

EVIDENCE-BASED COMPLEMENTARY THERAPY RECOMMENDATIONS TO
IMPROVE PSYCHOLOGICAL HEALTH AND QUALITY OF LIFE IN PEDIATRIC
CANCER PATIENTS: A BEST PRACTICE APPROACH

By

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ABSTRACT

The purpose of this thesis was to develop a best practice approach for improving quality of life in pediatric oncology patients utilizing music therapy as a form of complementary treatment. Incidence of invasive pediatric cancer has increased by twenty-nine percent within the past two decades. Studies suggest that pediatric cancer survivors have slightly lower college attendance rates, are more likely to be unemployed, and not married as young adults. The undesirable social outcomes are products of the disruptive nature of a cancer diagnosis and its impact on psychological health (Kids v Cancer, 2015). Evidence has shown that implementing complementary therapy to improve wellbeing under numerous conditions like pediatric cancer can be successful (Lin et al., 2011). By introducing music therapy into the pediatric oncology setting, the quality of life (QOL) and psychological health of the children can improve. Focusing on QOL and psychological health in pediatric cancer patients allows for normal functioning and development later on in adulthood.

CHAPTER 1

Introduction

Significance of the Problem

Forty-three children are diagnosed with cancer every day, and forty thousand children undergo cancer treatments every year in the United States (CureSearch, 2015). Coping with a pediatric cancer diagnosis and the associated medical procedures can be stressful, disruptive, and painful for the child and their family. Due to numerous doctors' appointments, hospitalizations, absences from school and after-school activities, and altered physical appearances and capabilities, a child may develop feelings of anxiety and helplessness (Durualp & Altay, 2012). Durualp & Altay found that children between the ages of 6 and 12 with cancer display significantly more depressive symptoms than their healthy peers as well as emotional indicators of impulsivity, mistrust, and anger (Durualp & Altay, 2012).

The determination of psychological health in pediatric cancer patients is defined as the occurrence or absence of distress as well as of positive wellbeing and psychological growth (Lin et al., 2011). The surveying of cancer survivors and their caregivers indicates that psychosocial needs during the course of treatment were inadequate and failed to serve as an integral part of the care provided (Adler & Page, 2008). Complementary therapy is often not the central focus of pediatric cancer care providers in comparison to surgical and pharmaceutical interventions. However, addressing this topic is essential in improving the quality of life of the patient. Furthermore, due to significant advances in medical treatment, more than eighty percent of pediatric cancer patients now survive five years or more (American Cancer Society, 2015). Acknowledging the importance of the psychological health of pediatric cancer patients better prepares them to continue on into adulthood.

The development of a child includes physical, intellectual, social, and emotional changes. When a child is diagnosed with cancer, the normal routine of their life and their healthy progression through the developmental stages is interrupted and compromised. Healthy maturation during the early years of a child's life is critical for appropriate and necessary functioning as an adult. The pediatric population in focus will be children between the ages of 10 and 12. By referencing theoretical components of personality, cognitive, and moral development, developmental tasks required during this period of life can be determined. According to Freud's psychosexual theory, children within this age range are in the latency stage. During the latency stage, energy of the child is devoted into acquisition of knowledge, honing social and communication skills, forming friendships, gaining hobbies, and engaging in play. (Hockenberry & Wilson, 71).

Influenced by Freud, developmental psychologist Erik Erikson maintained that the development of personality proceeded in predetermined psychosocial stages. Each stage had the possibility of two outcomes. Between the ages of 10 and 12, children are involved in the 'industry versus inferiority' stage. This stage marks the time in a child's life when they should have acquired enough skills to become workers and producers. Children are eager to participate in tasks and activities that they can start and finish for a sense of accomplishment and completion (Hockenberry & Wilson, 72). Children learn to be competitive and cooperative with their peers and begin to understand the rules of their environment, mainly their home life and school. Complications arise for the child when they feel a lack of competence and doubt their ability to be successful. The feelings of inadequacy may result from either too high of expectations placed upon them or personal observation of being unable to measure up to their peers (Hockenberry & Wilson, 72).

Statement of Purpose

In order to encourage a more proactive and prioritized response to the psychological health of pediatric cancer patients, a literature review was conducted on the utilization of complementary therapy to help alleviate the adverse psychological effects of pediatric cancer. The studies will be presented in the order of oldest to most current publication date to show the research trajectory of this topic. Complementary therapy encompasses a wide range of heterogeneous treatments including yoga, music therapy, and creative arts that have been shown to reduce the adverse psychological effects associated with cancer and cancer treatment (Lin et al., 2011). By evaluating the efficacy of the different complementary and alternative therapies, oncologists, nurses, social workers, and educators can better provide care with a holistic intention to improve the quality of life of their patients.

The majority of the studies selected for the literature review will be focused on music-based interventions as a form of complementary therapy. Music therapy is defined as the clinical and evidence-based use of musical interventions to help individuals achieve personal goals. The musical interventions remain within a therapeutic relationship between a patient and credentialed professional who has completed an approved music therapy program (American Music Therapy Association, 2016). Music therapy training programs originated during the 1940's in the state of Michigan. After almost ninety years of practice and research, a vast amount of evidence has been discovered supporting the benefits of using music therapy in the clinical and private setting. Music therapy can benefit not only oncology patients, but also individuals with mental health illnesses, developmental and learning disabilities, age-related cognitive decline, substance abuse problems, brain injuries, physical disabilities, and acute or chronic pain (American Music Therapy Association, 2016).

CHAPTER 2

Literature Review Results

Introduction

A literature review was conducted using peer-reviewed publications that aim to assess the efficacy of different forms of complementary therapy to improve distress in pediatric cancer patients. A review of the literature using Google Scholar and PubMed was conducted for the years 2008 through 2016. Due to a limited availability of relevant studies, sources older than 5 years were utilized.

