

Date: 2/16/2012

Title: The Effects of Music Therapy on Well-Being in Pediatric Inpatients

Clinical Question:

P (population/problem) Do pediatric inpatients who
I (intervention) receive active and/or passive music therapy and music medicine (in addition to standard care)
C (comparison) compared to standard medical care alone,
O (outcome) experience improved emotional, social & physical well being
T (time) during their current hospitalization?

Target Population: Hospitalized inpatients receiving care in a pediatric institution.

Definitions:

Music Therapy: The clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program. It is an established health profession in which music is used within a therapeutic relationship to address physical, emotional, cognitive, and social needs of individuals (AMTA, 2011a[5]).

Active Music Therapy: Administered by a board-certified music therapist and requires physical action by the medical patient and/or patient's family.

Passive Music Therapy: Administered by a board-certified music therapist and requires no or limited physical action by the medical patient and/or patient's family.

Music Medicine: Passive listening to pre-recorded music offered by medical personnel (Dileo 1999[5]).

Well-Being: Individual's perceived health and quality of life based on satisfaction with emotional, social, and physical life experiences.

Recommendation:

It is strongly recommended that both active and passive music interventions be facilitated by board-certified music therapists (and music medicine be made available by medical personnel) at the bedside for hospitalized pediatric patients to improve physical, emotional, and social well-being during their hospital stay (*Naylor, Kingsnorth, Lamont, McKeever, & Macarthur, 2011 [1a]; Klassen, Liang, Tjosvold, Klassen, Hartling, 2008 [1a]; Mrazova & Celec, 2010 [1b]; Nyguen, Nilsson, Hellstrom, Bengtson, 2010 [2a]*).

Discussion/Summary of Evidence related to the recommendation:

Music therapists have created a tremendous breadth of research over the past 60 years. Music therapy has studied its effects among many pediatric patient populations including acute and chronic hospitalized children: oncology, neonatology, burn, cystic fibrosis, asthma, neurology, eating disorders, mental health, developmental disabilities, autism spectrum, undergoing surgery/rehab, pain management, palliative care, and bereavement.

The current issues and trends in evidence-based pediatric medical music therapy research, as stated above, is not lack of quantity but lack of quality. The above systematic reviews illuminate that the field music therapy would benefit from strict adherence to methodological design and transparent reporting; use of published guidelines; a consensus on research priorities—larger sample sizes, standardized interventions, consistent outcome measures, simpler designs, and

high quality execution; requirement of clinically relevant and validated outcome measurements with follow-up assessments. One commonality of each study was intervention variability (unclear use of active and passive music therapy interventions together and separately) and lack of overall description making it very difficult to replicate. There is a need for a more homogeneous and systematic approach with focus on eligibility criteria (Naylor, Kingsnorth, Lamont, McKeever, & Macarthur, 2011 [1a]; Klassen, Liang, Tjosvold, Klassen, Hartling, 2008 [1a]; Mrazova & Celec, 2010 [1b]).

Naylor, Kingsnorth, Lamont, McKeever, & Macarthur, 2011 [1a] in a recent systematic review of 17 pediatric nonprocedural intervention studies found that music positively affected pediatric related outcomes. Four studies pertained specifically to the inpatient pediatric setting reporting: significance in regards to musical preference and music medicine, showing psychiatric inpatients who preferred a specific kind of music demonstrated increases in positive affect after listening to the pre-recordings; improved self concept when assisted in music composition; active music engagement (AME) participants had higher frequency of coping behaviors, significantly higher positive facial affect and active engagement ($p < 0.0001$) compared with music listening (ML) or audio storybooks (ASB) and significantly higher initiation during AME than ASB ($p < 0.05$); music therapy was effective in facilitating verbalization of hospital experiences and feelings. The systematic review concludes that music therapy may enhance cognitive abilities, facilitate non-verbal/verbal communication, influence physiology, reduce trauma, facilitate coping strategies, reduce maladaptive behaviors, and frequency of migraines in hospitalized pediatrics. These findings contribute to improving emotional, social and physical well-being of the investigated population. This review highlighted that significant results were reported more often for trials employing the systematic use of music with a trained music therapist than for ones employing no music therapist.

