

Research on Music in Clinical Settings

Music for Patients – Miscellaneous Studies

Music as an aid for postoperative recovery in adults: a systematic review and meta-analysis

Hole J1, Hirsch M2, Ball E3, Meads C4. [Lancet](#). 2015 Oct 24;386(10004):1659-71.

<http://www.ncbi.nlm.nih.gov/pubmed/26277246>

BACKGROUND:

Music is a non-invasive, safe, and inexpensive intervention that can be delivered easily and successfully. We did a systematic review and meta-analysis to assess whether music improves recovery after surgical procedures.

FINDINGS:

We identified 4261 titles and abstracts, and included 73 RCTs in the systematic review, with size varying between 20 and 458 participants. Choice of music, timing, and duration varied. Comparators included routine care, headphones with no music, white noise, and undisturbed bed rest. Music reduced postoperative pain (SMD -0.77 [95% CI -0.99 to -0.56]), anxiety (-0.68 [-0.95 to -0.41]), and analgesia use (-0.37 [-0.54 to -0.20]), and increased patient satisfaction (1.09 [0.51 to 1.68]), but length of stay did not differ (SMD -0.11 [-0.35 to 0.12]). Subgroup analyses showed that choice of music and timing of delivery made little difference to outcomes. Meta-regression identified no causes of heterogeneity in eight variables assessed. Music was effective even when patients were under general anaesthetic.

INTERPRETATION:

Music could be offered as a way to help patients reduce pain and anxiety during the postoperative period. Timing and delivery can be adapted to individual clinical settings and medical teams.

Effects of music therapy on pain, anxiety, and vital signs in patients after thoracic surgery.

Liu Y1, Petrini MA2. *Complement Ther Med*. 2015 Oct;23(5):714-8.

<http://www.ncbi.nlm.nih.gov/pubmed/26365452>

OBJECTIVE:

To examine the effectiveness of music listening on pain, anxiety, and vital signs among patients after thoracic surgery in China.

INTERVENTION:

The experimental group received standard care and a 30-min soft music intervention for 3 days, while the control group received only standard care. Measures include pain, anxiety, vital signs (blood pressure, heart rate and respiratory rate), patient controlled analgesia, and diclofenac sodium suppository use.

RESULTS:

The experimental group showed statistically significant decrease in pain, anxiety, systolic blood pressure and heart rate over time compared to the control group, but no significant difference were identified in diastolic blood pressure, respiratory rate, patient controlled analgesia and diclofenac sodium suppository use.

CONCLUSION:

The findings provide further evidence to support the practice of music therapy to reduce postoperative pain and anxiety, and lower systolic blood pressure and heart rate in patients after thoracic surgery in China.

Music interventions for mechanically ventilated patients.

Bradt J, Dileo C. Cochrane Database Syst Rev. 2014;(12)

<http://www.ncbi.nlm.nih.gov/pubmed/25490233>

BACKGROUND:

Mechanical ventilation often causes major distress and anxiety in patients. The sensation of breathlessness, frequent suctioning, inability to talk, uncertainty regarding surroundings or condition, discomfort, isolation from others, and fear contribute to high levels of anxiety. Side effects of analgesia and sedation may lead to the prolongation of mechanical ventilation and, subsequently, to a longer length of hospitalization and increased cost. Therefore, non-pharmacological interventions should be considered for anxiety and stress management. Music interventions have been used to reduce anxiety and distress and improve physiological functioning in medical patients; however, their efficacy for mechanically ventilated patients needs to be evaluated. This review was originally published in 2010 and was updated in 2014.

OBJECTIVES:

To update the previously published review that examined the effects of music therapy or music medicine interventions (as defined by the authors) on anxiety and other outcomes in mechanically ventilated patients. Specifically, the following objectives are addressed in this review. 1. To conduct a meta-analysis to compare the effects of participation in standard care combined with music therapy or music medicine interventions with standard care alone. 2. To compare the effects of patient-selected music with researcher-selected music. 3. To compare the effects of different types of music interventions (e.g., music therapy versus music medicine).

AUTHORS' CONCLUSIONS:

This updated systematic review indicates that music listening may have a beneficial effect on anxiety in mechanically ventilated patients. These findings are consistent with the findings of three other Cochrane systematic reviews on the use of music interventions for anxiety reduction in medical patients. The review furthermore suggests that music listening consistently reduces respiratory rate and systolic blood pressure. Finally, results indicate a possible beneficial impact on the consumption of sedatives and analgesics. Therefore, we conclude that music interventions may provide a viable anxiety management option to mechanically ventilated patients.

Music for stress and anxiety reduction in coronary heart disease patients.

Bradt J, Dileo C, Potvin N. Cochrane Database Syst Rev. 2013 Dec 28; (12)

<http://www.ncbi.nlm.nih.gov/pubmed/24374731>

BACKGROUND:

Individuals with coronary heart disease (CHD) often suffer from severe distress due to diagnosis, hospitalization, surgical procedures, uncertainty of outcome, fear of dying, doubts about progress in recovery, helplessness and loss of control. Such adverse effects put the cardiac patient at greater risk for complications, including sudden cardiac death. It is therefore of crucial importance that the care of people with CHD focuses on psychological as well as physiological needs. Music interventions have been used to reduce anxiety and distress and improve physiological functioning in medical patients;

however its efficacy for people with CHD needs to be evaluated.

OBJECTIVES:

To update the previously published review that examined the effects of music interventions with standard care versus standard care alone on psychological and physiological responses in persons with CHD.

AUTHORS' CONCLUSIONS:

This systematic review indicates that listening to music may have a beneficial effect on anxiety in persons with CHD, especially those with a myocardial infarction. Anxiety-reducing effects appear to be greatest when people are given a choice of which music to listen to. Furthermore, listening to music may have a beneficial effect on systolic blood pressure, heart rate, respiratory rate, quality of sleep and pain in persons with CHD. However, the clinical significance of these findings is unclear. Since many of the studies are at high risk of bias, these findings need to be interpreted with caution. More research is needed into the effects of music interventions offered by a trained music therapist.

Does live music benefits patients with brain and spinal injury?

Zhang CC1, Mou L, Wang X, Guo D. Eur Rev Med Pharmacol Sci. 2015 Sep;19(17):3246-50.