Measurement Instruments

All nine studies within the literature review measured distress through levels of anxiety and pain. In addition to questionnaires developed by the researchers, a numeric pain scale, Wong–Baker FACES Pain Rating Scale and State-Trait Anxiety Inventory were used as well. The Wong–Baker FACES tool was created through the conjoined efforts of a pediatric nurse consultant, child life specialist, and pediatric patients to help children ages three and older effectively communicate their pain. The tool uses a series of 6 faces each depicting a different expression. Each face is assigned a number of 0, 2, 4, 6, 8, or 10 with descriptions ranging from 0 being ‘no hurt’ accompanied by a smiling face, to 10 being ‘hurts worst’ with a face in tears (Wong-Baker FACES Foundation, 2016). The State-Trait Anxiety Inventory (STAI) is used in clinical settings to diagnose anxiety and to differentiate the presenting symptoms from syndromes of depression. It is also used in research as an indicator of distress. The tool contains a total of forty items for assessing trait and state anxiety. State anxiety items include: “I am tense; I am worried” and “I feel calm; I feel secure.” Trait anxiety items include: “I worry too much over something that really doesn’t matter” and “I am content; I am a steady person.” The

items are scored on a 1-4 point scale (“Almost Never” to “Almost Always”). A higher score received indicates a higher level of anxiety is present. The STAI is appropriate for individuals with at least a sixth-grade level of reading (American Psychological Association, 2016).

Music Therapy

Impact of Music on Pediatric Oncology Outpatients

Music created for the improvement of heart rate variability (HRV) and to increase vitality has been used to alleviate distress in hospitalized patients. Heart rate variability is the variability of the cardiac interbeat interval, which is a sensitive measure of autonomic balance. Studies have shown that improving heart rate variability signifies an increase in parasympathetic activity and relaxation. In the Kemper et al. (2008) prospective cohort study, patients with leukemia from the pediatric oncology unit at a hospital in Wisconsin were recruited to assess the effects of music on the patient’s overall wellbeing. The average age of the patients was nine and forty percent of the study population was male. During one routine clinic visit, the patients underwent usual care, then were asked to sit in a quiet room and relax for twenty minutes. During the second routine visit, usual care was performed, and the patients were asked to sit in the quiet room while listening to music for twenty minutes. The patients were asked to complete visual analog scales (VAS) before and after each session. The VAS assessed three positive and three negative states. Relaxation, well-being, and vitality or energy (scored from 0-10, with 10 being best) were the positive states measured. Anxiety, stress, and depression (scored from 0-10 with 10 being the worst) were the negative states measured. The music selected for the intervention was Doc Children’s HeartZones compact disk. This music was chosen because studies have shown its enhancement of vitality sense, stress reduction, and HRV improvement.

Of the 47 patients who completed the VAS, the score for relaxation fell (less relaxed)

with rest and rose (more relaxed) with the music intervention. This reflects that listening to music promoted greater relaxation in the patients. The other five VAS parameters were similar between the rest and music routine visits. Thirty-four of the 47 patients who completed the VAS also completed a measurement of HRV. Opposing the researcher's expected finding, the HRV parasympathetic parameter was significantly lower with the musical intervention than rest. The researchers discussed that perhaps being asked to stay and listen to unfamiliar music after usual care was upsetting to some of the children.

The researchers acknowledged that their study might be weakened by the type of VAS used. Shortened versions of the VAS was used, however research has shown that longer questionnaires provide more reliable results when assessing pain and quality of life in pediatric patients. Furthermore, because the age range was wide, the researchers opted to gather data from the patients using a parent proxy. This could alter the subjective data collected in the study and acts as another limitation.

Music Therapy to Reduce Pain and Anxiety in Children With Cancer Undergoing Lumbar Puncture: A Randomized Clinical Trial

The Nguyen et al. (2010) study aimed to find if music therapy was effective in reducing pain and anxiety in pediatric cancer patients undergoing a lumbar puncture. A lumbar puncture is a medical diagnostic test involving the insertion of a needle in the patient's lower back to collect cerebrospinal fluid (Mayo Clinic, 2014). The randomized clinical trial included 40 children aged 7-12 years with leukemia from the Oncology Ward at NHP, Hanoi. Twenty of the participants were randomly assigned to an experimental group where they would wear earphones with music playing during the procedure, and the other 20 were assigned to a control group wearing

earphones without music playing. The participants began listening to music 10 minutes prior to the procedure.

The primary assessment was pain and the secondary assessment was heart rate, blood pressure, respiratory rate, and oxygen saturation. All factors were measured before, during, and after the lumbar puncture procedure. Anxiety scores were also collected before and after the procedure. The self-report instruments used were the Numeric Rating Scale for pain, and the validated Spielberger State-Trait Anxiety Inventory (STAI) for anxiety. Interviews consisting of open-ended questions were conducted with 20 of the participants post-procedure (10 from the experimental group and 10 from the control group).

The pain and anxiety scores both during and after the procedures were significantly lower for the experimental music group than for the control group. The study also found statistically significant differences in decreasing heart rate and respiration rate during and after the procedure in the music group compared with the control group. The results did not demonstrate any changes in oxygen saturation levels or blood pressure. The findings from the interview portion of the study were analyzed and indicated that the majority of participants had a positive experience and expressed less fear in the music group, and the majority of those in the control group wanted to try the music intervention.

This study is particularly strong because of the multiple factors the researchers measured. The researchers were able to gather quantitative data in the form of self-reported pain and anxiety along with measureable physiological responses. This, in conjunction with a qualitative description of the patient experience strengthens the study. Furthermore, the absence of local anesthetics used avoided the variable of varying affects that analgesics can have on individuals. A limitation within the study would be a cultural factor that could potentially impact the

willingness to express and the degree of expression of pain and anxiety. Therefore, the study should be conducted in patients of various cultures as well.

Music Therapy CD creation for Initial Pediatric Radiation Therapy: A Mixed Method Analysis

A mixed-method research design was used to determine the effects of music therapy CD creation for pediatric cancer patients receiving their first radiation therapy treatment. The intervention was used to evaluate whether it had an impact on the participants distress and coping. The Barry et al. (2010) study recruited 11 participants between the ages of 6 to 13 at the Peter MacCallum Cancer Center. Five participants engaged in the creation of original music in the outpatient clinic waiting area, while six patients would receive standard care. The music therapy CD (MTCD) creation experimental group created music for 10 to 90 minutes using a Sony computer-based software program. The music was then placed onto a CD to be played during the radiation treatment. The day after the participants underwent radiation therapy, the researchers conducted an audio-recorded interview using the Kidcope measurement tool to assess for coping strategies and behavior. Participants were also asked open-ended questions by the interviewers. The researchers created questionnaires that were distributed to the parents and radiation therapy staff to assess their perceived distress and coping of the child participant.

The Kidcope scores were analyzed quantitatively while the open-ended questions and questionnaires were thematically evaluated. The results showed that the Kidcope scores did not indicate any significant differences in distress between the control and MTCD group. However, the summarized global analysis of the qualitative data showed that the MTCD group felt empowered, relieved, and better distracted during the radiation therapy. The control group expressed neutral responses.

