CHAPTER III

A HISTORIOGRAPHY OF THE SUBJECT

The field of music therapy is expanding rapidly into new areas, practices and interdisciplinary fields, redefining its goals and values. Music has been a subject of research since World War I and there is a vast research literature documenting the effect of different music therapy models on the physiological, psychological, social, existential and spiritual well being of persons with many different psychiatric or medical diagnoses. The term historiography here refers to a body of historical work on a specialized topic like Music Therapy. As The Cochrane Library includes meta-analyses / systematic reviews of the effect of music interventions on; pain relief, autistic spectrum disorders, schizophrenia, dementia, depression, mechanically ventilated patients, acquired brain injury and coronary heart disease patients, etc. In this context I have tried to give as many published abstracts of these experimental studies and reviews from reputed National and International journals of Music Therapy to point the complementary evidence from quantitative research.

The data sourced has been compiled thematically and thereafter periodically set (starting from 1950 – 2011) under 20 categories.
The following 20 categories define the role of Music as a therapy for:

A) Academic Skills
B) Animals
C) Anxiety- During, Pre & Post Surgery
D) Asthma
E) Cancer
F) Cardiovascular Problems
G) Chronic Pain
H) Developmental Disabilities
I) Depression
J) Diabetes
K) I.C.U Patients
L) Insomnia
M) Invasive & Non-Invasive Medical Procedures
N) Maternity Nursing
O) Mental Illnesses & Disorders
P) Migraine
Q) Palliative Care
R) Pre-Mature Babies & Neonates
S) Stress
T) Tumor

Each theme is followed by observations to figure out the variables studied in the cases and thus benefited by the melodic intonation.
A) ACADEMIC SKILLS

1. **Music and test anxiety: further evidence for an interaction.**

   Abstract - This study investigated the existence of an interaction between music and anxiety, with the hypothesis that highly test anxious subjects would perform better in a test like situation when background music was present than when the more usual condition of silence prevailed. 162 final year Diploma of Education and third year B.Ed. students completed Sarason's Test Anxiety Scale. Three experimental conditions were used in which students were required to study a 1500 word passage for 10 min. The conditions were silence, music as the students entered and music throughout. The second group showed the highest scores on a test of the material learned.

2. **Randomized crossover trial studying the effect of music on examination anxiety.**

   Abstract - The purpose of this study was to assess the effect of lento music on examination anxiety among nursing students. A randomized crossover classroom-based trial was conducted. Thirty-eight students with a mean age of 19.4 years (SD = .54) were randomly assigned to either a music /silence or a silence/music group sequence. The students in the music group were given a 40-min group-based music intervention in a classroom, whereas the students in the silence group received the regular test without music. Using paired t-tests, there were no significant difference in pretest scores for state anxiety, examination anxiety, finger temperature and pulse rate between the two conditions. Nonetheless, the findings indicated that music intervention did effectively decrease examination anxiety and state anxiety as well as reducing pulse rate and increasing higher finger temperature (p = 0.05 to 0.001). In addition, significant differences were detected between the pretest and posttest measures for silence (p = 0.001). The results suggest that lento music is effective at anxiety reduction. This study provides evidence for nursing faculty and clinical educators to foster nursing students' mastering over the anxiety of examination by using lento music.

1 Stanton, H.E., 1975, BRIT.J.EDUC.PSYCHOL, Volume 45, Issue 1, , Pages 80-82
Observations: Limited abstracts were obtained under this theme providing more scope of research in this area. The studies were conducted to see the impact of music over anxiety in academic discipline.

Both the studies showed positive effects of music in reducing anxiety.

Music Therapy is used as an independent therapeutic intervention in reducing anxiety in academic performance.
B) ANIMALS

1. **Anxiolytic effect of music depends on ovarian steroid in female mice.**

Abstract - Music is known to be able to elicit emotional changes, including anxiolytic effects. The gonadal steroid hormones estradiol and progesterone have also been reported to play important roles in the modulation of anxiety. In the present study, we examined whether the effect of music on anxiety is related to ovarian steroid in female mice. Behavioral paradigms measuring anxiety were tested in gonadally intact (SHAM) and ovariectomized (OVX) female mice chronically treated with either placebo (OVX/Placebo), 17β-estradiol (OVX/E), or progesterone (OVX/P). In the elevated plus maze, light-dark transition, and marble burying tests, SHAM and OVX/P mice exposed to music showed less anxiety than those exposed to white noise or silence while OVX/placebo mice did not show these effects at all. OVX/E mice showed the anxiolytic effect of music only in the marble-burying test. Furthermore, pretreatment with progesterone's metabolite inhibitor completely prevented the anxiolytic effect of music in behavioral tests, while pretreatment with progesterone receptor blocker did not prevent the anxiolytic effect of music. These results suggest that exposure to music reduces anxiety levels, and ovarian steroids, mainly progesterone, may be involved in the anxiolytic effect of music observed in female mice.

2. **Anxiolytic effect of music exposure on BDNFMet/Met transgenic mice.**

Abstract - Brain-derived neurotrophic factor (BDNF) has been reported to play important roles in the modulation of anxiety, mood stabilizers, and pathophysiology of affective disorders. Recently, a single nucleotide polymorphism (SNP) in the BDNF gene (Val66Met) has been found to be associated with depression and anxiety disorders. The humanized BDNFMet/Met knock-in transgenic mice exhibited increased anxiety-related behaviors that were unresponsive to serotonin reuptake inhibitors, fluoxetine. Music is known to be able to elicit emotional changes, including anxiolytic effects. In this study, we found that music treatment could significantly decrease anxiety state in

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1Chikahisa, S., etc., Behavioural Brain Research, Volume 179, Issue 1, 16 April 2007, Pages 50-59
2 Li, W.-J., etc., Brain Research, Volume 1347, Issue C, 6 August 2010, Pages 71-79
BDNFMet/Met mice, but not in BDNF+/−, mice compared with white noise exposure in open field and elevated plus maze test. Moreover, in contrast to white noise exposure, BDNF expression levels in the prefrontal cortex (PFC); amygdala and hippocampus were significantly increased in music-exposed adult BDNFMet/Met mice. However, music treatment could not up regulate BDNF levels in the PFC, amygdala, and hippocampus in BDNF +/- mice, which suggests the essential role of BDNF in the anxiolytic effect of music. Together, our results imply that music may provide an effective therapeutic intervention for anxiety disorders in humans with this genetic BDNFMet variant.