<http://www.ncbi.nlm.nih.gov/pubmed/26400530>

OBJECTIVE:

The purpose of this study is to examine the feasibility and prospective success associated with implementing and evaluating a six-week live music intervention on an inpatient neurorehabilitation ward.

PATIENTS AND METHODS:

In total 26 patients were included in this study. Out of which, 15 were patients and 11 were staff members. Staff participants completed wellbeing measures at before and after music. Patients completed an assortment of validated measures at five consecutive time points from baseline to follow-up. Staff participants experienced a minor decrease in wellbeing over time.

RESULTS:

The majority of the data collected from patients illustrated positive trends, with improvements in wellbeing, pain, cognition functioning, independent functioning, and mobility. The feasibility indicates that with modifications that this project is a viable venture.

CONCLUSIONS:

We found that live music appears to be promising new addition to neurorehabilitation.

Music interventions for improving psychological and physical outcomes in cancer patients.

Bradt J1, Dileo C, Grocke D, Magill L. Cochrane Database Syst Rev. 2011 Aug 10; (8)

<http://www.ncbi.nlm.nih.gov/pubmed/21833957>

BACKGROUND:

Having cancer may result in extensive emotional, physical and social suffering. Music interventions have been used to alleviate symptoms and treatment side effects in cancer patients.

OBJECTIVES:

To compare the effects of music therapy or music medicine interventions and standard care with standard care alone, or standard care and other interventions in patients with cancer.

MAIN RESULTS:

We included 30 trials with a total of 1891 participants. We included music therapy interventions, offered by trained music therapists, as well as listening to pre-recorded music, offered by medical staff. The results suggest that music interventions may have a beneficial effect on anxiety in people with

cancer, with a reported average anxiety reduction of 11.20 units (95% confidence interval (CI) -19.59 to -2.82, $P = 0.009$) on the STAI-S scale and -0.61 standardized units (95% CI -0.97 to -0.26, $P = 0.0007$) on other anxiety scales. Results also suggested a positive impact on mood (standardised mean difference (SMD) = 0.42, 95% CI 0.03 to 0.81, $P = 0.03$), but no support was found for depression. Music interventions may lead to small reductions in heart rate, respiratory rate, and blood pressure. A moderate pain-reducing effect was found (SMD = -0.59, 95% CI -0.92 to -0.27, $P = 0.0003$), but no strong evidence was found for enhancement of fatigue or physical status. The pooled estimate of two trials suggested a beneficial effect of music therapy on patients' quality of life (QoL) (SMD = 1.02, 95% CI 0.58 to 1.47, $P = 0.00001$). No conclusions could be drawn regarding the effect of music interventions on distress, body image, oxygen saturation level, immunologic functioning, spirituality, and communication outcomes. Seventeen trials used listening to pre-recorded music and 13 trials used music therapy interventions that actively engaged the patients. Not all studies included the same outcomes and due to the small number of studies per outcome, we could not compare the effectiveness of music medicine interventions with that of music therapy interventions.

AUTHORS' CONCLUSIONS:

This systematic review indicates that music interventions may have beneficial effects on anxiety, pain, mood, and QoL in people with cancer. Furthermore, music may have a small effect on heart rate, respiratory rate, and blood pressure. Most trials were at high risk of bias and, therefore, these results need to be interpreted with caution.

Application of Therapeutic Harp Sounds for Quality of Life among Hospitalized Patients.

Schneider DM, Graham K, Croghan K, Novotny P, Parkinson J, Lafky V, Sloan JA. *Journal of Pain and Symptom Management*, November 2014 (online) [http://www.jpmsjournal.com/article/S0885-3924\(14\)00558-2/abstract](http://www.jpmsjournal.com/article/S0885-3924(14)00558-2/abstract)

CONTEXT

Hospitalized patients experience symptoms including pain and anxiety that may negatively affect their well-being and overall quality of life (QOL), even when medical interventions are deemed successful.

OBJECTIVES

The objective of the study was to assess the efficacy of prescriptive live therapeutic harp sounds on patient symptoms and QOL.

METHODS

The study was a two-period, two-treatment arm crossover, randomized clinical trial. Individuals were randomized to harp music and standard care for the first 24 hours of the hospital stay, followed by 24 hours of only standard care, or vice versa. The harp intervention was 30–40 minutes of prescriptive live therapeutic harp sounds in the form of solo harp pieces and improvisations. Patients recorded well-being and symptom scores on linear analogue scales. Entry criteria included at least 18 years and a score of 3 or below on a 1–5 linear analogue scale indicating compromised overall QOL.

RESULTS

Ninety-two eligible patients participated in the clinical trial. All the QOL variables had significantly higher percentages of patients with improvements during the harp treatment than during standard care. Five symptoms—fatigue, anxiety, sadness, relaxation, and pain—were significantly improved following therapeutic harp treatment. Approximately 30% to 50% of patients showed a significant increase in the QOL measures after harp treatment.

CONCLUSION

There is evidence of strong positive effects on the QOL of hospitalized patients who received therapeutic harp sound treatment along with standard care.

Examples of the use of music in clinical medicine [Eksempler på bruk av musikk i klinisk medisin.]
Myskja A; Lindbaek M Seksjon for allmenntidrett, Universitetet i Oslo. Tidsskr Nor Laegeforen 2000
Apr 10;120(10):1186-90

ABSTRACT

Music has been an element in medical practice throughout history. There is growing interest in music as a therapeutic tool. Since there is no generally accepted standard for how, when and where music should be applied within a medical framework, this literature study endeavours to present an overview of central areas of application of music in medicine. It further attempts to find tentative conclusions that may be drawn from existing clinical research on the efficacy of music as a medical tool. Traditionally, music has been linked to the treatment of mental illness, and has been used successfully to treat anxiety and depression and improve function in schizophrenia and autism. In clinical medicine several studies have shown analgesic and anxiolytic properties that have been used in intensive care units, both in diagnostic procedures like gastroscopy and in larger operations, in preoperative as well as postoperative phases, reducing the need for medication in several studies. The combination of music with guided imagery and deep relaxation has shown reduction of symptoms and increased well-being in chronic pain syndromes, whether from cancer or rheumatic origin. Music has been used as support in pregnancy and gestation, in internal medicine, oncology, paediatrics and other related fields. The use of music with geriatric patients could prove to be especially fruitful, both in its receptive and its active aspect. Studies have shown that music can improve function and alleviate symptoms in stroke rehabilitation, Parkinson's disease, Alzheimer's disease and other forms of dementia. The role of music in 4 medicine is primarily supportive and palliative. The supportive role of music has a natural field of application in palliative medicine and terminal care. Music is well tolerated, inexpensive, with good compliance and few side effects.

