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Is Music Therapy Effective In Improving Emotional Health In Pediatric Cancer Patients

Elizabeth F. Matesa PA-S2

A SELECTIVE EVIDENCE BASED MEDICINE REVIEW

In Partial Fulfillment of the Requirements For

The Degree of Master of Science

In

Health Sciences-Physician Assistant

Department of Physician Assistant Studies
Philadelphia College of Osteopathic Medicine
Philadelphia, Pennsylvania

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ABSTRACT

OBJECTIVE: The objective of this evidence based medicine review is to determine whether music therapy is effective in improving emotional health in pediatric cancer patients.

Study Design: Two randomized controlled trials and a prospective cohort study were reviewed and selected based on their relevance to the clinical question and their inclusion of patient oriented outcomes (POEMS).

Data Sources: Each study was obtained by searching PubMed database.

Outcomes Measured: The outcomes measured included pain scores measured using a NRS pain scoring scale, anxiety scores were measured using the Spielberger State-Trait Anxiety Inventory (STAI) and visual analog score (VAS). Objective measurement of coping behaviors that included facial affect were measured using a behavior coding form from Skinner and Wellborn’s Motivation Theory of Coping.

Results: The results of the Nguyen et al. study showed that there was a change in the mean anxiety scores before the lumbar puncture and after the procedure in the music group of 8.1, which is significantly lower than the control group (no music) of 13.0. The Robb et al. study demonstrated there was a significant difference between ML and ASB group with a p-value of p=.0413. The cohort study results reported a change in mean anxiety scores for the music group was -0.3 and the control was -0.2 with a p-value of p=.54 which is not statistically significant.

Conclusions: The results of the three studies demonstrated that it is inconclusive whether or not music therapy is effective in improving emotional health in pediatric cancer patients.

Key words: Music therapy, pediatric cancer
INTRODUCTION

People with cancer face a myriad of difficulties that begin from experiencing an unknown cause of symptoms to the diagnosis of cancer through to treatment. Children with cancer experience significant stress through this process, and can have lasting effects as they grow and progress out of childhood. Coping with this stress is an important factor in the lasting emotional health of pediatric cancer patients. One of the most influential elements causing this stress is the pain pediatric cancer patients will undoubtedly experience. Untreated or undertreated pain can lead to unhealthy changes in behavior, self-concept, fear, anxiety and depression in children. This paper evaluates two randomized controlled trials (RCTs) and one prospective cohort study comparing the efficacy of music therapy on the emotional health of pediatric cancer patients.

Cancer is the most common cause of death by disease in children in the U.S.A. The National Cancer Institute states that approximately 12,400 children under the age of twenty are diagnosed with cancer each year. Therefore the pediatric cancer population is growing and with each new diagnosis is another child faced with the difficulties that accompany that diagnosis such as pain. Cancer treatment often involves an extensive amount of pain producing procedures. Pain as a result of medical procedures can be viewed as one of the worst experiences in children with cancer. In addition, according to a survey conducted by the American Childhood Cancer Organization three out of ten families reported spending up to ten thousand dollars out of pocket on additional medical expenses. This demonstrates the need for a more cost effective adjunctive method in treating children with cancer such as music therapy. Music listening is one non-pharmacological approach to relieve pain and anxiety in children. Children with cancer
typically undergo several pain producing procedures that vary according to type, location, size and other factors of the cancer itself. Some treatment options include: chemotherapy, radiation, surgical procedures, lumbar punctures, and bone marrow aspirations to name a few. Frequent pharmacological pain management includes the use of narcotics such as Dilaudid, Fentanyl, Methadone or oxycodone, which include their own set of deleterious side effects. Music therapy as an adjunctive and non-pharmacological treatment can offer beneficial physiologic and psychological effects for pediatric cancer patients.

OBJECTIVE

The objective of this evidence based medicine review is to determine whether music therapy is effective in improving emotional health in pediatric cancer patients.