3. **Music exposure differentially alters the levels of brain-derived neurotrophic factor and nerve growth factor in the mouse hypothalamus.**

Abstract - It has been reported that music may have physiological effects on blood pressure, cardiac heartbeat, respiration, and improve mood state in people affected by anxiety, depression and other psychiatric disorders. However, the physiological bases of these phenomena are not clear. Hypothalamus is a brain region involved in the regulation of body homeostasis and in the pathophysiology of anxiety and depression through the modulation of hypothalamic-pituitary-adrenal (HPA) axis. Hypothalamic functions are also influenced by the presence of the neurotrophins brain-derived neurotrophic factor (BDNF) and nerve growth factor (NGF), which are proteins involved in the growth, survival and function of neurons in the central nervous system. The aim of this study was to investigate the effect of music exposure in mice on hypothalamic levels of BDNF and NGF. We exposed young adult mice to slow rhythm music (6 h per day; mild sound pressure levels, between 50 and 60 dB) for 21 consecutive days. At the end of the treatment mice were sacrificed and BDNF and NGF levels in the hypothalamus were measured by enzyme-linked immunosorbent assay (ELISA). We found that music exposure significantly enhanced BDNF levels in the hypothalamus. Furthermore, we observed that music-exposed mice had decreased NGF hypothalamic levels. Our results demonstrate that exposure to music in mice can influence neurotrophin production in the hypothalamus. Our findings also suggest that physiological effects of music might be in part mediated by modulation of neurotrophins.

1 Angelucci, F., etc., Neuroscience Letters, Volume 429, Issue 2-3, 18 December 2007, Pages 152-155
Observations: Limited studies were obtained under this theme providing more scope of research in this area.

First 2 of 3 concluded on the efficacy of music in reducing anxiety in mice whereas the last study demonstrated that exposure to music in mice can influence neurotrophin (family of proteins that induce the survival, development, and function of neurons) production in the hypothalamus which subsequently leads to betterment of physiological parameters.

Music has been used as an independent therapeutic intervention in reducing anxiety in mice.
1. The effect of music and desensitization on preoperative anxiety in children.  

Abstract - In this study, music was used as part of a comprehensive preoperative teaching session aimed at informing pediatric patients about events pertaining to surgery. The purpose of the study was to investigate whether music therapy can transmit adequate information about the surgical experience to the pediatric patient to help reduce his or her anxiety and fear behaviors during induction of preoperative medication. Subjects were 75 children ages 3 through 8 who were admitted for elective surgery. The experimental design incorporated a three-sample method, with the control group receiving only verbal preoperative instruction the evening before surgery, Experimental 1 group receiving the previously mentioned verbal instruction with added music, and Experimental 2 group receiving this treatment strategy plus music immediately prior to induction of preoperative medication on the morning of surgery. The group receiving music therapy just prior to induction of preoperative medication was consistently rated as indicating less anxiety before and during induction of preoperative medication.

1 Chetta, H.D. Journal of music therapy, Volume 18, Issue 2, June 1981, Pages 74-87
2. Reduction of preoperative anxiety - Music as an alternative to pharmacotherapy.¹

Abstract - Ninety ASA I-II patients scheduled for a pre-planned surgical operation were randomly assigned to three groups: the first of these received no premedication, the second received 1-2 ml Thalamonal i.m and the third were offered music from a walkman via earphones. Excluded from the study were patients under 15 and over 65 years of age, patients suffering from malignant diseases, those expecting operations of uncertain outcome, and patients whose mother tongue was not German. All 90 patients were cared for by the same investigator. She obtained informed consent on the eve of the scheduled operation and chose the music that was to be offered preceding the operation according to the patient's wishes. Each patient's history was evaluated, including the grade of anxiety and his or her attitude towards music. Of course, a physical examination was also conducted. Ninety minutes prior to the operation, psychometric tests (STAI-G-X2, STAI-G-X1, ESA-S, and BF-S) were performed. Thereafter, either music was offered or else 1-2 ml Thalamonal was injected, according to the random assignment: group 1 received neither. Fifteen minutes before entering the operating room, the test expressing anxiety with regard to the situation were repeated as was the physical examination, and the investigator once again assessed the level of anxiety of the patients. On the evening of the day of surgery, all patients were asked to give an evaluation of the preoperative period. Trait-anxiety, as measured by the STAI-G-X2-Test, was comparable in all groups. State-anxiety was similar at the beginning of the investigative period, but then increased in the Thalamonal group, decreased in the music group, and remained the same in the 'no-medication' group.

¹ Daub, D., etc., Anaesthesist, Volume 37, Issue 9, 1988, Pages 594-597
The differences were statistically significant at the P< 0.05 level. The evaluation of the investigator correlated poorly with the subjective anxiety scores, especially in the Thalamonal group. The conclusion to be drawn from the study is that music may well be considered as an alternative for reducing preoperative anxiety in patients prior to minor surgery.

3. Patients' perceptions of music during surgery. ¹

Abstract - Music, as an aesthetic and symbolic medium, has the ability to dispel much of the fear and anxiety associated with facing the unknown alone. As such it is an ideal support for patients undergoing surgery where a non-general anesthetic is administered. However, it is important to consider whether, from the patient's perspective, the inclusion of music in such a situation is considered to be helpful. A pilot study conducted at an acute hospital involved interviewing 25 patients who, through an attitudinal scale and their interview responses, revealed positive support for the music that they listened to during their operation. Their remarks focused on the ability of the music, as a familiar personal and cultural medium, to ease their anxiety, to act as a distractor and to increase their threshold of pain. From a nursing perspective, such an application of music as therapy to reduce fear and anxiety may be viewed as being highly relevant to the work of the anesthetic nurse, with regard to a more individualized and holistic approach to patient care.

4. Relaxing to the beat: music therapy in perioperative nursing. ²

Abstract –Results: 1. Music therapy is a research-based nursing intervention that can be used in perioperative nursing to reduce anxiety and prevent postoperative complications. 2. Music therapy provides patients with some degree of control and the opportunity to participate in their own care. 3. The use of headphones allows the patient to listen to the music without the distraction of other sounds.

¹ Stevens, K. Journal of advanced nursing, Volume 15, Issue 9, September 1990, Pages 1045-1051
5. **The effect of music on patients under a local anesthesia for surgery: The response of former patients to a survey.**

Abstract - To reduce intraoperative tension and anxiety of patients given only a local anesthesia, the authors have employed music during surgery as a form of therapy. To ascertain the effects of this therapy, the opinions of 100 former patients who underwent surgery while hearing music were surveyed by a questionnaire about this form therapy. The response to this questionnaire has revealed that the anxiety and tension of patients who listened to music during were clearly reduced in contrast to control patients who underwent surgery in a non-music environment. Further, the calming effect of this music was most notable in younger patients and in cases of surgery involving the face or the head. The findings of this survey thus indicate that music is effective in reducing the anxiety and tension of patients given only a local anesthetic for their surgery. The authors thus stress the need to create a more comfortable operating room environment for patients undergoing surgery by providing soothing music and introducing other stress-reducing innovations.