The study was strengthened and enhanced by a mixed-method design, and assessing the thoughts of not only the pediatric patients, but also the parents and hospital staff. However, the study could benefit from a larger sample size and narrower range of time that participants participated in music making as to not have this act as an influencing variable. Furthermore, the researchers could have manipulated the design to determine if it was the experience of creating original music and hearing it during the treatment that was beneficial. The current results do not show if listening to any popular music would elicit the same effects.

Music's relevance for pediatric cancer patients: a constructivist and mosaic research approach

The O'Callaghan, Barry, Wheeler, & Grocke (2011) study used a constructivist approach with a grounded theory design to conduct interviews with participants to explore the role, impact, and effect of music in pediatric cancer patients. A mosaic multi-method way of collecting data was used as to analyze not only the perspective of the children, but the parents as well (O'Callaghan et al., 2011).

Participants were recruited in Melbourne, Victoria through a Pediatric Integrated Cancer Service (PICS), which is a three-hospital partnership dedicated to providing care near the children's homes. The sample included 26 pediatric patients aged 4-8 and 28 parents. The initial recruitment strategy was to use poster advertisements, and as the research progressed, personal invitations were issued in waiting rooms. Participants were interviewed in the inpatient and outpatient areas of the hospital either individually or with their parents, according to availability and participant preference. The interviews were audio-recorded. Child participants were asked questions about "music preferences, where and when they listened and their reactions to music; who they listened with; whether they used music the same or differently since visiting hospital;

thoughts about music therapy; and music-based recommendations for pediatric supportive cancer” (O’Callaghan et al., 2011). Parents were asked questions about their child’s music behavior and factors that affected their child’s music usage.

Researchers concluded the sampling when the data saturation was reached. Then, the researchers organized the transcribed interviews into 751 codes, 11 categories, and four themes. The themes found encompassed ideas that children’s cancer experiences could be helped by musical interactions, and that parents are grateful for music therapy and recommend more musical sound in the hospital environment.

The narrow age range, and the ratio of female to male child participants limited the research as 19 were male and only seven were female. Furthermore, by not controlling the interviews to be child only, the present of a parent could influence the responses the children gave during the interview. Furthermore, the interviewer used was a music therapist that the participants were familiar with. The familiarity could create a bias towards more positive responses. The recruitment method also posed as a limitation because the participants who would choose to volunteer could do so because they already have a positive affinity for music. This would produce an overall trend of music appreciation that may not be widespread. The study was strengthened by the use of a qualitative method versus administering scaled surveys to appraise the impact of music, as the musical experience requires a more personal and descriptive form of expression.

Impact of Music Therapy Interventions (Listening, Composition, Orff-Based) on the Physiological and Psychosocial Behaviors of Hospitalized Children: A Feasibility Study

The Colwell, Edwards, Hernandez, & Brees (2013) study strived to compare three music interventions and their physiological and psychological effect on hospitalized children. Thirty-

two patients (17 females and 15 males) from the pediatric unit of a large mid-western hospital participated in the study after being recruited by the nursing staff. The age of the patients range from 6 to 17 and were frequently hospitalized with conditions such as cancer, sickle cell disease, and respiratory infections.

The first music intervention consisted of nine participants listening to music that they could choose from a collection for 45 minutes. The music genres included: Children's, Hip-Hop, New Age, Rock, Male Pop, and Female Pop. The second intervention included 13 participants who were taught how to compose music using a computer program and were instructed to produce music that reflected them. The third and final intervention utilized Orff-based music therapy. Orff-based music therapy refers to active involvement in making music by using creative speech, singing, movement and instrument playing. Ten participants engaged in Orff-based music therapy.

Before and after the music interventions, a pediatric nurse recorded the patients' heart rate, blood pressure, and oxygen saturation. Additionally, the principal investigator and co-therapists recorded two additional measures: one physiological, the Wong-Baker FACES Pain Rating Scale and one psychosocial, the State-Trait Anxiety Inventory for Children (STAIC).

Results of the study showed that although all interventions decreased the level of pain, it appeared that patients who listened to music had the greatest reduction. Patients who composed music and engaged in Orff-based music therapy showed a decrease in anxiety with those in Orff-based having the greatest decrease. No significant changes in physiological measures were found in any of the three interventions.

Using the researchers to administer the measuring tools acts as a limitation of the study as their behavior and explanations could create a bias within the study. Furthermore, because the

interventions were extensive in their use of personnel, equipment and time, the number of participants is also a limitation and the researchers addressed this.

Various Complementary Therapies

Peaceful Play Yoga: Serenity and Balance for Children With Cancer and Their Parents

The Thygeson et al. (2010) preliminary study included not only the pediatric cancer patients, but their parents as well to participate in a yoga session as a complementary intervention for psychological benefits. Research has shown that yoga acts as a stress management technique by promoting relaxation, reducing anxiety, and improving sleep patterns (Thygeson et al., 2010). The participants included a convenience sample of 11 children between the ages of 6 and 12, five adolescents between the ages of 13 and 18, and 33 parents. The three cohorts were recruited from two inpatient hematology/oncology units at Children's Hospitals and Clinics of Minnesota. The study implemented a mixed-methods, within-subject, repeated-measures design. The researchers aimed to determine if anxiety and general wellbeing would be affected by the yoga intervention. The two variables were measured immediately before and after an inpatient, standardized 45-minute yoga class using the Spielberger State Trait Anxiety Inventory (STAI). The inventory comprises of a report scale used to measure state anxiety, or how the individual is feeling "right now" (Thygeson et al., 2010).

The yoga class was held in the in-patient playroom and taught by one of the researchers of the study who is a registered yoga instructor. Dimmed lighting and relaxing instrumental music was used as the instructor led the class through a curriculum consisting of safe and easily performed active and restorative yoga poses. The core concepts within the yoga curriculum were developed using consultations from hematology/oncology physical therapists, child life specialists, and outside yoga instructors with experience in teaching the oncology population. In

addition to the STAI, post-intervention participants were asked: “What would you tell another parent or child about what it is like to take a yoga class” (Thygeson et al., 2010)? The responses were analyzed qualitatively for the identification of themes agreed upon by the researchers. Relaxation, self-care, and stress relief were all prominent themes identified throughout all cohorts.