Effect of music on power, pain, depression and disability. Siedliecki SL, Good M. Journal of Advanced Nursing. 2006 54 (5):553-62.

ABSTRACT

This paper reports a study testing the effect of music on power, pain, depression and disability, and comparing the effects of researcher-provided music (standard music) with subject-preferred music (patterning music). The music groups had more power and less pain, depression and disability than the control group, but there were no statistically significant differences between the two music interventions. Nurses can teach patients how to use music to enhance the effects of analgesics, decrease pain, depression and disability, and promote feelings of power.

Effect of live music therapy for patients undergoing magnetic resonance imaging. Darcy D, Walworth D. J Music Ther 2010 47(4):335-50.

ABSTRACT

The purpose of the current study was to identify the effects of live music therapy interventions compared with preferred recorded music for patients undergoing MRI scans. To date, there has not been a published study involving the use of live music therapy during MRI scans. The current study investigated the differences between teenage through adult patients receiving live music therapy intervention during outpatient MRI scans versus the standard protocol of care listening to recorded music (N = 88). Subjects ranged in age from 15 to 93 years old. Results indicated subjects who received the live music therapy protocol reported significantly better perception of the MRI procedure ($p < 0.05$). Additionally, subjects receiving the live music therapy protocol had fewer scans repeated due to movement. Of the repeated images, 26% occurred in the live music group and 73% occurred in

the recorded music group. Subjects receiving live music therapy also requested less breaks from the scan. Two percent of the live music subjects requested a break and 17.6% of the control patients requested breaks. When comparing the same type of scan between groups, subjects receiving the live music protocol required less time to complete the scans. For lumbar scans without contrast (N = 14, n = 7, n = 7), live music subjects spent an average of 4.63 less min per scan for a total of 32 less min for 7 subjects. For brain scans (N = 8, n = 4, n = 4), live music subjects spent an average of 5.8 less min per scan for a total of 23 less min for 4 subjects. Results of the current study supports the use of live music therapy intervention for teenage and adult patients undergoing MRI scans to reduce patient anxiety and improve patient perception of the scan experience. Additionally, live music therapy has the potential to shorten the length of time required for patients to complete MRI Live Music Research (assembled 2013) NM, MG 3 scans due to decreased patient movements and fewer breaks requested during the scans. The cost savings impact of reduced procedure time can positively impact the facility productivity by allowing more scans to be scheduled daily.

Music may reduce anxiety during invasive procedures in adolescents and adults. Newton JT, King's College London, London, UK. Evid Based Dent. 2009 10(1):15.

DESIGN

A block randomised controlled trial was conducted.

INTERVENTION

Patients in the music (test) group listened to selected sedative music using headphones throughout the root canal treatment procedure. The control group subjects wore headphones but without the music.

OUTCOME MEASURE

Anxiety was measured before the study and at the end of the treatment procedure. Patients' heart rate, blood pressure and finger temperature were measured before the study and every 10 min until the end of the root canal treatment procedure.

RESULTS

The results revealed that there were no significant differences between the two groups for baseline data and procedure-related characteristics, except for gender. The subjects in the music group, however, showed a significant increase in finger temperature and a decrease in anxiety score over time compared with the control group. The effect size for state anxiety and finger temperature was 0.34 and 0.14, respectively.

CONCLUSIONS

Relaxing music administered through headphones to subjects during root canal treatment decreased the procedure-related anxiety of the patients and significantly increased finger temperature, but does not significantly affect blood pressure and heart rate over the procedure.

Collecting information on observable and measurable effects pre- and post- live therapeutic music sessions at patient's bedside. Peterson K, Fanning E: Karen Peterson, CMP and Elizabeth Fanning, PhD Unpublished study presented at ISQRMM Conference July 2013, University of Georgia

BACKGROUND

This study is a prototype, based on a random sample, to begin to explore the effects and qualify of effects of live, bedside music provided by Certified Music Practitioners® (CMPs) on different types of patients. The purpose of the study is to determine if effects documented from live, bedside music are significant or due to chance, and to compare where effects are the strongest in benefitting the patient's well-being.

METHODOLOGY

The sample in this study included randomly selected data from 101 live music sessions. Data analysis

involved repeated measures (pre- and post-) to identify effects in observable and measurable conditions. Data was collected by CMPs on a standardized form.

RESULTS

Data from this study demonstrates that live bedside music that addresses as well as changes in response to the patient's condition has a stabilizing effect on the patient's physical and emotional well-being, as evidenced by changes in observed conditions, including agitation, restlessness, and disorientation, and, in measured effects, as evidenced by the patient's lower blood pressure post-music.

CONCLUSIONS

Further data collection and analysis, with possible additional data to clarify effects, will confirm the strengths of this study's determinations, and elucidate opportunities for adaptation in order to ensure that goals in healing and well-being are met. Further data collection and analysis will also substantiate opportunities for facilities considering using CMPs to support the care of their patients. In addition, findings from comparative studies may be generalizable to support the practice of live, therapeutic musicians.

The impact of a live therapeutic music intervention on patients' experience of pain, anxiety, and muscle tension. Sand-Jecklin K, Emerson H. *Holist Nurs Pract* 2010 24(1):7-15.

ABSTRACT

This exploratory study demonstrated the positive impact of live music as a holistic patient intervention directed toward reducing pain, anxiety, and muscle tension levels of patients admitted to a tertiary care center for an emergent medical condition. Music can be combined with other holistic interventions to positively impact patient outcomes.

The effect of music listening on older adults undergoing cardiovascular surgery. Twiss E, Seaver J, McCaffrey R. *Nursing in Critical Care*. 2006 11(5): 224-231.