METHODS

The studies that are included in this review consist of two randomized controlled trials (RCTs) and one prospective cohort study. The population studied consists of male and female patients aged 1-18 years old with known diagnosis of cancer requiring medical treatment. The intervention used was adjunctive music therapy. More specifically Nguyen et al. intervention consisted of pediatric patients listening to music in headphones ten minutes prior to lumbar puncture and during the procedure itself compared to a non-music therapy group that had no music in their headphones. The cohort study used 20 minutes of music listening during oncology outpatient visits compared to a group resting for 20 minutes. Lastly, the Robb et al. RCT used active music engagement activities including a greeting song; action songs (using puppets and props) and illustrative songs that
incorporated story books\textsuperscript{1}. This group was compared to a music listening group as well as an audiobook group. The outcome measured is the emotional health of the pediatric patients after receiving music therapy measured through components of pain scale, anxiety, and positive facial affect of the patients.

The key words used in searches are “music therapy” and “pediatric cancer”. All of the RCT articles reviewed in this paper were published in English in peer-reviewed journals. I, the author of this systematic review, conducted all of the research using Pubmed database. Each article was selected based on their significant to my clinical question and on the basis that they had patient oriented outcomes (POEMS).

Inclusion criteria included articles that were randomized, controlled, trials blinded and/or cohorts published after 2007 consisting of patients aged 1 to 18 who were diagnosed with cancer. Exclusion criteria consisted of patients over 18 years old, articles with diseased oriented outcomes (DOE), or articles published before 2007. Summary statistics were reported by p-value, x test, ANCOVA, and confidence interval (CI).

**OUTCOMES MEASURED**

Outcomes measured include pain scores, anxiety, relaxation, depression and positive facial affect of the patients. Pain scores were measured on the Numeric Rating Scale (NRS) and anxiety scores were measured using the Spielberger State-Trait Anxiety Inventory (STAI)\textsuperscript{2}. Objective measurement of coping behaviors that included facial affect, active engagement and initiation were measured using a behavior coding form from Skinner and Wellborn’s Motivation Theory of Coping\textsuperscript{1}. Sessions were videotaped to facilitate collection of behavioral data with five minutes of pre-therapy taping to develop a
baseline condition and compare the participants post session video to pre session taping. Finally, children’s anxiety was measured using a visual analog scale (VAS). Each component of the VAS (relaxation, well being, vitality, anxiety, stress) was scored on a scale of 0-10 with 0 being the worst and 10 being the best. Depression was also scored on a scale of 0-10 with 10 being the worst.

Table-1 Demographics and characteristics of included studies

<table>
<thead>
<tr>
<th>Study</th>
<th>Type</th>
<th>#Pts</th>
<th>Age (yrs)</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
<th>W/D</th>
<th>Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nguyen² (2010)</td>
<td>RCT</td>
<td>40</td>
<td>7-12</td>
<td>Children with leukemia who were due to undergo lumbar puncture</td>
<td>Any children with hearing loss, visual deficits, or cognitive disorders</td>
<td>0</td>
<td>Listening to music in headphones 10 minutes prior to LP and during procedure</td>
</tr>
<tr>
<td>Robb¹ (2008)</td>
<td>RCT</td>
<td>83</td>
<td>4-7</td>
<td>English speaking pediatric oncology patients</td>
<td>Mental age less than 4 years old, admitted to ICU and first time admission for CA treatment</td>
<td>0</td>
<td>Active Music engagement intervention on coping behaviors in hospitalized pediatric oncology patients</td>
</tr>
<tr>
<td>Kemper⁴ (2008)</td>
<td>Cohort</td>
<td>67</td>
<td>0-17</td>
<td>Patients included were diagnosed with ALL or AML and had received primary oncology care at BCH</td>
<td>Patients over 18 years old.</td>
<td>4</td>
<td>Effect of listening to music 20 minutes at routine oncology outpatient visits versus resting for 20 minutes</td>
</tr>
</tbody>
</table>
RESULTS

Two of the articles reviewed were RCTs and the other was a prospective cohort study. Of the three articles, both RCTs populations consisted of inpatient admissions while the prospective cohort study looked at an outpatient population. In addition, each article measured a different outcome of emotional health. Despite this, one RCT and the cohort study addressed a music therapy group and compared it to a control group of no music being administered to the pediatric population, yet the other RCT compared a music listening group to an audiobook control group. Additionally, both of the RCT studies had no withdrawal of participants once the studies were conducted. This contrasts to the cohort study that had four participants withdrawal due to not wanting to stay beyond their outpatient appointment time to finish the study.