The results of the study show that the child cohort reported no change in their level of anxiety or sense of wellbeing. The adolescents and parents, however, experienced a significant decrease from pre-class to post-class levels of anxiety and an improved sense of wellbeing. Although the pilot study already poses strength in providing both qualitative and quantitative data, it failed to acknowledge how long the psychological benefits were sustained by the participants. The researchers themselves addressed this weakness. Furthermore, the study was weakened by using one of the researchers of the study to instruct the yoga class, as this poses a risk for bias.

Creative Arts Therapy Improves Quality of Life for Pediatric Brain Tumor Patients

Receiving Outpatient Chemotherapy

The Madden et al. (2010) mixed methods pilot study was designed to evaluate the effects of creative arts therapy (CAT) on the quality of life (QOL) of pediatric cancer patients receiving chemotherapy. CAT includes dance, music, and art activities focused on personal expression through body movement, sound, and graphics (Madden et al., 2010). The first part of the study included 16 patients between the ages of 2 to 13 from an outpatient oncology clinic at a 250-bed tertiary care, university affiliated, pediatric hospital. The PedsQL 4.0 Cancer Module, an instrument used to assess 8 subscales (pain and hurt, nausea, procedural anxiety, treatment anxiety, worry, cognitive problems, perceived physical appearance, and communication), was

used (Madden et al., 2010). The participants were either randomized into a control group that received the attention of a trained volunteer, or an experimental group that engaged in CAT. Each group was tested before, during, and after the intervention using the PedsQL 4.0 Cancer Module. The control group interacted with the volunteer through reading, conversing, or watching television. The experimental group participants engaged in three 1-hour weekly sessions of CAT for two weeks. This portion of the study showed a statistically significant improvement in reports of pain and nausea while thinking about medical treatment.

The second phase of the study was nonrandomized and descriptive including 32 participants between the ages of 3 to 21. The CAT therapist provided 1-hour group sessions for hematology, oncology, and bone marrow transplant patients each week. The Faces Scale and the Emotional Reactions Checklist were used to assess the emotional status of participants before and after the CAT group intervention. The Emotional Reactions Checklist is a form that asked the subjects to rate different emotions they felt on a 4-point scale (Madden et al., 2010). The results from the second phase show a statistically significant improvement in mood, increased feelings of excitement and happiness, and less feelings of nervousness.

Being that portions of the PedsQL 4.0 Cancer Module is a parent-proxy report instrument, it has poor reliability in determining changes in mood or pain experienced by the pediatric patients. The researchers also acknowledged that they were limited by a small sample size and trying to find statistical significance in a medium such as artistic expression. This is due to conflicting concepts within a “gold-standard” science and art, and the researchers suggested that future studies should be done with a qualitative design.

Health-related quality of life changes of children and adolescents with chronic disease after participation in therapeutic recreation camping program

The Békési, Torok, Kokonyei, Bokretas, Szentes, & Telepoczki (2011) study conducted a repeated within-subject measures short-term follow-up research design to determine the health-related quality of life (HRQoL) changes of children and adolescents with chronic illnesses who attended a therapeutic recreation camping program. Of the 115 participants who attended the camp, 32 of them were oncology patients between the ages of 10 and 18. The participants attended the Bátor Tábör camp in the countryside of Hungary for 8 days. During the camp session they were able to do activities including archery, horseback riding, boating, arts and crafts, team games, and other sports.

The Hungarian version of Kidscreen-52 questionnaire was used to assess the HRQoL of the campers. The questionnaire 10 subscales include assessment of psychological wellbeing and moods and emotions (Békési et al., 2011). The questionnaires were mailed to the homes of the participants 8 weeks before and after the camp session. The results showed that the program had a positive impact on the HRQoL of children and adolescents living with cancer, diabetes and juvenile immune arthritis. The areas of self-perception of children less than 14 years of age was especially enhanced.

The study results were limited by the amount of time that passed when the questionnaires were mailed to the participants. The amount of time that passed is problematic because a different experience or event could be the reason behind the positive impact on HRQoL. The study would benefit from administering a questionnaire immediately at the conclusion of the camp, and then after a break period to see if the positive effect had sustained.

The effectiveness of therapeutic play, using virtual reality computer games, in promoting the psychological well-being of children hospitalised with cancer

A total of 122 children between the ages of 8 and 16 admitted to the pediatric oncology unit of a large acute-care hospital in Hong Kong participated in a study that focused on the effectiveness of virtual reality computer games in improving psychological health. Of the 122 child participants, 52 formed the experimental group, and 70 were placed in the control group.

The Li, Chung, & Ho (2011) study consisted of two separate phases. In the first phase, all participants admitted to the oncology ward received usual care and acted as the control group. After data collection for the control group was complete, there was a one-month break before data collection began for the second phase. Thereafter, in addition to their usual care, all participants admitted to the oncology unit in Phase two received 30 minutes of therapeutic play using virtual reality computer games five times a week. A PlayMotion system was installed in a pediatric oncology playroom to create an interactive, virtual environment using the playroom walls, floor, and ceiling. The video game system does not require the use of any devices, but relies on the shadows of moving arms to experience different activities like flying over a city or playing volleyball. (Li et al., 2011).

In order to evaluate the effects of the virtual reality computer games, baseline state anxiety scores and depressive symptoms of children were assessed on admission for both the control and experimental group. The state anxiety level of children was measured using the short form of the Chinese Version of the State Anxiety Scale for Children (CSAS-C). The level of depression in the participants was assessed using the Center for Epidemiologic Studies Depression Scale for Children (CES-DC). The state anxiety level and depressive symptoms of participants were assessed again seven days after admission. The Li et al. study results did not

find differences in anxiety scores between the two groups on day 7. However, the study showed that children in the experimental group had statistically significant fewer depressive symptoms in comparison to the control group on day seven.

The strengths within the Li et al. study include the high level of homogeneity of variance between the control group and experimental group. Both groups were similar in age and gender, medical diagnosis, baseline state anxiety scores and depressive symptoms. The researchers were able to eliminate the experimenter bias effect by utilizing different research nurses for data collection and administering the interventions. The assessment tools of the study are also a strength of the study as empirical evidence has shown that both the CSAS-C and CES-DC tests have adequate internal consistency reliability, good concurrent validity and excellent construct validity (Li et al., 2011). However, the study would benefit from increasing the number of measurements done within a longer period of time to demonstrate consistency of results. An additional weakness would be that all participants were Chinese and admitted to one hospital, indicating a poor focus on demonstrating wide applicability. The study was also limited by the failure to describe what usual care was already being implemented that could have a potential psychological effect.