ABSTRACT

The purpose of this study was to determine the effect of music listening on postoperative anxiety and intubation time in patients undergoing cardiovascular surgery. Coronary artery disease and valvular heart disease affect approximately 15 million Americans and 5 million persons in the UK annually, with the majority of these patients being older adults. The anxiety experienced before, during and after surgery increases cardiovascular workload, thereby prolonging recovery time. Music listening as a nursing intervention has shown an ability to reduce anxiety. The study used a randomized control trial design. Sixty adults older than 65 years were randomly assigned to the control and the experimental groups. The experimental group listened to music during and after surgery, while the control group received standard postoperative care. The Spielberger State Trait Anxiety Inventory was administered to both groups before surgery and 3 days postoperatively. The mean of the differences between scores was compared using analysis of variance. Differences in mean intubation time were measured in both groups. Older adults who listened to music had lower scores on the state anxiety test ($F=5.57, p=.022$) and had significantly fewer minutes of postoperative intubation ($F=5.45, p=.031$) after cardiovascular surgery. Older adults undergoing cardiovascular surgery who listen to music had less anxiety and reduced intubation time than those who did not.

Music therapy as a nursing intervention for patients supported by mechanical ventilation. Chlan L. *AACN Clinical Issues: Advanced Practice in Acute & Clinical Care*. 2000 11(1): 128-138

ABSTRACT

Music therapy is a nonpharmacologic nursing intervention that can be used as a complementary adjunct in the care of patients supported by mechanical ventilation. This article details the theoretical basis of

music therapy for relaxation and anxiety reduction, highlights the research testing the intervention in such patients, and discusses areas of needed research to extend further the implementation of music therapy in critical care nursing practice in an effort to promote a healing environment for patients.

The effects of live therapeutic music on patient's affect and perceptions of care: A randomized field study. Mulubrhan F. Mogos, Nancy Angard, Lloyd Goldstein, Jason W. Beckstead. *Complementary Therapies in Clinical Practice*, 2013 19(4): 188-192.

ABSTRACT

This article examines the effects of live therapeutic music (LTM) on patients in a hospital setting. LTM was hypothesized to directly increase patients' positive affect and to indirectly influence their perceptions of the care they received.

One hundred patients participated in a two-group quasi-experimental design in which they completed a very brief questionnaire assessing their affect and perception of care. Half of the participants were exposed to LTM at the bedside. The other half served as a comparison group. A structural equation model was used to test the hypothesized effects of LTM. The model explained 63% of the variance in patient's affect and 10% of the variance in perceptions of care.

Conclusions: Patients respond to LTM with increased positive affect and by assigning higher ratings to the care they receive. LTM could be used as a viable means to improve patient outcomes and satisfaction.

The Connection Between Art, Healing, and Public Health: A Review of Current Literature
[Heather L. Stuckey](#), DEd and [Jeremy Nobel](#), MD, MPH. *Am J Public Health*. 2010 February; 100(2): 254-263.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2804629/>

ABSTRACT

This review explores the relationship between engagement with the creative arts and health outcomes, specifically the health effects of music engagement, visual arts therapy, movement-based creative expression, and expressive writing. Although there is evidence that art-based interventions are effective in reducing adverse physiological and psychological outcomes, the extent to which these interventions enhance health status is largely unknown. Our hope is to establish a foundation for continued investigation into this subject and to generate further interest in researching the complexities of engagement with the arts and health.

Music's Effects on the Body, Emotions, and Biological Systems

Effects of relaxing music on salivary cortisol level after psychological stress. Khalfa S, Dalla Bella S, Roy M, Peretz I, Lupien S. *Ann N.Y. Acad Sci* 2003 999:374-6

ABSTRACT

The goal of the present study was to determine whether relaxing music (as compared to silence) might facilitate recovery from a psychologically stressful task. To this aim, changes in salivary cortisol levels were regularly monitored in 24 students before and after the Trier Social Stress Test. The data show that in the presence of music, the salivary cortisol level ceased to increase after the stressor, whereas in silence it continued to increase for 30 minutes. Results obtained from projects in which self-organizing musical structures spontaneously arise through electrical interface between the brain and generative

musical systems are surveyed. This provides a springboard for examining important paradigm shifts taking place in our thinking about what musical forms can be and how this might influence efforts to increase our understanding of the underlying neural dynamics. Implications of this work for the design of music curricula are considered, emphasizing the importance of active imaginative listening. A view of composing, termed "propositional music," is introduced in which the proposition of cognitive models of music is an ongoing part of creative musical activity.

Emotional responses to music: towards scientific perspectives on music therapy. Suda M., Morimoto K., Obata A., Koizumi H., Maki A. *Neuroreport*. 2008 Jan 8;19(1):75-8.

ABSTRACT

Neurocognitive research has the potential to identify the relevant effects of music therapy. In this study, we examined the effect of music mode (major vs. minor) on stress reduction using optical topography and an endocrinological stress marker. In salivary cortisol levels, we observed that stressful conditions such as mental fatigue (thinking and creating a response) was reduced more by major mode music than by minor mode music. We suggest that music specifically induces an emotional response similar to a pleasant experience or happiness. Moreover, we demonstrated the typical asymmetrical pattern of stress responses in upper temporal cortex areas, and suggested that happiness/sadness emotional processing might be related to stress reduction by music.

Measuring effects of music, noise, and healing energy using a seed germination bioassay Creath K, Schwartz GE, Center for Frontier Medicine in Biofield Science, University of Arizona, Tucson, AZ. *J Altern Complement Med* 2004 10(1):113-22

OBJECTIVE

To measure biologic effects of music, noise, and healing energy without human preferences or placebo effects using seed germination as an objective biomarker.

METHODS

A series of five experiments were performed utilizing okra and zucchini seeds germinated in acoustically shielded, thermally insulated, dark, humid growth chambers. Conditions compared were an untreated control, musical sound, pink noise, and healing energy. Healing energy was administered for 15-20 minutes every 12 hours with the intention that the treated seeds would germinate faster than the untreated seeds. The objective marker was the number of seeds sprouted out of groups of 25 seeds counted at 12-hour intervals over a 72-hour growing period. Temperature and relative humidity were monitored every 15 minutes inside the seed germination containers. A total of 14 trials were run testing a total of 4600 seeds.