6. **Effect of music on ambulatory surgery patients’ postoperative anxiety.**

Abstract - Music Therapy is becoming an increasingly popular form of complementary medicine and has been shown to be particularly helpful to alleviate stress and anxiety in stressful environments. One recent study conducted at the Day Surgery Unit of St Mary’s Hospital, Mequon, Wisconsin, USA investigated the role that music therapy might play in a postoperative setting for ambulatory patients. Forty-two ambulatory surgery patients were assigned to either an experimental group to receive music therapy along with the standard preoperative instructions or a control group to receive the standard preoperative instruction alone. Heart rate, blood pressure and respiratory rates were used as measurements of anxiety and physical stress. The only difference in the two groups was that the patients in the experimental group were allowed to listen to the music of their choice prior to surgery. The results revealed that the patients in the experimental group

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2 Augustin P, etc., AORN Journal of Music Therapy, 1996; 63:4,750
showed significantly lower heart rates compared to the patients in the control group. The experimental group also showed greater improvements in blood pressure and respiration rate. The researchers concluded that music therapy offers demonstrable benefits for ambulatory surgery patients and they recommend that the patients should be offered music as an effective option to help alleviate postoperative anxiety.

7. **The use of music during the immediate postoperative recovery period.**

Abstract - The most effective approach to managing patients' pain in the immediate postoperative period may include a combination of pharmacologic agents and noninvasive, non-pharmacologic interventions. In this study, nurse researchers evaluated the effect of music on pain and anxiety levels and selected physiologic parameters of two groups of patients who were emerging and recovering from anesthesia. Patients in the treatment group listened to music through headphones during the last 30 minutes of their surgical procedures and during the first hour in the post anesthesia care unit (PACU). Patients in the control group had identical surgical procedures, received the same preoperative medications, and were managed with the same anesthesia protocol but did not listen to music in the OR / PACU. No differences existed between the two patient groups in the variables measured; however, patients in the treatment group stated that music helped them relax and functioned as a distracter.

8. **Introducing a music program in the perioperative area.**

Abstract - Music can touch patients deeply and thus transform their anxiety and stress into relaxation and healing. Patients with cancer who undergo surgical procedures are highly stressed. To help alleviate these patients' stress and improve their comfort, perioperative nurses at Memorial Sloan-Kettering Cancer Center (MSKCC), New York, surveyed surgical patients and staff members about introducing a perioperative music program. This article reviews the literature on the use of music in perioperative care settings and describes MSKCC's decision to evaluate and then implement a music program.

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1 Heiser, R.M., etc., AORN journal, Volume 65, Issue 4, April 1997, Pages 777-778, 781-785
2 Cunningham, M.F., etc., AORN journal, Volume 66, Issue 4, October 1997, Pages 674-682
9. **State of the science of music interventions. Critical care and perioperative practice**

Abstract - Music therapy is an easy to administer, relatively inexpensive, noninvasive intervention that can reduce anxiety and pain in critical care and perioperative patients. Libraries of relaxing music selections need to be compiled, reflecting diverse musical tastes. Providing patients with the opportunity to partake in music therapy sessions, selecting their own music, and providing them with quiet, uninterrupted time to listen to the music provides patients with a sense of control and separation from the multiple environmental stressors they are experiencing. Although there is now an extensive empirical base for the therapeutic usefulness of music therapy, particularly with the myocardial infarction population, few hospitals have adopted music therapy programs. Patient satisfaction and outcomes clearly have improved after music therapy sessions have been implemented. Further study with more diverse samples with a wider variety of medical conditions is indicated. Most of these studies used only one or two music sessions. It is not known whether effectiveness of music therapy sessions improves with repeated exposures. Further, there are little data with respect to optimal time for implementation of music therapy, length of music therapy sessions, or types of music to use. The effects of cultural diversity have not been addressed. Music therapy can improve the quality of care that critical care and perioperative nurses deliver to their patients.

10. **The lived experience of listening to music while recovering from surgery.**

Abstract - Music has been shown to have positive physiological and psychological effects on patients in previous studies. In this study, the authors looked at the lived experience of listening to music and evaluated findings from a phenomenological perspective. Specifically, the authors described the following three themes that emerged from interview data with 8 participants who listened to music during postoperative recovery: (a) comfort from a discomforting condition, (b) familiarity in a strange environment, and

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1 White, J.M., Critical care nursing clinics of North America, Volume 12, Issue 2, June 2000, Pages 219-225
(c) distraction from fear, pain, and anxiety. In addition, implications for the use of music by nurses are discussed.

11. **Music therapy before and during oral surgeries as a positive relaxing influence on the young patients.**

Abstract - Music therapy before and during oral surgeries as a positive relaxing influence on the young patients. Oral surgery is usually accompanied by pain, higher anxiety level and emotional tension that are of concern especially in children and teenage patients. Modern medicine aims at reducing of these negative feelings and their influence on mental state of patients. Music therapy is one of the methods used to achieve it. The aim of the study was to assess the influence of music applied before and during oral surgeries on: a) patients' attitude to the treatment, their behavior before, during and after the surgery and the comprehension of the doctor's orders; b) mental state of the patients evaluated by doctors; c) subjective evaluation of the level of pain and anxiety. In the Clinic of Oral Surgery at Medical University of Gdansk 130 patients aged from 7 to 14 years have been examined. In 100 patients (43 females 7 to 14 and 57 males 7 to 14 years) music was applied before and during the surgery procedure. The index group consisted of 30 patients aged from 7 to 14 years - 17 females (7 to 14 years) and 13 males (7 to 14 years). In the index group music has not been used. Patients had been randomly assigned to the groups. Following examination methods towards all the patients have been used: Conclusion: Application of the music therapy before and during oral surgeries has shown a positive relaxing influence on the young patients. The great influence of the music therapy on the evaluation of pain level and bettering of emotional state, lowering of anxiety has been proven.

12. **A comparison of intra-operative or postoperative exposure to music - A controlled trial of the effects on postoperative pain.**

Abstract - The effect of intra-operative compared to postoperative music on postoperative pain was evaluated in a controlled trial. In all, 151 patients undergoing day case surgery

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1 Gawrońska-Skorkowska, J., etc., Annales Academiae Medicae Medicae Gedanensis, Volume 32, 2002, Pages 161-172
2 Nilsson, U., etc., Anaesthesia, Volume 58, Issue 7, 1 July 2003, Pages 6903
for inguinal hernia repair or varicose vein surgery under general anaesthesia were randomly allocated to three groups: group 1 listened to music intra-operatively, group 2 listened to music postoperatively and group 3, the control group, listened to 'white noise'. The anaesthetic and postoperative analgesic techniques were standardized. Pain was assessed using a numeric rating scale (0-10) and patients' requirements for postoperative morphine, paracetamol and ibuprofen were recorded. The effect of music on nausea, fatigue and anxiety was also investigated. The results showed that patients exposed to music intra-operatively or postoperatively reported significantly lower pain intensity at 1 and 2 h post-operatively and patients in the postoperative music group required less morphine at 1 h compared to the control group. No differences were noted in the other variables. This study demonstrates that there is a short-term pain-reducing effect of music therapy however; the beneficial effects do not differ if the patient is exposed to music intra-operatively or postoperatively.