Nguyen et al. compared the music group to the control group’s anxiety scores. The results showed that there was a change in the mean anxiety scores before the lumbar puncture and after the procedure in the music group of 8.1, which is significantly lower than the control group (no music) of 13.0. These results are statistically significant because the calculated p value is p<.001. In addition, the study showed that mean pain scores before the lumbar puncture in the music group were 1.2 and remained unchanged after the procedure. This compares to the control group mean scores, which were 1.75 before the procedure and increased to 3 after the procedure. The calculated p-value was also p <.001 indicating that these values are statistically significant. However, the other RCT reviewed the effect of music listening group (ML) to an audiobook group (ASB) and compared mean scores of the behavioral outcomes (positive affect). The results of the study reported that there was a significant difference between ML and ASB group with a p-
value of p=.0413. In addition, the ML group resulted in mean positive affect scores of 7.7 compared to the ASB group mean score of 2.0. This demonstrates a large change in mean scores suggesting the treatment effect was large with a narrow CI at 95%. Lastly, the prospective cohort study measured the relaxation and anxiety level of a music listening group to a control group to show that the change in mean for the music group was -0.3 and the control was -0.2 with a p-value of p=.54. This indicates that the data is not statistically significant or in other words we cannot reject the null hypothesis of the test. Safety of the intervention applied was not included in any three of the studies reviewed.

Table 2- Comparison and statistical significant of outcomes measured of included studies

<table>
<thead>
<tr>
<th>Outcome measured</th>
<th>Scoring system</th>
<th>Mean scores</th>
<th>p-values</th>
<th>Statistically Significant?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nguyen et al.²</td>
<td>NRS</td>
<td>Music group = 1.2 Control =3</td>
<td>P&lt; .001</td>
<td>yes</td>
</tr>
<tr>
<td>Robb et al.¹</td>
<td>Skinner and Wellborn's Motivation Theory of Coping</td>
<td>ML= 7.7 ASB=2.0</td>
<td>P=.0413</td>
<td>yes</td>
</tr>
<tr>
<td>Kemper et al.⁴</td>
<td>Visual Analog Score (VAS)</td>
<td>Music group= -0.3 Control= -0.2</td>
<td>P=.54</td>
<td>no</td>
</tr>
</tbody>
</table>

DISCUSSION

After reviewing the results of each of the three studies, I observed that each of the studies had several limitations. For instance, all three of the studies had very small sample sizes, which can be viewed in table 1. All three studies had sample sizes less than 100 participants, which can skew the validity of the results to being less significant. In addition, all three studies had a different definition of the outcome being measured in my review.
Matesa, Music Therapy

(Emotional health). Emotional health was measured as pain scores in one study, positive affect in another and anxiety in the last. It therefore, must be inferred that the results of each study indicate that emotional health was either benefited or not by these outcomes. It would have been more beneficial if there were a universal method of measuring the effectiveness of music therapy on pediatric cancer patients. Also the Nguyen et al. study used a STAI score to measure one of its outcomes, however this scoring system was engineered for adults and the authors modified it for a pediatric population. However, despite these findings, music therapy is inexpensive and a non harmful. It is not complicated and no extra time needs to be taken to perform it.

CONCLUSION

It is inconclusive whether or not music therapy is effective in improving the emotional health in pediatric cancer patients. While two of the studies showed a relatively large change in mean of the music group compared to the control group, the cohort study did not have statistically significant results. However, none of the studies reported an deleterious effects of music therapy and it therefore cannot be said that music therapy is harmful in any way. Yet, it also cannot be concluded that music therapy is effective either due to the many limitation of the studies as well. As more pediatric cancer patients undergo painful and emotionally trying procedures, it would be beneficial to further evaluate in a more standardized fashion the effects of music therapy.
REFERENCES