RESULTS

Musical sound had a highly statistically significant effect on the number of seeds sprouted compared to the untreated control over all five experiments for the main condition ($p < 0.002$) and over time ($p < 0.000002$). This effect was independent of temperature, seed type, position in room, specific petri dish, and person doing the scoring. Musical sound had a significant effect compared to noise and an untreated control as a function of time ($p < 0.03$) while there was no significant difference between seeds exposed to noise and an untreated control. Healing energy also had a significant effect compared to an untreated control (main condition, $p < 0.0006$) and over time ($p < 0.0001$) with a magnitude of effect comparable to that of musical sound.

CONCLUSION

This study suggests that sound vibrations (music and noise) as well as biofields (bioelectromagnetic and healing intention) both directly affect living biologic systems, and that a seed germination bioassay has the sensitivity to enable detection of effects caused by various applied energetic conditions.

Music at End of Life

Music thanatology: prescriptive harp music as palliative care for the dying patient. Freeman L, Caserta M, Lund D, Rossa S, Dowdy A, Partenheimer A. *Am J Hosp Palliat Care*. 2006 23(2):100-4
ABSTRACT

Music thanatology represents an emerging area in which the raw materials of music, usually harp and/or voice, assist and comfort the dying patient. During prescriptive "music vigils," the clinician-musician carefully observes physiological changes, cues, and breathing patterns, thereby synchronizing the music to reflect or support the patient's physiology and overall condition. Using data collected from 65 patients, this study was designed to assess the effectiveness of prescriptive harp music on selected palliative care outcomes using a sample of de-identified data forms from past music vigils. Patients were administered a 25- to 95-minute intervention of prescriptive harp music. Data collected included vital signs and observational indicators before (T₁) and after (T₂) the vigil. Patients were more likely to experience decreased levels of agitation and wakefulness while also breathing more slowly and deeply with less effort at the conclusion of the music vigil. Results from this study suggest that a prescriptive vigil conducted by a trained music thanatologist could provide an effective form of palliative care for dying patients.

Restoring the Spirit at the End of Life: Music as an Intervention for Oncology Nurses. Halstead MT, Roscoe ST. *Clinical Journal of Oncology Nursing* 2002 6(6): 332-336
ABSTRACTS

Music is a useful therapeutic intervention that can improve quality of life for dying patients. Physiologic mechanisms in response to carefully chosen musical selections help to alleviate pain, anxiety, and nausea and induce sleep. Expression of feelings enhances mood. Palliative care nurses increase the effectiveness of this intervention through careful assessment of patient needs, preferences, goals of intervention, and available resources. Music, a universal language, is an important clinical adjunct that addresses individual and family needs, thereby assisting patients to achieve a peaceful death. This article explores musical categories of preferences to assist nurses, patients, and families in choosing music that meets specific therapeutic objectives.

Spirituality, psychotherapy and music in palliative cancer care: research projects in psycho-oncology at an oncology center in Switzerland. Renz M, Schutt Mao M, Cerny T. *Supportive Care in Cancer* 2005 13(12): 961-966.

ABSTRACT

It is recognized as increasingly important in palliative care that spiritual needs of terminally ill patients should be acknowledged and addressed. Two research projects investigated the feasibility of psychotherapeutic and music therapeutic assistance offered to advanced cancer patients. The first project (1998–2000) sought to improve the understanding of the effect of therapeutic support given to 80 patients and the characteristics of the dying process. The second project (2000–2003) assessed the significance of spiritual experiences in illness and affliction. Empathic therapeutic assistance, observations and systematic record keeping were combined with statistical assessment in an interdisciplinary approach. A respectful attitude and spiritual care were taken to perceive and analyse changes in border areas of life. The first project studied the rules and methods of terminal communication and described three stages in the dying process. After a 'passing through,' the dying often had a spiritual opening leading in a state beyond all pain. The second project concentrated on spiritual experiences. Of 251 treated patients, 135 had such experiences. Spiritual experiences can have

a great impact on physical and emotional well-being (alleviate pain, release from anxiety and despair, engender feelings of serenity and wholeness) and facilitate dying. Music therapy, psychotherapy and spiritual assistance offer essential methods for psycho-oncology and palliative care. A holistic and interdisciplinary approach is needed to assist patients in their complex suffering. Our findings on spiritual experience and terminal communication should stimulate further research in a still unexplored territory of clinical research.

Music therapy in an integrated pediatric palliative care program. Knapp C, Madden V, Wang H, Curtis C, Sloyer P, Shenkman E, Departments of Epidemiology and Health Policy Research, University of Florida, Gainesville, FL, USA. *Am J Hosp Palliat Care*. 2009 -2010 26(6):449-55. Epub 2009 Aug 7. ABSTRACT

National experts have recommended that children with life-limiting illnesses receive integrated palliative and medical care. These programs offer a variety of services, including music therapy. Using survey data from parents whose were enrolled in Florida's Partners in Care: Together for Kids (PIC:TFK) program, this study investigates parents' experiences with music therapy. About 44% of children with life-limiting illnesses and 17% of their siblings used music therapy. For children who used music therapy, multivariate results suggest that their parents were 23 times as likely to report satisfaction with the overall PIC:TFK program ($P < .05$) versus parents whose children did not use music therapy. Pediatric palliative care programs should include music therapy, although recruiting licensed music therapists may be challenging.

Music in Long-term Care and for the Elderly

A trio to treasure: the elderly, the nurse, and music. Kramer MK, University of Utah, College of Nursing, Salt Lake City, USA. *Geriatr Nurs* 2001 22(4):191-5.

ABSTRACT

Music is a powerful tool for maintaining and restoring health and is particularly suited to elder care. Music can be used to induce relaxation, alter moods, and create distraction. Music's effect is attributed to its vibrational properties, which are processed through the senses and integrated within the central nervous system. Nurses have a major responsibility to understand, appreciate, and use music in their practice.