13. Interactive Music Therapy as a Treatment for Preoperative Anxiety in Children: A Randomized Controlled Trial. 1

Abstract - In this study, we examined whether interactive music therapy is an effective treatment for pre-induction anxiety. Children undergoing outpatient surgery were randomized to 3 groups: interactive music therapy (n = 51), oral midazolam (n = 34), or control (n = 38). The primary outcome of the study was children's perioperative anxiety. We found that children who received midazolam were significantly less anxious during the induction of anesthesia than children in the music therapy and control groups (P = 0.015 and P = 0.005, respectively). We found no difference in anxiety during the induction of anesthesia between children in the music therapy group and children in the control group. An analysis controlling for therapist revealed a significant therapist effect; i.e., children treated by one of the therapists were significantly less anxious than children in the other therapist group and the control group on separation to the operating room (OR) (P < 0.05) and on entrance to the OR (P < 0.05), but not on the introduction of the anesthesia mask (P = not significant). Children in the midazolam group were the least anxious even after controlling for therapist effect (P < 0.05). We conclude that music

1 Kain, Z.N., etc., Anesthesia and Analgesia, Volume 98, Issue 5, May 2004, Pages 1260-1266
therapy may be helpful on separation and entrance to the OR, depending on the therapist. However, music therapy does not appear to relieve anxiety during the induction of anesthesia.

14. Effect of music on vital signs and postoperative pain. ¹

Abstract - Pharmacological methods to improve postoperative pain are well documented, but an increasing interest in non-pharmacological methods has stimulated research in this field. Traditional and pharmacological interventions to relieve perioperative anxiety and pain are being challenged by an increasing demand for more holistic approaches. This study tested the hypothesis that listening to music preoperatively and postoperatively would affect patients' experience of pain, nausea, and well-being and have an impact on their vital signs. The authors conclude that a period of peaceful rest before and after surgery reduces patient anxiety.

15. Stress reduction and analgesia in patients exposed to calming music postoperatively: A randomized controlled trial. ²

Abstract - Background and objectives: This randomized controlled trial was designed to evaluate, first, whether intra- or postoperative music therapy could influence stress and immune response during and after general anaesthesia and second, if there was a different response between patients exposed to music intra- or postoperatively. Method: Seventy-five patients undergoing open hernia repair as day care surgery were randomly allocated to three groups: intraoperative music, postoperative music and silence (control group). Anaesthesia and postoperative analgesia were standardized and the same surgeon performed all the operations. Stress response was assessed during and after surgery by determining the plasma cortisol and blood glucose levels. Immune function was evaluated by studying immunoglobulin A (IgA) levels. Patients' postoperative pain, anxiety, blood pressure (BP), heart rate (HR) and oxygen saturation were also studied as stress markers. Results: There was a significantly greater decrease in the level of cortisol in the postoperative music group vs. the control group (206 and 72 mmol L-1 decreases,
respectively) after 2 h in the post anaesthesia care unit. The postoperative music group had less anxiety and pain and required less morphine after 1 h compared with the control group. In the postoperative music group the total requirement of morphine was significantly lower than in the control group. The intraoperative music group reported less pain after 1 h in the post anaesthesia care unit. There was no difference in IgA, blood glucose, BP, HR and oxygen saturation between the groups. Conclusion: This study suggests that intraoperative music may decrease postoperative pain, and that postoperative music therapy may reduce anxiety, pain and morphine consumption.

16. The effect of music on preoperative anxiety in day surgery. ¹

Abstract – Aim: This paper reports a study to test the hypothesis that day surgery patients who listen to music during their preoperative wait will have statistically significantly lower levels of anxiety than patients who receive routine care. Background. Although previous day surgery research suggests that music effectively reduces preoperative anxiety, methodological issues limit the generalizability of results. Methods. In early 2004, a randomized controlled trial design was conducted to assess anxiety before and after listening to patient preferred music. Participants were allocated to an intervention (n = 60), placebo (n = 60) or control group (n = 60). Pre- and post-test measures of anxiety were carried out using the State-Trait Anxiety Inventory. Results. Music statistically significantly reduced the state anxiety level of the music (intervention) group. No relationships were found between socio-demographic or clinical variables such as gender or type of surgery. Conclusion. The findings support the use of music as an independent nursing intervention for preoperative anxiety in patients having day surgery.

¹ Cooke, M., etc., Journal of Advanced Nursing, Volume 52, Issue 1, October 2005, Pages 47-55


Abstract – Aim: We have considered pain and emotive anxiety as important factors of a slow down of the motoric recovery in patients operated of reconstruction of the anterior cruciate ligament and music therapy as a good measure of therapeutic support. Methods. In our study have been included 28 patients between 20 and 35 years operated of reconstruction of anterior cruciate ligament (ACL) with rotula tendon in arthroscopy. For 14 patients the usual rehabilitation and the postoperative period have been integrated with musicotherapy, while the other 14 have represented the control group. The valuation of the pain has been effectuated through the VAS, the functional recover with the Lysholm II score. Patients were controlled at 2 and 6 months after the operation. The patients have also been asked to valuate the degree of satisfaction of the result. Results. The effectuated valuation of pain has given an average of 16% in the treated group and an average of 22% in the control group. Lysholm II score: in the treated group was 93-5, in the control group 94.69. The satisfaction degree has been defined "good" for the 14 patients treated while only 11 of the control group have defined the result as "good". Conclusion. The music therapy leads to a large acceptance of postoperative pain by patients and to an optimal functional recovery with an increase of the degree of satisfaction.

1 Valeo, M., etc., Minerva Ortopedica e Traumatologica, Volume 57, Issue 2, April 2006, Pages 65-67
Effects of music-based therapy on distress following knee arthroplasty. ¹

Abstract - Anxiety and depression are frequent after total knee arthroplasty (TKA). Musical intervention can benefit many, including severe patients (agitated older people with dementia and terminal-ill patients) and surgical cases. This pilot study was aimed at verifying whether music therapy is beneficial after TKA. Reducing anxiety and depression is has a positive effect for the wellbeing of patients and is likely to have positive effects on outcome. In their pilot study, the authors found that a positive and specific effect of singing on depression was seen and that music therapy may be recommended after TKA instead of a pharmacological intervention.

Abstract - Organ transplant recipients characteristically experience low levels of relaxation and high levels of anxiety, pain, and nausea. Although music therapy has demonstrated effectiveness in ameliorating these types of conditions with patients in other areas of medical hospitals, no studies have evaluated the effects of music therapy on solid organ transplant patients. The purpose of this study was to assess the impact of music therapy on anxiety, relaxation, pain, and nausea levels in recovering patients on the adult transplant unit of the hospital utilizing a pre-posttest design. Participants (N= 58) received an individual 15-35 minute music therapy session consisting of live patient-preferred music and therapeutic social interaction. To remain consistent with the hospital's evaluative instruments during this pilot study, participants' self-reported levels of anxiety, relaxation, pain, and nausea, were based on separate 10-point Likert-type scales. The principal investigator observed affect and verbalizations at pre and posttest.