Summary

The literature review consistently demonstrates that the use of complementary therapy is effective in improving the psychological health and quality of life of pediatric cancer patients. The interventions are recreational and creative outlets that can provide benefits including pain reduction, lowering distress and anxiety, improving wellbeing, and acting as a distraction tool for coping. Most of the participants were also receptive of the intervention methods. Practitioners, nurses, social workers can implement the therapeutic activities to promote holistic care during

the healing process. However, the cost behind the complementary therapy and availability of resources and staff may present a barrier in offering the activities. The increase in child cancer diagnoses, but increased survival rate, indicates that appraising complementary therapies for this patient population is critical for a healthy psychosocial development throughout the lifespan.

While the complementary therapies have great potential in improving the quality of life of pediatric patients, further studies should be initiated to gain a better understanding in this area. The studies collectively failed to show if the improvements in psychological health were sustained. This focus of study requires further research in order to determine which specific complementary intervention is most beneficial in comparison to one another. For example, the studies showed that yoga and virtual realities were effective, but it is unknown which activity yielded better results. The efficacy of each therapy could also be determined by gender, age group, and race/ethnicity. Furthermore, studying the difference in effect based on the severity of treatment and diagnosis could show if and what manipulations would need to be made due to these variables.

Table 1. Summary of Findings From Literature Review on the Efficacy of Complementary Therapy in Improving Psychological Health and Quality of Life in Pediatric Cancer Patients

Author(s) and Date	Questions, Variables, Objectives, and Hypothesis	Design, Sample, and Setting	Findings	Notes
Kemper et al., 2008	Assess the effects of music that improves heart rate variability on the overall wellbeing of pediatric oncology patients	Prospective cohort study 63 patients between the ages of 1 and 17 Wisconsin, USA	Score for relaxation fell (less relaxed) with rest and rose (more relaxed) with the music intervention. Other five VAS parameters were similar between the rest and music routine visits. HRV parasympathetic parameter was significantly lower with the musical intervention than rest	Heart rate variability is the variability of the cardiac interbeat interval, which is a sensitive measure of autonomic balance. The music selected for the intervention was Doc Children’s HeartZones compact disk.
Thygeson et al., 2010	Effect of yoga intervention on anxiety and general wellbeing in pediatric oncology patients	Mixed-methods, within-subject, repeated-measures design Convenience sample of 11 children between the ages of 6 and 12, 5 adolescents between the ages of 13 and 18, and 33 parents Minnesota, USA	Child cohort reported no change in their level of anxiety or sense of wellbeing. Adolescents and parents experienced a significant decrease from pre-class to post-class levels of anxiety and an improved sense of wellbeing.	Spielberger State Trait Anxiety Inventory (STAI) used to measure state anxiety

<p>Madden et al., 2010</p>	<p>Evaluate the effects of creative arts therapy (CAT) on the quality of life (QOL) of pediatric cancer patients receiving chemotherapy</p> <p>Participants either received creative arts therapy or met with a trained volunteer</p>	<p>Mixed methods pilot study</p> <p>Phase 1: 16 patients between the ages of 2 to 13</p> <p>Phase 2: 32 participants between the ages of 3 to 21 USA</p>	<p>CAT experimental group showed a statistically significant improvement in reports of pain and nausea while thinking about medical treatment.</p> <p>Statistically significant improvement in mood, increased feelings of excitement and happiness, and less feelings of nervousness.</p>	<p>The PedsQL 4.0 Cancer Module, Faces Scale and the Emotional Reactions Checklist were used for psychological assessment</p>
<p>Nguyen et al., 2010</p>	<p>Efficacy of music therapy in reducing pain and anxiety in pediatric cancer patients undergoing a lumbar puncture</p> <p>Pain and anxiety measured both with self-report instruments and physiologically</p> <p>Participants wore either earphones with or without music playing.</p>	<p>Randomized clinical trial</p> <p>40 children aged 7-12 years</p> <p>Hanoi, Vietnam</p>	<p>The pain and anxiety scores both during and after the procedures were significantly lower for the experimental music group</p> <p>Statistically significant differences in decreasing heart rate and respiration rate during and after the procedure in the music group compared with the control group.</p> <p>No changes in oxygen saturation levels or blood pressure.</p> <p>Interview findings showed that participants had a positive experience and expressed less fear in the music group, and the majority of those in the control group wanted to</p>	<p>The self-report instruments used were the Numeric Rating Scale for pain, and the 6-validated Spielberger State-Trait Anxiety Inventory (STAI) for anxiety.</p>

			try the music intervention.	
Barry et al., 2010	Efficacy of music therapy CD creation for pediatric cancer patients receiving their first radiation therapy treatment Measured levels of distress	Mixed-method research design (quantitative & qualitative) Questionnaires and open-ended interview questions 11 participants between the ages of 6 to 13 (5 in experimental, 6 in control) Melbourne, Victoria	Kidcope scores did not indicate any significant differences in distress between the control and MTCD group MTCD group felt empowered, relieved, and better distracted during the radiation therapy The control group expressed neutral responses	Questionnaires distributed to the parents and radiation therapy staff
Li et al., 2011	Effectiveness of virtual reality computer games in improving psychological health in pediatric cancer patients Measured anxiety and depressive levels	2-phase, quantitative design 122 children between the ages of 8 and 16 Hong Kong	No differences in anxiety scores between the two groups Children in the experimental group had statistically significant fewer depressive symptoms in comparison to the control group on day 7	High level of homogeneity of variance between the control group and experimental group. CSAS-C and CES-DC tests used
O'Callaghan et al., 2011	Determine the role, impact, and effect of music in pediatric cancer patients	Constructivist approach with a grounded theory design Interviewed participants (qualitative) 26 pediatric patients aged 4-8 and 28 parents Melbourne, Victoria	751 codes, 11 categories, and four themes Themes: children's cancer experiences could be helped by musical interactions, and that parents are grateful for music therapy and recommend more	Participants were interviewed either individually or with their parents Interviewer used was a music