Use of music to decrease aggressive behaviors in people with dementia. Clark ME, Lipe AW, Bilbrey M, Tennessee Technological University, Cookeville, USA. *J Gerontol Nurs* 1998 24(7): 10-7

ABSTRACT

The purpose of this study was to examine the effects of recorded, preferred music in decreasing occurrences of aggressive behavior among individuals with Alzheimer's type dementia during bathing episodes. Eighteen older adults, age 55 to 95, with severe levels of cognitive impairment, participated in the study. They were randomly scheduled for observation during bath time under either a control (no music) condition or an experimental condition in which recorded selections of preferred music were played via audiotape recorder during the bathing episode. Following a 2-week (10 episode) observation period, conditions were reversed. A total of 20 observations were recorded for each individual. Results indicated that during the music condition, decreases occurred in 12 of 15 identified aggressive behaviors. Decreases were significant ($p < 0.05$) for the total number of observed behaviors and for hitting behaviors. During the music condition, caregivers frequently reported improved affect and a general increase in cooperation with the bathing task. The implications of these findings for improving

the overall quality of care for severely cognitively impaired older are discussed.

The contribution of intimate live music performances to the quality of life for persons with dementia. van der Vleuten M, Visser A, Meeuwesen L. *Patient Educ Couns.* 2012 89(3):484-488

OBJECTIVE

The aim of this study was to assess the effect of intimate live music performances delivered by professional singers on the quality of life of persons with mild and severe dementia in nursing homes.

METHODS

A sample of 54 persons with varying degrees of dementia participated in the study. Complete data sets are available for 45 persons. Using a quasi-experimental design, quality of life was assessed on the dimensions of participation (human contact, care relationship and communication) and mental well-being (positive emotions, negative emotions and communication). Observational rating scales were completed by Live Music Research (assembled 2013), caregivers and family after the performance.

RESULTS

Intimate live music performances have a positive effect on human contact, care relationships, positive emotions and negative emotions, especially for the mild dementia group. They lead to improved human contact, better communication, more positive and less negative emotions, and an improved relationship between caregiver and receiver.

CONCLUSION

Intimate live music performances are an inexpensive, non-invasive, feasible way to improve a deteriorating quality of life for persons suffering from dementia. This form of supplementary care may also alleviate the task of caregivers.

PRACTICE IMPLICATIONS

Nursing homes should make more use of intimate live music performance as forms of complementary care.

A randomized controlled trial exploring the effect of music on quality of life and depression in older people with dementia. Cooke M, Moyle W, Shum D, Harrison S, Murfield J. *J Health Psychol* 2010 15(5):765-76.

ABSTRACT

This randomized controlled trial investigated the effect of live music on quality of life and depression in 47 older people with dementia using the Dementia Quality of Life and Geriatric Depression Scale. The control/reading group reported higher mid-point feelings of belonging than the music group ($F(1, 45) = 6.672, p < .05$). Sub-analyses of ≥ 50 per cent music session attendance found improvements in self-esteem over time ($F(2, 46) = 4.471, p < .05$). Participants with scores that were suggestive of increased depressive symptoms had fewer depressive symptoms over time ($F(2, 22) = 8.129, p < .01$). Findings suggest music and reading activities can improve self-esteem, belonging and depression in some older people with dementia.

Non-pharmacological interventions for agitation in dementia: systematic review of randomised controlled trials.

Livingston G1, Kelly L1, Lewis-Holmes E1, Baio G1, Morris S1, Patel N1, Omar RZ1, Katona C1, Cooper C1. *Br J Psychiatry.* 2014 Dec;205(6):436-42.

<http://www.ncbi.nlm.nih.gov/pubmed/25452601>

BACKGROUND:

Agitation in dementia is common, persistent and distressing and can lead to care breakdown. Medication is often ineffective and harmful.

AIMS:

To systematically review randomised controlled trial evidence regarding non-pharmacological interventions. Method We reviewed 33 studies fitting predetermined criteria, assessed their validity and calculated standardised effect sizes (SES).

RESULTS:

Person-centred care, communication skills training and adapted dementia care mapping decreased symptomatic and severe agitation in care homes immediately (SES range 0.3-1.8) and for up to 6 months afterwards (SES range 0.2-2.2). Activities and music therapy by protocol (SES range 0.5-0.6) decreased overall agitation and sensory intervention decreased clinically significant agitation immediately. Aromatherapy and light therapy did not demonstrate efficacy.

Music for Infants and Children

Live music is beneficial to preterm infants in the neonatal intensive care unit environment. Arnon S, Shapsa A, Forman L, Regev R H, Baur S, Litmanovitz I, Dolfim T Z. *Birth*. 2006 33 (2): 131-6.

BACKGROUND

Music stimulation has been shown to provide significant benefits to preterm infants. We hypothesized that live music therapy was more beneficial than recorded music and might improve physiological and behavioral parameters of stable preterm infants in the neonatal intensive care unit.

METHODS

Thirty-one stable infants randomly received live music, recorded music, and no music therapy over 3 consecutive days. A control of the environment noise level was imposed. Each therapy was delivered for 30 minutes. Inclusion criteria were postconceptional age \geq 32 weeks, weight \geq 1,500 g, hearing confirmed by distortion product otoacoustic emissions (DPOAEs), and no active illness or documentation of hyperresponsiveness to the music. Heart rate, respiratory rate, oxygen saturation, and a behavioral assessment were recorded, every 5 minutes, before, during, and after therapy, allowing 30 minutes for each interval. The infant's state was given a numerical score as follows: 1, deep sleep; 2, light sleep; 3, drowsy; 4, quiet awake or alert; 5, actively awake and aroused; 6, highly aroused, upset, or crying; and 7, prolonged respiratory pause $>$ 8 seconds. The volume range of both music therapies was from 55 to 70 dB. Parents and medical personnel completed a brief questionnaire indicating the effect of the three therapies.

RESULTS

Live music therapy had no significant effect on physiological and behavioral parameters during the 30-minute therapy; however, at the 30-minute interval after the therapy ended, it significantly reduced heart rate (150 \pm 3.3 beats/min before therapy vs 127 \pm 6.5 beats/min after therapy) and improved the behavioral score (3.1 \pm 0.8 before therapy vs 1.3 \pm 0.6 after therapy, $p < 0.001$). Recorded music and no music therapies had no significant effect on any of the tested parameters during all intervals. Both medical personnel and parents preferred live music therapy to recorded music and no music therapies; however, parents considered live music therapy significantly more effective than the other therapies.

CONCLUSIONS

Compared with recorded music or no music therapy, live music therapy is associated with a reduced heart rate and a deeper sleep at 30 minutes after therapy in stable preterm infants. Both recorded and no music therapies had no significant effect on the tested physiological and behavioral parameters.