Results indicated there were significant improvements in self-reported levels of relaxation, anxiety (both p < .001), pain (p < .01), and nausea (p < .05). Although there was no reliability measure, there were significant increases in positive verbalizations and positive affect (p < .001). All participants reported that they would desire music therapy again during a future long-term hospital stay. From the results of this exploratory study, it seems that music therapy can be a viable psychosocial intervention for hospitalized postoperative solid transplant patients. Implications for clinical practice and suggestions for future research are provided.

20. Strategies for decreasing patient anxiety in the perioperative setting. ¹

Abstract - Preoperative patient anxiety is a pervasive problem that can have far-reaching effects. Among these effects are increased postoperative pain, increased risk for infection, and longer healing times. Many factors affect perioperative patient anxiety, including the need for surgery, perceived loss of control, fear of postoperative pain, and alteration of body image. This systematic review of current literature was undertaken to identify evidence-based interventions for decreasing patient anxiety in perioperative practice. According to the current research literature, perioperative education and music therapy can be used to successfully reduce surgical patients' anxiety.

21. Music versus diazepam to reduce preoperative anxiety: a randomized controlled clinical trial. ²

Image Source: http://virtualneuro.net/neuroblog/?p=443

¹ Bailey, L., AORN Journal, Volume 92, Issue 4, October 2010, Pages 445-460
² Berbel, P., etc., Revista española de anestesiología y reanimación, Volume 54, Issue 6, June 2007, Pages 355-358
Abstract - OBJECTIVES: To compare the effectiveness of music to that of diazepam in reducing preoperative anxiety. PATIENTS AND METHODS: Patients were randomized to 2 groups to receive diazepam or listen to music on the day of surgery and the previous day. Just before the operation, anxiety was assessed with the State-Trait Anxiety Inventory. Cortisol levels, heart rate, and blood pressure were also recorded. RESULTS: Two hundred seven patients were enrolled. No significant differences in any of the outcome measures (anxiety, cortisol level, heart rate, or blood pressure) were found between the 2 groups (music vs sedative). CONCLUSIONS: Our findings indicate that music is as effective as sedatives for reducing preoperative anxiety.

22. The impact of music on postoperative pain and anxiety following cesarean section.  

Image Source: http://www.medindia.net/surgicalprocedures/images/c-section.jpg

Abstract - Background: The relief of post-cesarean delivery pain is important. Good pain relief improves mobility and reduces the risk of thromboembolic disease, which may have been increased during pregnancy. Pain may impair the mother's ability to optimally care for her infant in the immediate postpartum period and may adversely affect early interactions between mother and infant. It is necessary, therefore that pain relief be safe and effective and results in no adverse neonatal effects during breast-feeding. Music may be considered as a potential method of post cesarean pain therapy due to its noninvasiveness and lack of side effects. In this study we evaluated the effect of intraoperative music under general anesthesia for reducing the postoperative morphine requirements after cesarean section. Methods: In a double blind placebo-controlled trial,

1 Reza, N., etc., Middle East Journal of Anesthesiology, Volume 19, Issue 3, October 2007, Pages 573-586
100 women (ASA I) scheduled for elective cesarean section under general anesthesia, were randomly allocated into two groups of fifty. After standardization of anesthesia, patients in the music group were exposed to a compact disk of Spanish guitar after induction of anesthesia up to the time of wound dressing. In the control group patients were exposed to white music. Postoperative pain and anxiety were evaluated by visual analog scale (VAS) up to six hours after discharge from PACU. Morphine was given intravenously for reducing pain to VAS ≤ 3 postoperatively. Results: There was not statistically significant difference in VAS for pain between two groups up to six hours postoperatively (P>0.05). In addition, morphine requirements were not different between two groups at different time intervals up to six hours postoperatively (P>0.05). There was not statistically significant difference between two groups regarding postoperative anxiety score and vomiting frequency (P>0.05). Conclusion: As per conditions of this study, intraoperative Spanish music was not effective in reducing postoperative pain after cesarean section. In addition postoperative morphine requirement, anxiety, and vomiting were not affected by the music during general anesthesia.

23. The effect of patient-selected music on early postoperative pain, anxiety, and hemodynamic profile in cesarean section surgery.¹

Abstract - Background: After cesarean section surgery, routine pharmacologic methods of analgesia - opioids and benzodiazepines - may impair the immediate close contact of mother and neonate for their sedative and emetic effects. Objectives: The aim of this study was to explore the effect of patient-selected music on postoperative pain, anxiety, opioid requirement, and hemodynamic profile. Methods: A total of 80 patients, American Society of Anesthesiologists (ASA) physical status I-II, scheduled to undergo general anesthesia and elective cesarean section surgery were enrolled. Patients were randomly allocated to receive 30 minutes of music or silence via headphones postoperatively. Pain and anxiety were measured with a visual analogue scale. Total postoperative morphine requirement as well as blood pressure and heart rate were recorded after the intervention period. Results: Pain score and postoperative cumulative opioid consumption were

¹ Ebneshahidi, A., etc., Journal of Alternative and Complementary Medicine, Volume 14, Issue 7, 1 September 2008, Pages 827-831
significantly lower among patients in the music group (p < 0.05), while there were no
group differences in terms of anxiety score, blood pressure, or heart rate (p > 0.05).
Conclusions: Postoperative use of patient-selected music in cesarean section surgery
would alleviate the pain and reduce the need for other analgesics, thus improving the
recovery and early contact of mothers with their children.

24. **Effect of music on preoperative anxiety in men undergoing urogenital surgery.**

Abstract - Objective: The purpose of the current study was to investigate the effect of
music therapy on preoperative anxiety levels in Turkish men undergoing urogenital
surgery. Design: The study employed a quasi-experimental design. Patients were selected
using randomized controlled sampling. Setting: The study was conducted in a urology
clinic in Aziziye Research Hospital, Süleyman Demirel Medical Centre, Atatürk
University, Erzurum, a city in the east of Turkey. Subjects: The study was conducted
with a total of 64 patients; 32 in the experimental group; 32 in the control group; aged
between 18 and 65; and able to speak, read and write Turkish. Intervention: The control
group received routine preoperative care while the experimental group listened to their
choice of music for 30 minutes in their room while they awaited surgery. Main outcome
measures: Pre and post test anxiety was measured using the State Trait Anxiety Inventory
(STAI) to assess anxiety before and after listening to the music preferred by the patient.
Results: Anxiety score averages between the groups following the music therapy were
statistically significant (p<0.001); 33.68 (SD=8.03) for the experimental group and
44.43(SD=10.42) for the control group. Conclusions: These findings support the use of
music as an independent nursing intervention to manage preoperative anxiety in patients
undergoing urogenital surgery. Listening to self-selected music during the preoperative
period can effectively reduce anxiety levels and should be a useful tool for preoperative
nursing.