Another systematic review aimed to review the effects of music therapy and identify key issues that need to be solved or prevented in future studies, and discussed a need for an international multi-center cooperation to bring about scientifically sound evidence. Mrazova & Celec, 2010 [1b], identified 23 of 28 studies having a positive effect—most of these trials however, were biased by the number of participants. The 7 trials that pertained to pediatric inpatients resulted in beneficial outcomes. Benefits in emotional, social and physical well-being include: In neonates, increased feeding rates/decreased hospitalization, increase in quiet sleep states/less crying, lower maternal anxiety, and reduced heart rate and deeper sleep; decrease in pain in burn debridement; reducing distress before/during/after blood tests; and increased positive affect in hospitalized children. During critical appraisal of these two systematic reviews, it was discovered that there was an overlap of 5 non-inpatient pediatric studies.

Klassen, Liang, Tjosvold, Klassen, Hartling, 2008 [1a], a systematic review of randomized controlled trials looking at the effect of music for pain and anxiety in children undergoing medical procedures reviewed 19 (5 active MT, 14 passive MT) parallel randomized control trials. MT showed a significant reduction in pain and anxiety in a synthesis of 9 studies, $n = 704$ with a heterogeneity of $I^2 = 42\%$ (standardized mean difference [SMD] = -0.35; 95% confidence interval [CI], -0.55 to -0.14). The analyzed MT outcome synthesis of 5 studies, $n = 284$ with a heterogeneity of $I^2 = 52.4\%$ significantly reduced anxiety (SMD = -0.39; 95% CI, -0.76 to -0.03). In regards to pain a synthesis of 5 studies, $n = 465$ with a heterogeneity of $I^2 = 49.7\%$, and (SMD = -0.39; 95% CI, -0.66 to -0.11). 12 of these 19 studies compared MT to standard care, and of those, two trials pertained to pediatric inpatients: reported active music therapy interventions to have significant effect in reducing anxiety. This review concluded that passive MT is as effective as active MT; overall this systematic review concluded, for children undergoing medical procedures, music is effective in reducing pain and anxiety and reduces the amount of pharmacological interventions.

The reduction of pharmacological interventions is cost-effective. Procedural support is a major component of medical music therapy. Ngyuen, Nilsson, Hellstrom, Bengtson, 2010 [2a] found that music medicine had a positive effect on reducing pain and fear for pediatrics undergoing a lumbar puncture. The music group showed significance in pain scores during ($p < .001$) and after ($p < .003$) the procedure. The music group showed significantly lower anxiety scores ($p < .001$) before the lumbar puncture procedure. This evidence supports the use of music medicine to create hospital music libraries and radio-media centers to meet the needs of a large inpatient hospital with little or no music therapy support.

The following two studies were not included in the above systematic reviews of randomized control trials, but directly pertain to this targeted pediatric population in regards to improving well-being and reducing anxiety and distress through music therapy assisted procedural support: Loewy, et al., 2005 [3a] compared the effect of live music therapy versus the use of chloral hydrate to induce sedation in pediatrics undergoing EEG procedure. Music therapy had a significantly positive effect for level of sleep/sedation ($p < .001$) and length of sleep/sedation ($p < .001$) in comparison to the chloral hydrate group providing a safe, non-pharmacological and cost-effective alternative. A cost-effective analysis for music therapy procedural support (Walworth, 2005) [5a] indicated success in eliminating patient sedation, reducing procedural time and in the number of medical professionals present during ECGs, CT scans, IV starts, X-rays, ventilator extubations, & EEGs.

Dimensions for Judging the Strength of the Recommendation:

Reflecting on your answers to the dimensions below and given that more answers to the left of the scales indicates support for a stronger recommendation, complete one of the sentences above to judge the strength of this recommendation.

(Note that for negative recommendations, the left/right logic may be reversed for one or more dimensions.)