In a commentary about this research, Bryan C. Hunter, PhD, CAT, MT-BC, and Olle Jane Z. Saltier, MD (Birth 33:2 June 2006, p. 137), point out that “Arnon and colleagues appear to be the first to compare live versus recorded music in a single experimental design testing music therapy in the neonatal intensive care unit.” They also note that “the soothing effect of live music on the total environment should not be underestimated. It is much easier to become habituated to recorded music than to live music, where the therapist is present on-site, and interacting with patients, parents, and staff, and responding to the needs of individuals in real time.”“

A meta-analysis of the efficacy of music therapy for premature infants. Standley JM Center for Music Research, Florida State University, Tallahassee, FL 32306-1180, USA. J Pediatr Nurs 2002 17(2):107-13

ABSTRACT

This meta-analysis on music research with premature infants in neonatal intensive care units (NICU) showed an overall large, significant, consistent effect size of almost a standard deviation ($d = .83$) (Cohen, 1998). Effects were not mediated by infants' gestational age at the time of study, birthweight, or type of music delivery nor by physiologic, behavioral, or developmental measures of benefit. The homogeneity of findings suggests that music has statistically significant and clinically important benefits for premature infants in the NICU. The unique acoustic properties that differentiate music from all other sounds are discussed and clinical implications for research-based music therapy procedures cited.

Music Therapy Research in the NICU: An Updated Meta-Analysis. Standley JJ. Neonatal Netw 2012 31(5):311-6.

PURPOSE

To provide an overview of developmental and medical benefits of music therapy for preterm infants.

DESIGN

Meta-analysis.

SAMPLE

Empirical music studies with preterm infants in the neonatal intensive care unit (NICU).Main

OUTCOME

Evidence-based NICU music therapy (NICU -MT) was highly beneficial with an overall large significant effect size (Cohen's $d = 0.82$). Effects because of music were consistently in a positive direction.

RESULTS

Results of the current analysis replicated findings of a prior meta-analysis and included extended use of music. Benefits were greatest for live music therapy (MT) and for use early in the infant's NICU stay.

Bedside musical care: applications in pregnancy, childbirth, and neonatal care. Olson SL, Michigan State University. J Obstet Gynecol Neonatal Nurs 1998 27(5):569-75

ABSTRACT

Although music therapy in health care settings is not new, bringing live music to the bedside is a new way of extending the caring tradition of nursing practice. Bedside musical care is consistent with a philosophy of holistic nursing practice and can be used during pregnancy, childbirth, and in neonatal care. It is defined as live music at the bedside, which is part of a treatment plan to foster integrity, well-being, and health for varied populations across the life span.

Therapeutic effects of music and mother's voice on premature infants. Standley JM, Moore RS. *Pediatr Nurs* 1995 21(6):509-12, 574

ABSTRACT

Aversive environment auditory stimuli is a common concern in neonatal intensive care. Recently, interest has developed regarding the use of music applications to mask such stimuli and to reduce the high risk for complications or failure to thrive. In this study of 203 oxygenated, low birth weight infants in a Newborn Intensive Care Unit of a regional medical center in the Southeastern United States, 10 infants listened to lullabies and 10 infants to recordings of their mother's voice through earphones for 20 minutes across three consecutive days. Oxygen saturation levels and frequency of oximeter alarms were recorded. Results indicated a differential response to the two auditory stimuli as listening time progressed. On Day 1, the infants listening to music had significantly higher oxygen saturation levels, but these effects disappeared by Days 2 and 3. On Days 2 and 3, however, the babies hearing music had significantly depressed oxygen saturation levels during the posttest intervals after the music was terminated. Infants hearing music had significantly fewer occurrences of Oximeter alarms during auditory stimuli than did those listening to the mothers' voice. Implications for the therapeutic use of auditory stimuli in the Newborn Intensive Care Unit are discussed.

The effect of soothing music on neonatal behavioral states in the hospital newborn nursery.

Kaminski J, Hall W. *Neonatal Netw* 1996 15(1):45-54

ABSTRACT

Most newborns born in Western countries spend their first transitional hours in hospital nurseries. Noxious noise levels in the nursery can interfere with neonatal efforts to achieve physiological and behavioral homeostasis. Literature indicates that music has been used to induce relaxation states and reduce stress responses. This study used a one-group, pretest, posttest design. A convenience sample of 20 term, Caucasian neonates was recruited. The number of high arousal behavioral states and the number of state changes of the newborns was recorded for a control and an experimental period. Soothing, lyrical music was played in the baby's bed during the experimental period. The data was compared using McNemar's test statistic. A significant 4 difference ($p < .01$) was observed. The results suggest that soothing music may be a feasible intervention to help newborns demonstrate fewer high arousal states and less state lability.

Effects of music therapy on oxygen saturation in premature infants receiving endotracheal suctioning. Chou LL, Wang RH, Chen SJ, Pai L. Tri-Service General Hospital. *J Nurs Res (China)* 2003 11(3):209-16

ABSTRACT

The purpose of this study was to investigate how premature infants' oxygen saturation changed in response to music therapy while they were receiving endotracheal suctioning. A convenience sample of 30 premature infants was selected from three neonatal intensive care units. A onegroup repeated measures design was adopted for this study. The oxygen saturation of all subjects was first measured while they were receiving endotracheal suctioning during a four-hour control period with regular care. Then, four hours after the control period was completed, an experimental period began in which the music " Transitions" was played. One minute before suctioning, the level of oxygen saturation was measured to provide the baseline data. During a period of 30 minutes after suctioning, the oxygen saturation was recorded every minute to analyze the clinical effects of music therapy. The results showed that premature infants receiving music therapy with endotracheal suctioning had a significantly higher SPO₂; than that when not receiving music therapy ($p < .01$), and the level of oxygen saturation returned to the baseline level faster than when they did not receive music therapy ($p < .01$).

Accordingly, it is hoped that giving appropriate music therapy as developmental care to premature infants when performing any nursing intervention may enhance not only the quality of nursing care but also quality of the infant's life.