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1 Arslan, S., etc., Australian Journal of Advanced Nursing, Volume 26, Issue 2, 2008, Pages 46-54
25. Relaxing music as pre-medication before surgery: A randomized controlled trial.¹

Abstract - Introduction: Patients who await surgery often suffer from fear and anxiety, which can be prevented by anxiolytic drugs. Relaxing music may be an alternative treatment with fewer adverse effects. This randomized clinical trial compared pre-operative midazolam with relaxing music. Method: Three hundred and seventy-two patients scheduled for elective surgery were randomized to receive pre-operative prevention of anxiety by 0.05-0.1 mg-kg of midazolam orally or by relaxing music. The main outcome measure was the State Trait Anxiety Inventory (STAI X-1), which was completed by the patients just before and after the intervention. Results: Of the 177 patients who completed the music protocol, the mean and (standard deviation) STAI-state anxiety scores were 34 (8) before and 30 (7) after the intervention. The corresponding scores for the 150 patients in the midazolam group were 36 (8) before and 34 (7) after the intervention. The decline in the STAI-state anxiety score was significantly greater in the music group compared with the midazolam group (P<0.001, 95% confidence interval range -3.8 to -1.8). Conclusion: Relaxing music decreases the level of anxiety in a pre-operative setting to a greater extent than orally administrated midazolam. Higher effectiveness and absence of apparent adverse effects makes pre-operative relaxing music a useful alternative to midazolam for pre-medication.

26. School-aged children's experiences of postoperative music medicine on pain, distress, and anxiety.²

Abstract - 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, and objective pain scores (Face, ¹ Bringman, H., etc., Acta Anaesthesiologica Scandinavica, Volume 53, Issue 6, July 2009, Pages 759-764 ² Nilsson, S., etc., Paediatric Anaesthesia, Volume 19, Issue 12, December 2009, Pages 1184-1190
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 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.

27. The Effect of Music on Postoperative Pain and Anxiety. ¹

Abstract - The purpose of this study was to determine if listening to music or having a quiet rest period just before and just after the first ambulation on postoperative day 1 can reduce pain and/or anxiety or affect mean arterial pressure, heart rate, respiratory rate, and/or oxygen saturation in patients who underwent a total knee arthroplasty. Fifty-six patients having a total knee arthroplasty were randomly assigned to either a music intervention group or a quiet rest group. A visual analog scale was used to measure pain and anxiety. Physiologic measures, including blood pressure, heart rate, oxygen saturation, and respiratory rate, were also obtained. Statistical findings between groups indicated that the music group's decrease in pain and anxiety was not significantly different from the comparison rest group's decrease in pain (F = 1.120; p = .337) or anxiety (F = 1.566; p = .206) at any measurement point. However, statistical findings within groups indicated that the sample had a statistically significant decrease in pain (F = 6.699; p = .001) and anxiety (F = 4.08; p = .013) over time. Results of this research provide evidence to support the use of music and/or a quiet rest period to decrease pain and anxiety. The interventions pose no risks and have the benefits of improved pain.

¹ Allred, K.D., etc., Pain Management Nursing, Volume 11, Issue 1, March 2010, Pages 15-25
reports and decreased anxiety. It potentially could be opioid sparing in some individuals, limiting the negative effects from opioids. Nurses can offer music as an intervention to decrease pain and anxiety in this patient population with confidence, knowing there is evidence to support its efficacy.

28. **Strategies for decreasing patient anxiety in the perioperative setting.**

Abstract - Perioperative patient anxiety is a pervasive problem that can have far-reaching effects. Among these effects are increased postoperative pain, increased risk for infection, and longer healing times. Many factors affect perioperative patient anxiety, including the need for surgery, perceived loss of control, fear of postoperative pain, and alteration of body image. This systematic review of current literature was undertaken to identify evidence-based interventions for decreasing patient anxiety in perioperative practice. According to the current research literature, perioperative education and music therapy can be used to successfully reduce surgical patients' anxiety.

29. **Music therapy for patients receiving spine surgery.**


Abstract - Aims and objectives. The aim of this study was to evaluate the effects of music therapy on anxiety, postoperative pain and physiological reactions to emotional and

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1 Bailey, L., AORN Journal, Volume 92, Issue 4, October 2010, Pages 445-460,
2 Lin, P.-C., etc., Journal of Clinical Nursing, Volume 20, Issue 7-8, April 2011, Pages 960-968
physical distress in patients undergoing spinal surgery. Background: Surgery-related anxiety and pain are the greatest concern of surgical patients, especially for those undergoing major procedures. Design: A quasi-experimental study design was conducted in a medical center in Taiwan from April-July 2006. Methods: Sixty patients were recruited. The study group listened to selected music from the evening before surgery to the second day after surgery. The control group did not listen to music. Patients' levels of anxiety and pain were measured with visual analogue scales (VAS). Physiological measures, including heart rate, blood pressure and 24-hour urinalysis, were performed. Results: The average age of the 60 patients was 62·18 (SD 18·76) years. The mean VAS score for degree of anxiety in the study group was 0·8-2·0, compared with 2·1-5·1 in the control group. The mean VAS score for degree of pain in the study group was 1·7-3·0, compared with 4·4-6·0 in the control group. The differences between the two groups in VAS scores for both anxiety (p=0·018-0·001) and pain (p=0·001) were statistically significant. One hour after surgery, the mean blood pressure was significantly lower in the study group than in the control group (p=0·014), but no significant differences were found between the two groups in urine cortisol (p=0·145-0·495), norepinephrine (p=0·228-0·626) or epinephrine values (p=0·074-0·619). Conclusions: Music therapy has some positive effects on levels of anxiety and pain in patients undergoing spinal surgery. Relevance to clinical practice: Complementary music therapy can alleviate pain and anxiety in patients before and after spinal surgery.

Observations: Impact of music on different variables like anxiety, pain, stress, increased / decreased consumption of analgesic & anxiolytic drugs and others, have been studied in cases of pre, intra and post-surgery.

12 out of 29 studies found music effective in reducing pain, 19 of them confirmed that music reduces anxiety, 3 studies reported lesser consumption of pain relieving drug (morphine) on exposure to music and 2 of them considered music to be an alternative to anxiety reducing (anxiolytic) drugs and. 3 studies gave null results where no significant differences in variables were found using music & drugs.

Music has been used as a supportive and adjunct therapy in perioperative practices facilitating the medical procedures by being a major distractor for the patient.
D)  ASTHMA

1.  Studies on the use of music therapy as a form of breathing exercise in bronchial asthma.  

Abstract - 96 patients suffering was examined. 46 patients over one year were offending kinesytherapy during a special active music therapy techniques were used. It was the form of breathing exercises. 50 patients during the period of one year were under program of traditional breathing kinesytherapy. The authors observed a greater effectiveness of music therapy, which decrease bronchial resistances, increases physical self-feeling and reduces anxiety level.