1. Grade of the body of evidence	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Moderate	<input type="checkbox"/> Low
<i>Comments:</i> Three systematic reviews (Naylor, Kingsnorth, Lamont, McKeever, & Macarthur, 2011 [1a]; Klassen, Liang, Tjosvold, Klassen, Hartling, 2008 [1a]; Mrazova & Celec, 2010 [1b]) and one randomized control trial (Ngyuen, Nilsson, Hellstrom, Bengtson, 2010 [2a]) directly support this clinical question as stated above.			
2. Safety/harm (Side Effects and Risks)	<input checked="" type="checkbox"/> Minimal	<input type="checkbox"/> Moderate	<input type="checkbox"/> Serious
<i>Comments:</i> There were no adverse reactions, side effects or risks in any of the music therapy interventions found in the appraised studies: Klassen, Liang, Tjosvold, Klassen, Hartling, 2008 [1a]; Naylor, Kingsnorth, Lamont, McKeever, & Macarthur, 2011 [1a]; Mrazova & Celec, 2010 [1b]; Ngyuen, Nilsson, Hellstrom, Bengtson, 2010 [2a].			
3. Health benefit to patient	<input type="checkbox"/> Significant	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> Minimal
<i>Comments:</i> Facilitating music therapy services with pediatric inpatients and their families can promote improvement in their physical, emotional, and social well-being during their hospital stay as reflected in a significant reduction in anxiety/pain as evidenced in the standardized mean difference -0.39 in Klassen et al., 2008 [1a] study.			
4. Burden on patient to adhere to recommendation	<input checked="" type="checkbox"/> Low	<input type="checkbox"/> Unable to determine	<input type="checkbox"/> High
<i>Comments:</i> Because music therapy is a powerful and non-invasive medium, unique outcomes are possible. In addition to its applications with hospital patients, music therapy is used successfully with persons of all ages and disabilities (AMTA, 2006).			
5. Cost-effectiveness to healthcare system	<input checked="" type="checkbox"/> Cost-effective	<input type="checkbox"/> Inconclusive	<input type="checkbox"/> Not cost-effective
<i>Comments:</i> Not included in the four high level studies reviewed above, one good quality prospective cohort study (Loewy et al., 2005 [3a]) and two expert opinion studies (Walworth, 2005 [5a]).			
6. Directness of the evidence for this target population	<input checked="" type="checkbox"/> Directly relates	<input type="checkbox"/> Some concern of directness	<input type="checkbox"/> Indirectly relates
<i>Comments:</i> Only pediatric studies were included to support this recommendation and clinical question.			
7. Impact on morbidity/mortality or quality of life	<input checked="" type="checkbox"/> High	<input type="checkbox"/> Medium	<input type="checkbox"/> Low
<i>Comments:</i> No impact on morbidity/mortality. High impact on quality of life as defined by emotional, social and physical well-being.			

Reference List: (Evidence Level in []; See Table of Evidence Levels following references)

American Music Therapy Association (AMTA), (2011a). Definition and Quotes about Music Therapy. From <http://www.musictherapy.org/about/quotes/> [5].

American Music Therapy Association (AMTA), (2011b). Habilitation: Music Therapy Research and Evidence-Based Practice Support. From http://www.musictherapy.org/assets/1/7/bib_habilitation.pdf [5].

American Music Therapy Association (AMTA), (2006). Fact Sheets: Music Therapy & Medicine. From http://www.musictherapy.org/assets/1/7/MT_Medicine_2006.pdf [5].

Dileo C. (1999). "A classification model for music and medicine." In: Dileo C editor(s). Applications of Music in Medicine. American Music Therapy Association, 1999:1–6 [5].

