Symptom management	Visual analogue scales that measured anxiety, mood and relaxation at the start and finish of each session revealed that symptoms are best alleviated when the patients are viewed holistically.	Researchers were not able to study long-term effects (patients were discharged).
Naylor, Kingsnorth, Lamont, McKeever, Macarthur (2011) LOE I: systemic review of RCTs	Music Therapy	17 studies, 575 participants	Overall wellbeing of the child	Music had a positive impact with coping behaviors. Active music engagement was associated with positive facial expressions and higher rates of interaction and exploration with the environment. Music therapy was also associated with decreased migraines.	Weak methodological trial quality.

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

Robb, et al. (2014) LOE II: RCT	Music therapy: song writing and story board production (video animation)	N=113 oncology patients aged 11-24 undergoing amyeloablativeH SCT for cancer.	RIM model: distress, defensive coping, social integration, family environment, hope	Courageous coping improved with therapy, which is associated with better adjustment long-term. "Notable but non-significant outcome in selftranscendence."	Risk of bias from music therapists. The study was underpowered and left room for type II error. Possible missing data.
Docherty, Chervin, Stegenga, Ferguson, Roll, Haase (2012) LOE VI: qualitative study	No intervention noted, open ended interview	N=16 parents of pediatric cancer patients	Perspectives of parents of adolescents/young adults with cancer who are attending music therapy	Parents expressed that music therapy for their child enhanced their connection with others, allowed a positive emotional experience and expression, assisted them in leaving a lasting legacy, gave them a better outlook and adaptation ability, and improved their overall quality of life.	Small sample size and qualitative data.
Robb, et al. (2008) LOE II: RCT	Participants randomly assigned to Active Music Engagement (AME), music listening, or audio story books	N=83 participants aged 4-7	Coping behaviors: positive facial affect, active engagement, initiation.	AME participants had a higher ability to cope compared to ML and ASB. Both positive facial affect and active engagement levels were higher in AME participants, along with initiation. This study supports interactive music therapy for pediatric oncology patients between the ages of 4 and 7.	ML and ASB are considered passive therapies, and therefore bias outcome when compared with an active therapy.
Kemper, Bouhairie, Martin, Woods (2008) LOE: VI	No intervention noted, cross-sectional survey	N=187 NICU staff and N=20 PEDS ONC staff	Attitudes of staff in PEDS ONC unit & NICU toward music therapy	Most staff agree music has the potential to improve sleep, decrease stress, and 70% from both groups agreed that it can reduce pain. These favorable attitudes tell us staff members are not barriers to music therapy. Favorable outcomes were more likely in those with a musical background.	Conducted in a medical center where music is not routinely played. Results may differ in other settings. Survey distributed by 2 different students.
Barry, O'Callaghan, Wheeler, Grocke (2010)	Music therapy CD (MTCD) creation	N=11 patients aged 6-13. Half were randomly assigned to either experimental group or standard care group	Pediatric cancer patient's coping & distress during first radiation treatment.	67% of children in "standard care" group resorted to social withdrawal as a coping mechanism, where as 0% of those in the music group exhibited social withdrawal.	Interviews were brief due to illness. Small sample of participants. Possible bias.
Tanriverdi, Aydemir (2013) LOE VI	Sample survey	N=112 Oncologists	Perspectives of Medical Oncologists towards music therapy for their patients.	55% of oncologists recommend music therapy to prevent high levels of anxiety in cancer patients.	Out of the 402 oncologists who received this survey, only 112 participated. It was suggested that the other oncologists were not interested enough in music therapy to fill out the survey.

# INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

## Bibliography

- Barry, P., O'Callaghan, C., Wheeler, G., & Grocke, D. (2010). Music therapy CD creation for initial pediatric radiation therapy: A mixed methods analysis. *Journal of Music Therapy, 47*(3), 233-263. doi: 10.1093/jmt/47.3.233
- Callaghan, C. O., Sexton, M., & Wheeler, G. (2007). Music therapy as a non-pharmacological anxiolytic for pediatric radiotherapy. *Australasian Radiology, 51*, 162. Retrieved from <http://eds.b.ebscohost.com/eds/pdfviewer/pdfviewer?sid=28cd4501-ea10-46a0-a31d-9aece57f4515%40sessionmgr110&vid=9&hid=120>
- Docherty, S. L., Robb, S. L., Phillips-Salimi, C., Cherven, B., Stegenga, K., Hendricks-Ferguson, V., Haase, J. (2013). Parental perspectives on a behavioral health music intervention for adolescent/young adult resilience during cancer treatment: Report from the children's oncology group. *Journal of Adolescent Health, 52*(2), 170-178. Retrieved from <http://www.sciencedirect.com/science/article/pii/S1054139X1200211X#>
- Hart, J. (2009). Music therapy for children and adults with cancer. Books, articles, & more. *Alternative & Complimentary Therapies, 15*(5), 225. Retrieved from <http://eds.b.ebscohost.com/eds/pdfviewer/pdfviewer?sid=28cd4501-ea10-46a0-a31d-9aece57f4515%40sessionmgr110&vid=7&hid=120>
- Huang, S., Good, M., & Zauszniewski, J. (2010). The effectiveness of music in relieving pain in cancer patients: A randomized controlled trial. *International Journal of Nursing Studies, 47*, 1354-1362. Retrieved from [http://ac.els-cdn.com/S0020748910001100/1-s2.0-S0020748910001100-main.pdf?\\_tid=2b185b32-dfa5-11e4-abe6-00000aacb35e&acdnat=1428686301\\_6e4a9b63d0b7dfbdf6a3609b1af5c2e](http://ac.els-cdn.com/S0020748910001100/1-s2.0-S0020748910001100-main.pdf?_tid=2b185b32-dfa5-11e4-abe6-00000aacb35e&acdnat=1428686301_6e4a9b63d0b7dfbdf6a3609b1af5c2e)

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

- Kemper, K. J., Bouhairie, A., Martin, K., & Woods, C. (2008). Staff attitudes and expectations about music therapy: Pediatric oncology versus neonatal intensive care unit. *Pediatric Research*, 64(1), 105-109. Retrieved from <http://www.nature.com/doi/10.1203/PDR.0b013e318174e6fb>
- Kemper, Hamilton, McLean, & Lovato. (2008). Impact of music on pediatric oncology outpatients. *Pediatric Research*, 64(1), 105-109. Retrieved from <http://www.nature.com/doi/10.1203/PDR.0b013e318174e6fb>
- Mathews L. Pain in Children: Neglected, Unaddressed and Mismatched. *Indian Journal of Palliative Care*. 2011;17(Suppl):S70-S73. doi:10.4103/0973-1075.76247.
- Naylor, Treurnicht, Kingsnorth, Lamont, McKeever, & Macarthur. (2011). The effectiveness of music in pediatric healthcare: A systematic review of randomized controlled trials. *Evidence-Based Complementary and Alternative Medicine*, 2011, 1-18. doi: 10.1155/2011/464759
- O'Callaghan, Dun, Baron, & Barry. (2013). Music's relevance for children with cancer: Music therapists' qualitative clinical data-mining research. *Social Work in Health Care*, 52(2-3), 125-143. doi:10.1080/00981389.2012.737904
- Potvin, Bradt, & Kesslick. (2015). Expanding perspective on music therapy for symptom management in cancer care. *Journal of Music Therapy*, Retrieved from <http://jmt.oxfordjournals.org/cgi/doi/10.1093/jmt/thu056>
- Robb, S. L. (2000). The effect of therapeutic music interventions on the behavior of hospitalized children in isolation: Developing a contextual support model of music therapy. *J Music Therapy*, 32(2), 118-46. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/10932125>

## INTERACTIVE MUSIC THERAPY AND PEDIATRIC ONCOLOGY

Robb, S. L., Clair, A. A., Watanabe, M., Monahan, P. O., Azzouz, F., Stouffer, J. W. . . .

Hannan, A. (2008). Randomized controlled trial of the active music engagement (AME) intervention on children with cancer [corrected] [published erratum appears in *PSYCHO ONCOL* 2008 sep;17(9):957]. *Psycho-Oncology*, 17(7), 699-708. doi:10.1002/pon.1301

Robb, S., Burns, D., Stegenga, K., Haut, P., Monahan, P., Meza, J., . . . Haase, J. (2014).

Randomized clinical trial of therapeutic music video intervention for resilience outcomes in adolescents/young adults undergoing hematopoietic stem cell transplant: A report from the children's oncology group. *Cancer (0008543X)*, 120(6), 909-917. doi: 10.1002/cncr.28355

Tanriverdi, O., & Aydemir, N. (2013). Perspectives of medical oncologists regarding music therapy for patients with cancer in turkey - can musicology be inegrated into psycho-oncology? *Asian Pacific Journal of Cancer Prevention*, 14(11), 6537-6540. doi: 10.7314/APJCP

Thrane. (2013). Effectiveness of integrative modalities for pain and anxiety in children and adolescents with cancer: A systematic review. *Journal of Pediatric Oncology Nursing*, 30(6), 320-332. doi:10.1177/1043454213511538

Tucquet, & Leung. (2014). Music therapy services in pediatric oncology: A national clinical practice review. *Journal of Pediatric Oncology Nursing*, 31(6), 327-338. doi:10.1177/1043454214533424