The effects of music listening on inconsolable crying in premature infants. Keith DR, Russell K, Weaver BS. *J Music Ther.* 2009 46(3):191-203. Over the decades, medical staff have developed strategies to manage crying episodes of the critically ill and convalescing premature infant. These episodes of crying occur frequently after infants are removed from ventilation, but before they are able to receive nutrition orally. Not only are these episodes stressful to infants and upsetting to parents, but they are also stressful and time consuming for the staff that take care of these patients. Although the literature supports the benefits of music therapy in regard to physiological and certain behavioral measures with premature infants, no research exists that explores the use of music therapy with inconsolability related to the "nothing by mouth" status. This study explored the effects of music therapy on the crying behaviors of critically ill infants classified as inconsolable. Twenty-four premature infants with gestational age 32-40 weeks received a developmentally appropriate music listening intervention, alternating with days on which no intervention was provided. The results revealed a significant reduction in the frequency and duration of episodes of inconsolable crying as a result of the music intervention, as well as improved physiological measures including heart rate, respiration rate, oxygen saturation, and mean arterial pressure. Findings suggest the viability of using recorded music in the absence of a music therapist or the maternal voice to console infants when standard nursing interventions are not effective.

Effect of Music by Mozart on Energy Expenditure in Growing Preterm Infants. Lubetzky R, Mimouni FB, Dollberg S, Reifen R, Ashbel G, Mandel D. *Pediatrics.* 2009.

OBJECTIVE

The rate of weight gain in preterm infants who are exposed to music seems to improve. A potential mechanism could be increased metabolic efficiency; therefore, we conducted this study to test the hypothesis that music by Mozart reduces resting energy expenditure (REE) in growing healthy preterm infants.

DESIGN

A prospective, randomized clinical trial with crossover was conducted in 20 healthy, appropriate-weight-for-gestational-age, gavage-fed preterm infants. Infants were randomly assigned to be exposed to a 30-minute period of Mozart music or no music on 2 consecutive days. Metabolic measurements were performed by indirect calorimetry.

RESULTS

REE was similar during the first 10-minute period of both randomization groups. During the next 10-minute period, infants who were exposed to music had a significantly lower REE than when not exposed to music ($P = .028$). This was also true during the third 10-minute period ($P = .03$). Thus, on average, the effect size of music on REE is a reduction of approximately 10% to 13% from baseline, an effect obtained within 10 to 30 minutes.

CONCLUSIONS

Exposure to Mozart music significantly lowers REE in healthy preterm infants. We speculate that this effect of music on REE might explain, in part, the improved weight gain that results from this "Mozart effect."

School-aged children's experiences of postoperative music medicine on pain, distress, and

anxiety. Nilsson S, Kokinsky E, Nilsson U, Sidenvall B, Enskär K, Department of Paediatric Anaesthesia and Intensive Care Unit, The Queen Silvia Children's Hospital, Sahlgrenska University Hospital, Göteborg, Sweden. *Paediatr Anaesth.* 2009 19(12):1184-90.

AIM

To test whether postoperative music listening reduces morphine consumption and influence pain, distress, and anxiety after day surgery and to describe the experience of postoperative music listening in school-aged children who had undergone day surgery.

BACKGROUND

Music medicine has been proposed to reduce distress, anxiety, and pain. There has been no other study that evaluates effects of music medicine (MusiCure) in children after minor surgery.

METHODS

Numbers of participants who required analgesics, individual doses, objective pain scores (Face, Legs, Activity, Cry, Consolability [FLACC]), vital signs, and administration of anti-emetics were documented during postoperative recovery stay. Self-reported pain (Coloured Analogue Scale [CAS]), distress (Facial Affective Scale [FAS]), and anxiety (short State-Trait Anxiety Inventory [STAI]) were recorded before and after surgery. In conjunction with the completed intervention semi-structured qualitative interviews were conducted.

RESULTS

Data were recorded from 80 children aged 7-16. Forty participants were randomized to music medicine and another 40 participants to a control group. We found evidence that children in the music group received less morphine in the postoperative care unit, 1/40 compared to 9/40 in the control group. Children's individual FAS scores were reduced but no other significant differences between the two groups concerning FAS, CAS, FLACC, short STAI, and vital signs were shown. Children experienced the music as 'calming 14 and relaxing.'

CONCLUSIONS

Music medicine reduced the requirement of morphine and decreased the distress after minor surgery but did not else influence the postoperative care.

The Effects of Music Therapy on Vital Signs, Feeding, and Sleep in Premature Infants. Loewy J, Stewart K, Dassler A, Telsey A, Homel P, PhD, The Louis Armstrong Center for Music & Medicine NICU and Department of Biostatistics, Beth Israel Medical Center, New York. *J of Pediatrics.* Accepted January 2013

OBJECTIVES

Recorded music risks overstimulation in NICUs. The live elements of music such as rhythm, breath, and parent-preferred lullabies may affect physiologic function (eg, heart and respiratory rates, O₂ saturation levels, and activity levels) and developmental function (eg, sleep, feeding behavior, and weight gain) in premature infants.

METHODS

A randomized clinical multisite trial of 272 premature infants aged ≥ 32 weeks with respiratory distress syndrome, clinical sepsis, and/or SGA (small for gestational age) served as their own controls in 11 NICUs. Infants received 3 interventions per week within a 2-week period, when data of physiologic and developmental domains were collected before, during, and after the interventions or no interventions and daily during a 2-week period.

RESULTS

Three live music interventions showed changes in heart rate interactive with time. Lower heart rates occurred during the lullaby ($P < .001$) and rhythm intervention ($P = .04$). Sucking behavior showed differences with rhythm sound interventions ($P = .03$). Entrained breath sounds rendered lower heart

rates after the intervention ($P = .04$) and differences in sleep patterns ($P < .001$). Caloric intake ($P = .01$) and sucking behavior ($P = .02$) were higher with parent-preferred lullabies. Music decreased parental stress perception ($P < .001$).

CONCLUSIONS

The informed, intentional therapeutic use of live sound and parent-preferred lullabies applied by a certified music therapist can influence cardiac and respiratory function. Live Music Research (assembled 2013) NM, MG 5 Entrained with a premature infant's observed vital signs, sound and lullaby may improve feeding behaviors and sucking patterns and may increase prolonged periods of quiet-alert states. Parent-preferred lullabies, sung live, can enhance bonding, thus decreasing the stress parents associate with premature infant care.