			musical sound in the hospital environment.	therapist that the participants were familiar with (limitation)
Békési et al., 2011	Changes in health-related quality of life (HRQoL) in children with chronic illnesses who attended a therapeutic recreation camping program	Repeated within-subject measures short-term follow-up research design 115 participants, 32 of them were oncology patients between the ages of 10 and 18 Hungary	Results showed that the program had a positive impact on the HRQoL of children and adolescents living with cancer, diabetes and juvenile immune arthritis Self-perception of children less than 14 years of age was especially enhanced	Used Kidscreen-52 questionnaire
Colwell et al., 2013	Compare three music interventions and their physiological and psychological effect on hospitalized children	Pre-test/post-test group design with a matched sample for age and gender. Thirty-two patients (17 females and 15 males) from the pediatric unit aged 6-17 years Kansas, USA	All interventions decreased the level of pain, patients who listened to music had the greatest reduction Patients who composed music and engaged in Orff-based music therapy showed a decrease in anxiety, Orff-based having the greatest decrease. No significant changes in physiological measures were found in any of the three interventions.	Report instruments used were Wong–Baker FACES Pain Rating Scale and the State-Trait Anxiety Inventory for Children Orff-based music therapy refers to active involvement in making music by using creative speech,

				singing, movement and instrument playing.
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CHAPTER 3

Best Practice Protocol

Introduction

The purpose of this thesis is to detail best practice recommendations involving complementary therapy and its role in promoting general wellbeing in pediatric oncology patients. The type of therapy in focus will be music, and the recommendations are compiled utilizing the literature review presented in the previous chapter. While research suggest several other activities including yoga, recreational camping, and creative arts as effective complementary therapies for improving psychological health in pediatric cancer patients, they will not be covered in this chapter. The purpose of narrowing the focus to discuss music therapy is that music therapy has the largest amount of evidence supporting its use compared to the other therapies, and is applicable to the clinical setting.

The musical interventions present in the literature review involved either patients listening to or creating music. Music therapy was chosen because of numerous existing studies that appear to show the ability of music to reduce levels of serum cortisol and also increase levels of serum oxytocin. Common hypotheses as to why music is effective in relieving pain and anxiety is that music can distract the patient's attention away from negative stimuli. Furthermore, it has been proposed that music can modify cognitive states, moods, and emotions or act as a mild sedative to promote relaxation and lower distress (Nguyen et al., 2010).

Evidence-Based Recommendations

Complementary Therapy Intervention (a)

Studies show that listening to music during medical procedures or a hospitalization can be effective in decreasing pain and anxiety scores. A baseline pain and anxiety score will be

established using the numeric rating pain scale, Wong–Baker FACES Pain Rating Scale, and the State-Trait Anxiety Inventory for Children. The same instruments will evaluate for effectiveness of the intervention. Music playing through earphones will be offered to all children who are undergoing painful or stressful medical procedures or who are admitted to the pediatric oncology unit. If the child is unable to wear earphones during the procedure, music will be played on speakers in the procedure room. Different age-appropriate songs from various styles of music will be available to the patients so they can select music that they personally enjoy. If the child does not have a musical preference, music similar to Doc Children’s HeartZones from the Kemper et al. (2008) study will be played. If the child is not undergoing a procedure, a musical therapist will be present for a portion of the music listening experience. The music therapist will engage with the patient by asking the patient why they chose the specific song, what feelings and emotions the song elicits, and how the song relates to the patient. This recommendation is based off of three studies that had pediatric oncology patients between the ages of one and seventeen listen to music either at a scheduled time during their hospitalization or a lumbar puncture procedure. All three studies reported that by listening to music, there was a decrease in the level of pain, and two of the studies reported a decrease in anxiety as well. Furthermore, in one of the studies, listening to music showed the greatest decrease in pain when compared to other types of musical therapy.

Complementary Therapy Intervention (b)

Creating music through the use of computer-based programs can also be effective in decreasing pain and anxiety scores. The program allows patients to create their own original music that can be remixed to vary in structure, tempo, instrumentation, and pitch. This recommendation is based off of the Barry et al. (2010) mixed-methods study which had patients

create their music CDs to be played during their first radiation treatment. The importance of involving music in the patient's hospital experience can be found through the findings of the O'Callaghan et al. (2012) study. The grounded theory designed study found four corresponding themes within their study:

A. Children's cancer experiences can be helped by their own music.
B. Children's cancer experiences can be helped by hospital music therapy and creative programs, which can also vicariously support their families.
C. Children's cancer experiences can be helped by musical interactions within their families, social networks, and electronic (including online) connections.
D. Parents are grateful for music therapy and related care, and recommend more supportive musical and sound hospital environments.

O'Callaghan et al. (2012)

Complementary Therapy Intervention (c)

The Orff-approach is an intervention that was explored in the Colwell et al. (2013) study and will serve as the last recommendation. Developed by Carl Orff, a German composer, and his colleague in the 1920's, this method serves to support music education with speech, drama, and music as to mimic the child's world of play (American Orff-Schulwek Association, 2016). In the Cuhna & Carvalho (2012) study conducted by the University of Aveiro, Portugal, weekly music education of fifty 5th and 6th graders (10-12 years old) was modified to be Orff-based. For the entire academic year, after every music class, the students were asked to complete a questionnaire created by the researchers. The results concluded that the majority of the students experienced positive emotions during all music classes, with over fifty percent of them experiencing the highest level of positivity (e.g. happy, cheerful, satisfied). Only one percent of the students experience a negative emotion during this time (Cuhna & Carvalho, 2012).

The last recommendation will be framed around the Colwell et al. (2013) study that utilized the an Orff-based approach to find that the therapy could decrease pain, anxiety, and was experienced with a high-level of engagement by the participants. During the Orff-based music

therapy, the patients will be asked to focus on their self-identity while participating in specific music activities. Each patient will be asked several questions pertaining to favorite things, future goals, and other self-descriptions. Throughout the session, the patients will play un-pitched and melodic percussion instruments while performing speech chanting and body percussion through the help of a trained musical therapist familiar with the Orff approach. Self-identity is an important concept to explore during the music therapy for the healthy development of the child. Erikson's psychosocial stage of identity versus role confusion occurs between the ages of 12 to 18. Many pediatric oncology patients will be or are currently in this stage. Frequent hospitalizations and a diagnosis of cancer may impair the child's ability to develop a sense of self. Encouraging Orff-based music therapy with a focus on self-identity can decrease the pain and anxiety that the patient feels while supporting the establishment of their role in society.