2.  The influence of musicotherapy on anxiety level in hospitalized asthmatic patients.  

Abstract - The role of musicotherapy as a supportive treatment is not well defined. The musicotherapy cannot be estimated as the isolated method it is often only the part of the complex therapy. The aim of this study was to evaluate the influence of musicotherapy on anxiety level in hospitalized asthmatic patients. The patient group was consisted of 36

patients with bronchial asthma (23 women and 13 men). In all patients we evaluated the level of anxiety (attribute and state) according to Spielberger and intensity of dyspnoe according to Borg scale at the first day of examination and after 10 days of rehabilitation program. Moreover we performed spirometry. The respiratory rehabilitation program included: exercise of breath control, correction of respiratory pattern, training of diaphragm and additional respiratory muscles. The duration of musicotherapy lasted 15 min. After 10 days rehabilitation with or without musicotherapy we found the reduction of anxiety (state) (p<.0001). However we did not observe the difference between two studied groups with or without musicotherapy in diminishing of anxiety (p = 0.55). In conclusion, we believe that the musicotherapy can play important role in treatment of somatic disease but our study did not confirm its additive positive meaning in patients with bronchial asthma.

3. The influence of music therapy on pulmonary rehabilitation efficiency in adults with asthma.¹

Abstract - Study aim: The aim of the study was to evaluate the influence of complex pulmonary rehabilitation completed with music therapy on level of anxiety, dyspnoea and value of chosen variables connected with patency of respiratory tract in hospitalized asthmatic patients. Material and methods: Study involved 60 consecutive patients with bronchial asthma: 43 woman and 17 men. In all patients spirometry was carried out before and after therapeutice program. The anxiety - state and trait were evaluated according to Spielberger STAI, the intensity of dyspnoea was evaluated according to Borg Scale, both at the first day of examination and after 10 days of pulmonary rehabilitation program. The program included: exercise of breath control, correction of respiratory pattern, training of diaphragm and additional respiratory muscles. The duration of music therapy was 12 min (for 10 days). Participants in music therapy group had possibility to choose one type of music from: classical music, jazz and film music. Results: After 10 days of rehabilitation with or without music therapy the reduction of anxiety-state's level (p<0,001) and dyspnoea (p<0,001) was observed. No well-defined differences were found between two studied groups with or without music therapy in

diminishing of anxiety - state (p=0.96) and dyspnoea (p=0.44). The results reveal that value of FEV1 (Forced Expiratory Volume) and PEF (Peak Expiratory Flow) increased in final measurement (p=0.001 for both rates). However, there was no visibly greater improvement related to the level of obturation in the subgroup, which was listening to the music versus subgroup without music therapy (p=0.09 and p= 0.12 respectively).

Image Source: http://www.beltina.org/pics/asthma.jpg

Observations: The above 3 abstracts, studied the effectiveness of music on anxiety and others, in asthmatic patients. 1 out of 3 cases used active music therapy itself as a breathing exercise, resulting in reducing anxiety and promoting physical wellness. The other 2 studies employed music listening, which negated music’s effectiveness in asthmatic patients.

Music has been used as an independent therapeutic intervention here where merely listening music was not of much help but singing as a form of breathing exercise did work fruitfully for asthma.
Abstract - Recent evidence suggests that at least one cancer patient in three uses some form of complementary and alternative medicine (CAM). We conducted a review of the published research on the efficacy of these treatments for breast cancer, which resulted in some observations about the current state of research and guidelines for future research. Although many of the papers reported encouraging results, the preponderance of phase I and II trials and other limitations precluded definitive conclusions about the efficacy of the treatments reported in these studies. A growing institutional base in this country has begun to facilitate improved research on CAM for cancer, yet many gaps remain. For example, there are no published reports of clinical trials or observational studies with survival endpoints for treatment agents used by many cancer patients. Clinical trials of a few CAM treatments are now in progress, but the results will not be available for several years. More complex and customized treatments may require innovative study designs and practitioner-investigator collaborations. Given the mounting evidence that CAM

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1 Jacobson JS, etc., J Am Med Women’s Assoc 1999 Fall; 54(4):177-80
treatments are biologically active as well as widely used, CAM research may affect cancer outcomes.

2. **An Investigation into synchronization of heart rate and music rhythm in a relaxation therapy in patients with cancer pain.**

Abstract - Scientists in Germany have investigated the influence of music therapy upon the heart in cancer patients suffering from chronic pain. Monitoring the synchronization and co-ordination of heart rate in cancer patients, the scientists carried out a pilot study with 28 patients suffering chronic cancer pain in a stable phase of cancer. The intervention was a 14-day training of a relaxation therapy for improving falling asleep, which included a 30-minute lullaby-like, rhythmically dominated music with gradually decreasing tempi. The researchers measured the continuous registration of heart rate and its comparison with musical beat on day 1 and 15; analysis of the degree of synchronization–coordination of systole and musical central time point; time of falling asleep and the patient’s subjective evaluation of the relaxation therapy and pain intensity. It was found that the music had a profound effect; the patients in the relaxation group showed an increasing synchronization and co-ordination of heart rate and musical beat. At a tempo of between 48 and 42 beats per minute there occurred a very stable 2:3 synchronization. Those patients reporting the best relaxation and analgesic effects showed the most synchronization. Music therapy also led to an improvement of falling asleep and a decrease in consumption of analgesics. The study showed that Lullaby-like music within a specific range of tempi may induce a trainable synchronization of heart rate, and thereby induce a relaxation and analgesic response.

3. **A pilot study into therapeutic effects of music therapy at a Cancer Help Center.**

Abstract - since the mid-1980s, music therapy has been a regular feature of the residential program at the internationally renowned Bristol Cancer Help Centre, United Kingdom. Music therapy complements other therapeutic interventions available to residents at the

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2 Burns, S.J.I., etc., Alternative Therapies in Health and Medicine, Volume 7, Issue 1, 2001, Pages 48-56
center. Objective: To compare the therapeutic effects of listening to music in a relaxed state with the active involvement of music improvisation (the playing of tuned and untuned percussion instruments) in a music therapy group setting and to investigate the potential influence of music therapy on positive emotions and the immune system of cancer patients. Design: A quantitative pre-posttest, psychological/physiological measures, and qualitative focus group design. Setting: A cancer help center that offers a fully integrated range of complementary therapies, psychological support, spiritual healing, and nutritional and self-help techniques addressing the physical, mental, emotional, and spiritual needs of cancer patients and their supporters. Participants: Twenty-nine cancer patients, aged 21 to 68 years. Intervention: Group music therapy interventions of listening to recorded/live music in a relaxed state and improvisation. Main Outcome Measures: Increased well-being and relaxation and less tension during the listening experience. Increased well-being and energy and less tension during improvisation. Increased levels of salivary immunoglobulin A and decreased levels of cortisol in both experiences. Results: Psychological data showed increased well-being and relaxation as well as altered energy levels in both interventions. Physiological data showed increased salivary immunoglobulin A in the listening experience and a decrease in cortisol levels in both interventions over a 2-day period. Preliminary evidence of a link between positive emotions and the immune system of cancer patients was found. Conclusions: These findings, which link listening to music in a relaxed state and improvisation to alterations in psychological and physiological parameters may provide a better understanding of the effectiveness of music therapy for cancer patients.