- Kain, Z.N., Caldwell-Andrews, A.A., & Krivutza, D.M., et al. (2004). Interactive music therapy as a treatment for preoperative anxiety in children: A randomized controlled trial. *Anesth Analg* 2004; 98:1260–1266, [2a].
- Klassen, J.A., Liang, L., Tjosvold, L., et al., (2008). “Music for Pain and Anxiety in Children Undergoing Medical Procedures: A Systematic Review of Randomized Controlled Trials.” *Ambulatory Pediatrics* 2008; 8: 117-128, [1a].
- Kemper, K. J., & Danhauer, S. C. (2005). Music as therapy. *Southern Medical Journal*, 98 (3), 282–288, [5a].
- Loewy, J., Hallan, C., et al. (2005). Sleep/Sedation in Children Undergoing EEG Testing: A Comparison of Chloral Hydrate and Music Therapy. *Journal of PeriAnesthesia Nursing*, Vol 20, No 5 (October), 2005: pp 323-332, [3a].
- Mrazova, M., & Celec, P., (2010). “A Systematic Review of Randomized Controlled Trials Using Music for Children.” *The Journal of Alternative and Complimentary Medicine*, Vol. 16, Number 10, 2010, pp. 1089-1095,[1b].
- Naylor, K.T., Kingsnorth, S., Lamont, A., et al., (2011). “The Effectiveness of Music in Pediatric Healthcare: A Systematic Review of Randomized Controlled Trials. *Evidence-Based Complementary and Alternative Medicine*. Vol., 2011, Article ID 464759, 18 pages, [1a].
- Ngyuen, T.N., Nilsson, S., Hellstrom, AL., et al., (2010). “Music Therapy to Reduce Pain and Anxiety in Children with Cancer Undergoing Lumbar Puncture: A Randomized Clinical Trial.” *Journal of Pediatric Oncology Nursing* 27(3) pp. 146-155, [2a].
- Walworth, D.D. (2005). Procedural-Support Music Therapy in the Healthcare Setting: A Cost-Effective Analysis. *Journal of Pediatric Nursing*, Vol 20, No 4 (August), [5a].
- World Health Organization (WHO), (2009). Mental health: a state of well-being. From: http://www.who.int/features/factfiles/mental_health/en/ [5].

SUPPORTING INFORMATION

Background / Purpose of BEST Development:

Research supports the overall ability of preferred music to enhance mood, attention, and behavior to enable the client to maintain or optimize function. Many clients with chronic or untreatable conditions suffer from anxiety and low mood. There is a promising and growing body of research related to the impact of music therapy on mood and psycho-emotional state (AMTA, 2011b [5]). Though this research is promising, it is unclear how this interventional evidence is being used and how it guides the practice of medical music therapists in their clinical work.

The World Health Organization defines health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (WHO, 2009 [5]). Music is widely used to enhance well-being (Kemper/Danhauer, 2005 [5a]). Music therapists shift their therapeutic focus from rehabilitation to habilitation and quality of life (AMTA, 2011² [5]). Due to the uncertainty of evidenced based and best practice music therapy protocols it is difficult to measure the specific outcomes or even the reasoning for the application of music therapy interventions for any patient-specific population. This evidence must be evaluated and synthesized to not only guide practice but help define and further understand why and how music therapy works.

Applicability Issues:

Not all pediatric medical institutions have a music therapist as part of the interdisciplinary team. Funding is an issue as reimbursement for medical music therapy at this time is non-existent in the state of Ohio. Outcomes and

measurements for music therapy interventions (and when to apply and why) are heterogeneous if not unknown throughout our current literature--standardized electronic assessment and on-going documentation will increase our understanding of population-specific needs and intervention rationales while facilitating a foundation to replicate this work. This will have a great impact for future high-level studies including cost-effective analysis. At this time music therapist's trainings are offered at the bachelor, master and doctorate levels providing a great variable in skill and facilitation as described in Kain et al, 2004 [2a], noting a significant therapist effect: children treated by one of the music therapists were less anxious than children in the other music therapist's group. Music medicine can be administered and encouraged by all healthcare professionals that provide care at the bedside. The interaction in discovering which music is meaningful to the patient will have an individualized and may positively affect the inpatient's well-being.

Outcome or Process Measures:

As evidenced in the above literature, music therapy studied its effect on and positively impacted fluctuations in mood; self-concept; frequency of coping related behaviors; verbalization of hospital experiences; response to stressful events; preterm infants: weight gain/days to discharge, feeding, sleep/crying, heart rate; pain; and anxiety in inpatient pediatrics. The studies listed above had many different process and outcome measurements. The implementation of an electronic music therapy assessment with specific and detailed session description, duration, frequency and quality of life indicators will facilitate a foundation for replication, continuity of care, safety, flow and future intervention and diagnosis-specific research. Educating staff on how to make appropriate referrals (creating a form and communicating with unit staff on referral reasoning/prioritization (i.e., any combination of pain, procedural support, issues or problems with emotional, social, physical and cognitive functioning), tracking referrals, (patients followed, and unmet needs due to the amount of current referrals), reporting and charting the effects and outcomes of music therapy to the interdisciplinary team, and collecting data from patient/family satisfaction surveys, will facilitate a multi-dimensional approach to the validation and unbiased use of music therapy.