Summary

Different forms of music therapy can improve the wellbeing and psychological health of hospitalized pediatric oncology patients, and thus should be made available in the clinical setting (Barry et al. (2010); Colwell et al. (2013); Kemper et al. (2008), Nguyen et al. (2010); O'Callagh et al. (2011)). The suggested interventions for the best practice recommendations for pediatric oncology patient are based on the previously reviewed studies. Details on how the interventions can be implemented and evaluation of their efficacy will be discussed in the following chapter.

CHAPTER 4

Implementation and Evaluation

The first portion of this section will focus on implementing music therapy for pediatric oncology patients within the clinical setting. Diffusion of Innovations is the theory that will be used as the framework for implementation. The theory was set forth by communication specialist Everett Rogers who sought to explain how and why novel ideas spread through a social community. The model is utilized often within the clinical setting as a guide to introduce evidence-based practice. Knowledge, persuasion, decisions, and implementation are the first four stages of the theory, with evaluation acting as the last (Rogers, 2003). In the second portion of this section, evaluation methods on how effective the intervention is after its implementation will be discussed.

Implementation

Knowledge

The knowledge phase of Roger's Diffusion of Innovations Theory involves understanding the innovation and how it functions (Rogers, 2003). Because a music therapist will execute the intervention, furthering the knowledge within other healthcare professionals will not need to be extensive. Posters advertising the music therapy interventions can be placed in frequently used settings like waiting rooms, hallway bulletin boards, bathrooms, break rooms, and workstations. RN educators would need to become familiar with how evidence has shown that music therapy is beneficial, and then advise nurses to offer the intervention to pediatric patients and to announce when music therapy sessions would occur to patients and their families.

Before the implementation of music therapy can occur, it must be ensured that the healthcare facility has written policies and procedures that permit the use of music during

medical procedures and to allocate appropriate funding for music therapy in the clinical setting. Should no such policy exist or if financial needs require examination, an interdisciplinary task force composed of various personnel should meet for appropriate development. It is critical to educate the group on the benefits of music therapy and why implementation would promote positive outcomes for the pediatric cancer patients.

Persuasion

During the persuasion stage, the social setting will form either a positive or negative attitude toward the innovation and will determine whether or not the intervention is accepted. The formed attitude is dependent upon the knowledge that is gained in the previous step. A contributing factor in the formation of a positive or negative attitude towards an innovation relies on the degree of uncertainty regarding the innovation's worth. Thus, it is essential that the benefits of music therapy are extensively outlined, and examining successes of other hospitals with similar programs can be helpful. The target audience for persuasion would be the stakeholders of the hospital. Stakeholders in healthcare are providers, payers, employers, and patients (Duke University School of Medicine, 2016). It is important to highlight that increasing patient satisfaction by focusing on holistic care supports better hospital ratings, patient return rates, and increased revenue.

Decisions

The adoption or rejection of the proposed intervention occurs during the decision phase. The task force would need to produce a cost analysis and estimate required resources for music therapy. Based on this information, the stakeholders will need to decide whether the intervention is worth the cost. Adoption of an intervention occurs more rapidly and efficiently with the initial use of a trial phase. Hiring a temporary licensed musical therapist to hold music therapy sessions

could assist in persuading the stakeholders to adopt the intervention. After each session, feedback from the participants would be gathered to present to the stakeholders, allowing them to witness the intervention in action and the impact it carries.

Implementation

Should the decision to adopt the intervention occurs, steps to implement music therapy would follow. Hiring a licensed musical therapist is required for the implementation of each intervention previously discussed. For complementary therapy intervention (a), the music therapist will be required to select age-appropriate music from an array of genres. Music playing platforms including iTunes, Spotify, YouTube, or Pandora can be used. After the creation of a music library, pre-operative nurses can begin presenting the option of listening to music to the pediatric patients before their medical procedures.

Complementary therapy intervention (b) requires for the selection of computer-based music creation program by the music therapist. FlexiMusic Kids Composer is a music creating-composing software program that helps teach children the basics of music-making and recording. The software has 200 instrument sounds, including drums, keyboards, guitars, horns, percussion, and sound effects. It also allows for the inclusion of personal vocals to be added. The musical therapist will need to become familiarized with the software before introducing the intervention to pediatric patients. Every day during an afternoon period the musical therapist will be available in the playroom with laptops that have the program downloaded to allow for the patients to use. The patients will have the option of saving their music creations to be played for personal use or during medical procedures.

Lastly, complementary intervention therapy (c) requires for the music therapist to be familiar with the Orff-approach and to develop activity plans using the approach as a guide.

All three interventions will be made available to the pediatric patients regardless of age as long as the child can engage safely, and with the permission of their parent or guardian. However, for the purpose of evaluation, only children between the ages of 10 to 12 years will be surveyed to determine the efficacy of the interventions. The interventions will be implemented throughout the duration of the hospitalization.

Evaluation

Confirmation

The last area to be discussed will be the evaluation of placing the evidence-based intervention into practice. The evaluation process of the Theory of Diffusion of Innovation is referred to as the confirmation stage, and it is applied to determine whether or not the intervention was effective and should continue to be implemented (Rogers, 2003).

To evaluate the efficacy of implementing music therapy within pediatric oncology clinical settings would require the development of a survey to be completed by music therapy participants. The survey would collect both qualitative and quantitative data for evaluation.

The survey will consist of the Spielberger State Trait Anxiety Inventory (STAI) and the Emotional Reactions Checklist. The STAI measures state anxiety, while the Emotional Reactions Checklist assesses emotional status. The Colwell et al., (2013), Madden et al., (2010), Nguyen et al., (2010), and Thygeson et al., (2010) studies mentioned in the literature review utilized these tools in their research. Additionally, a series of free-response questions will be developed for further assessment of the effects of the music therapy. The questions composed below will mirror topics that were discussed in the PedsQL 4.0 Cancer Module, an instrument used in the Madden et al., (2010) study.

- | |
|---|
| 1. Do you feel procedural or treatment anxiety and why? |
| 2. How do you feel about your physical appearance since you have been in the hospital |
| 3. Are you worried about being in the hospital and how would you describe your worry? |

Participants of the Orff-based music therapy as well as pediatric patients who use the FlexiMusic Kids Composer computer program will be asked to complete the survey before the introduction of either intervention. After three sessions of either the Orff-based music therapy or using the computer program, the participants will be asked to complete the same survey again. The survey results will be analyzed for an improvement in STAI scores and Emotional Reactions Checklist responses. Furthermore, frequent themes within the free-response answers will be gathered and evaluated to infer whether the interventions are benefitting the participants. An additional question will be added to this survey asking whether participating in the music therapy activities improved the participants' hospital stay and overall sense of wellbeing.