Search Strategy:

Terms: Music therapy, medical music therapy, pediatric music therapy, music therapy and: pediatrics, children, quality of life, mood, well-being, emotions, social state, anxiety, pediatrics, hospitalized children, pain, & inpatients.
Databases: Medline/PubMed, Cinahl, PsychInfo, Cochrane Library, Alt Healthwatch, GoogleScholar, & NACRHI.
Last date of search: 4/19/2011.
No filters or limits were used.

Relevant CCHMC Evidence-Based Documents:

Music Therapy Knowing Note

Group/Team Members:

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Conflicts of Interest were declared for each team member:

- No financial conflicts of interest were found.
 The following financial conflicts of interest were disclosed:

Note: Full tables of evidence grading system available in separate document:

- [Table of Evidence Levels of Individual Studies by Domain, Study Design, & Quality](#) (abbreviated table below)
- [Grading a Body of Evidence to Answer a Clinical Question](#)
- [Judging the Strength of a Recommendation](#) (abbreviated table below, dimensions table above)

Table of Evidence Levels (see note above)

Quality level	Definition
1a [†] or 1b [†]	Systematic review, meta-analysis, or meta-synthesis of multiple studies
2a or 2b	Best study design for domain
3a or 3b	Fair study design for domain
4a or 4b	Weak study design for domain
5a or 5b	General review, expert opinion, case report, consensus report, or guideline
5	Local Consensus

†a = good quality study; b = lesser quality study

Table of Recommendation Strength (see note above)

Strength	Definition
It is strongly recommended that... It is strongly recommended that... not...	There is consensus that benefits clearly outweigh risks and burdens (or visa-versa for negative recommendations).
It is recommended that... It is recommended that... not...	There is consensus that benefits are closely balanced with risks and burdens.
There is insufficient evidence and a lack of consensus to make a recommendation...	

Copies of this Best Evidence Statement (BEST) and related tools (if applicable, e.g., screening tools, algorithms, etc.) are available online and may be distributed by any organization for the global purpose of improving child health outcomes.

Website address: <http://www.cincinnatichildrens.org/svc/alpha/h/health-policy/best.htm>

Examples of approved uses of the BEST include the following:

- copies may be provided to anyone involved in the organization’s process for developing and implementing evidence-based care;
- hyperlinks to the CCHMC website may be placed on the organization’s website;
- the BEST may be adopted or adapted for use within the organization, provided that CCHMC receives appropriate attribution on all written or electronic documents; and
- copies may be provided to patients and the clinicians who manage their care.

Notification of CCHMC at EBDMinfo@cchmc.org for any BEST adopted, adapted, implemented, or hyperlinked by the organization is appreciated.

Please cite as: Cincinnati Children’s Hospital Medical Center: Best Evidence Statement The Effects of Music Therapy on Well-Being in Pediatric Inpatients, <http://www.cincinnatichildrens.org/svc/alpha/h/health-policy/best.htm>, BEST 121, pages 1-6, 2/16/12.

This Best Evidence Statement has been reviewed against quality criteria by 2 independent reviewers from the CCHMC Evidence Collaboration.

For more information about CCHMC Best Evidence Statements and the development process, contact the Evidence Collaboration at EBDMinfo@cchmc.org.

Note

This Best Evidence Statement addresses only key points of care for the target population; it is not intended to be a comprehensive practice guideline. These recommendations result from review of literature and practices current at the time of their formulation. This Best Evidence Statement does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. This document is not intended to impose standards of care preventing selective variances from the recommendations to meet the specific and unique requirements of individual patients. Adherence to this Statement is voluntary. The clinician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.