To determine whether or not listening to music during medical procedures is effective in alleviating pain and anxiety, the participants will be asked the same question stated above. In addition to this question, participants will be asked to reflect on previous medical procedures they have experienced and perform a compare-contrast worksheet on the influence that music had on their perceived anxiety and pain¹.

Strengths/Limitations and Recommendations for Future Research

The strengths of this best practice protocol include the completion of a thorough literature review and an evidence-based intervention that can be applied to a wide demographic beyond what was discussed in this thesis. The large number of children being diagnosed with cancer every day indicated a need for an intervention to address the psychological issues that may arise with the given diagnosis during adolescence. The thesis found many current studies on the

¹ See Appendix A

impact of music therapy for hospitalized pediatric oncology patients. Evaluating music therapy as an intervention is beneficial in that it is generalizable to not only children, but adults as well. Benefits are also not limited to gender or cultural background. Music therapy acknowledges the psychosocial needs of pediatric oncology patients while increasing quality of life and wellbeing. The protocol can be implemented with few difficulties, as finding ways to play music or install music programs is both economical and easily executed.

The protocol is limited in that it fails to address any repercussions with associating music and a stressful time period. Staff and family should be made aware that music associated with medical procedures may be uncomfortable to listen to later on in life. This limitation inspires a recommendation that future research should be devoted to this focus.

An additional recommendation for future research includes addressing whether the positive benefits of music therapy increases or decreases with age, and at what age range does the benefits seem to be experienced most effectively.

Summary

The purpose of this thesis was to conduct a literature review focused on the efficacy of complementary therapy for the support of wellbeing and quality of life in pediatric oncology patients. Focusing on this area within healthcare is critical due to the number of children who are diagnosed with cancer every day, and the ramifications of the diagnosis on their current and future emotional and mental health or development. The thoroughly completed review supported best-practice recommendations involving various forms of music therapy to improve psychological outcomes in pediatric oncology patients.

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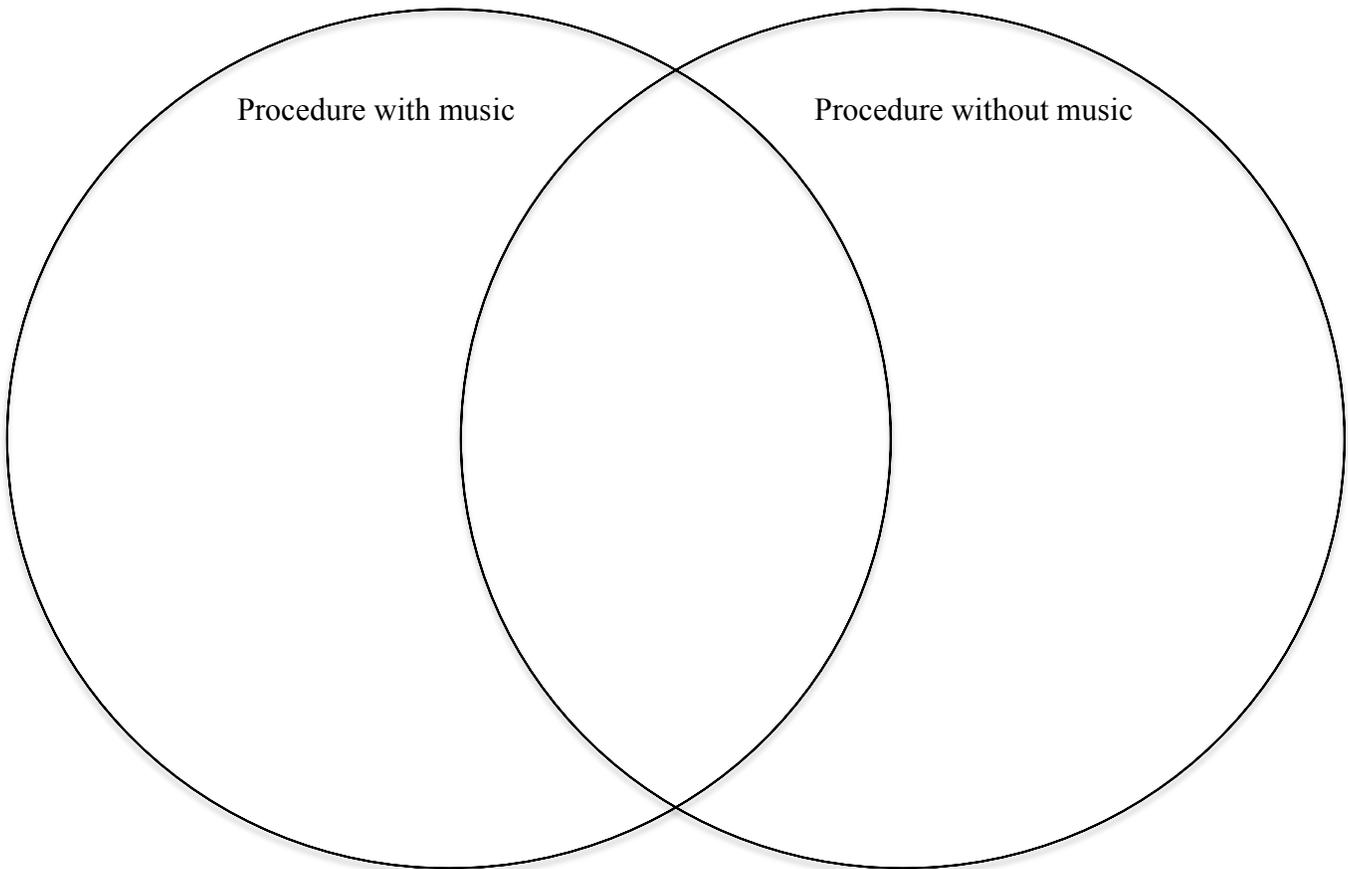
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Appendix A

Directions: Place the words in the box into the part of the circle for how you feel about ‘Procedures with music’ or ‘Procedures without music’. Place the word in the shared part of the two circles if the word applies to both. Then, answer the question at the bottom of the worksheet. All words do not have to be used.

I feel more pain I feel less pain I feel more anxious I feel less anxious Scary



Additional Questions:

1. Did participating in the music therapy activities improve your hospital stay and overall sense of happiness or comfort?
 - a. If yes, why?
 - b. If no, why not?