Abstract - The use of music therapy with children in health settings has been documented, but its effectiveness has not yet been well established. This pilot study is a preliminary exploration of the effectiveness of interactive music therapy in reducing anxiety and increasing the comfort of hospitalized children with cancer. Methods: Pre-and post-music therapy measures were obtained from children (N = 65) and parents. The

1 Barrera, M.E., etc., Psycho-Oncology, Volume 11, Issue 5, September 2002, Pages 379-388
measures consisted of children's ratings of mood using schematic faces, parental ratings of the child's play performance, and satisfaction questionnaires completed by parents, children and staff. Results: There was a significant improvement in children's ratings of their feelings from pre to post-music therapy. Parents perceived an improved play performance after music therapy in preschoolers and adolescents but not in school-aged children. Qualitative analyses of children and parents' comments suggested a positive impact of music therapy on the child's well being. Conclusions: These preliminary findings are encouraging and suggest beneficial effects of interactive music therapy with hospitalized pediatric hematology/oncology patients. In future studies replicating these findings should be conducted in a randomized control trial.

5. Music Therapy for Mood Disturbance during Hospitalization for Autologous Stem Cell Transplantation: A Randomized Controlled Trial. ¹

Abstract - High-dose therapy with autologous stem cell transplantation (HDT/ASCT) is a commonly used treatment for hematologic malignancies. The procedure causes significant psychological distress and no interventions have been demonstrated to improve mood in these patients. Music therapy has been shown to improve anxiety in a variety of acute medical settings. In the current study, the authors determined the effects of music therapy compared with standard care on mood during inpatient stays for HDT/ASCT. METHODS: Patients with hematologic malignancy admitted for HDT/ASCT at two sites (Memorial Sloan-Kettering Cancer Center and Ireland Cancer Center in Cleveland, Ohio) were randomized to receive music therapy given by trained music therapists or standard care. Outcome was assessed at baseline and every 3 days after randomization using the Profile of Mood States. RESULTS: Of 69 patients registered in the study, follow-up data were available for 62 (90%). During their inpatient stay, patients in the music therapy group scored 28% lower on the combined Anxiety/Depression scale (P = 0.065) and 37% lower (P = 0.01) on the total mood disturbance score compared with controls. CONCLUSIONS: Music therapy is a noninvasive and inexpensive intervention that appears to reduce mood disturbance in patients undergoing HDT/ASCT.

¹ Cassileth, B.R., etc., Cancer, Volume 98, Issue 12, 15 December 2003, Pages 2723-2729
6. **Cancer patients' interest and preferences for music therapy.**

Abstract - The reason for lack of routine integration of music therapy into healthcare may be that patients are not comfortable being involved in a music therapy intervention. Therefore, the goal of this study was to examine cancer patients’ interest in and preferences for using 2 types of music therapy interventions, music-making and music listening. Sixty-five patients completed the Music Interest Survey in addition to standardized measures of coping, affect, anxiety, and fatigue. Results suggest adult cancer patients are interested in music therapy, especially music listening. Patient interest and preference were associated with negative affect, anxiety, age, perceived intervention-specific benefits, barriers, and self-efficacy. Findings highlight the need for a comprehensive assessment of patient needs and preferences prior to intervention.

7. **The role of music therapy in care of terminally ill cancer patients.**

Abstract - Music therapy has been used in hospices since the 1970s. Data that has been gathered so far indicate the positive influence of music therapy on terminally ill patients. What motivated the author to conduct his own study was the dearth of Polish research in the field. Objectives: To investigate the influence of music therapy on terminally ill cancer patients Material and methods: The research group was comprised of 6 terminally ill cancer patients. Various qualitative data have been amassed to provide basis for the in-depth case study. During four music therapy research sessions the following techniques were used: therapeutic talk, listening to music, relaxation with music, projection with music, reminiscence with music, instrumental improvisation, and singing. Results: The results adduced evidence of the positive influence of music therapy treatment on the patients' mood, anxiety, apprehension and irritation. The treatment has also appeared to decrease physical distress, such as weakness, exhaustion, and dyspnoea. In the majority of cases, music therapy enhanced family relations. It was evaluated in a positive way by both patients and their caretakers. Conclusions: The positive influence of music therapy on terminally ill patients is substantiated by the evidence that it contributes to the

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reduction of intensity of some symptoms connected with cancer. The scope of the study is, however, exceedingly broad and requires further, quantitative investigation.


Abstract - This paper is about a single case study of a Squamous Cell Carcinoma - Hypopharynx patient, to find out if receptive music therapy could be combined with comprehensive counseling and also if health information could be provided as a cognitive behavioral intervention to address psychological distress and situational anxiety, which are common problems with cancer patients in a hospital environment. Baseline data was collected from the patient using Spielberger's State-Trait Anxiety Inventory. Assessments were done for situational anxiety before, during and after the music and counseling interventions. Pre and Post-test composite anxiety scores were compared, which indicated the efficacy of the treatment. Though the primary endpoint of the study was state anxiety, the unique experiences of listening to music, which could be explained only by the patient listening to music and the self-report made by the patient when analyzed reflected the spiritual dimensions of the music therapy sessions.


Abstract - This study examined the effects of music therapy (MT), immediate and over time, on patients' psychological functioning, quality of life, and physiologic stress arousal. This intervention, whereby patients use music strategies to cope with cancer-related stressors, is based on a transactional stress-coping framework. Using a longitudinal, randomized controlled design, 70 women with metastatic breast cancer received either MT or usual care. The MT consisted of three individual sessions led by a music therapist. Psychological symptoms were measured with the Hospital Anxiety and Depression Scale and quality of life with the Functional Assessment of Cancer Therapy-General plus a Spirituality subscale at baseline and approximately 6 weeks and 3 months

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1 Sundar, Sumathy, 2006, University of Madras
later. Visual analog scales, heart rate, and blood pressure were assessed in the MT group immediately before and after individual sessions. Significant immediate effects of MT were observed: relaxation, \( p = < .0001 \); comfort, \( p = < .0001 \); happiness, \( p = < .0001 \); heart rate, \( p = .0003 \); although no significant differences between conditions were found over time. A high attrition rate underscored the complexities inherent in conducting intervention research with advanced cancer patients.

10. Use of preferred music to reduce emotional distress and symptom activity during radiation therapy. ¹

➤ Radiation Therapy

Image Source:
http://www.memorialhealth.com/aci/services/departments/radiation/truebeam.jpg

Abstract - Music therapy has decreased anxiety levels in many medical settings. This randomized clinical trial examined the effectiveness of a music listening intervention, delivered by a board-certified music therapist, in patients undergoing curative radiation therapy (RT). Emotional distress (anxiety, depression, and treatment-related distress) and symptoms (fatigue and pain) were measured at baseline, mid-treatment, and end of treatment in 63 patients undergoing RT. Although patients who listened to self-selected

¹ Bochen, D., Onkologia Polska, Volume 9, Issue 4, 2006, Pages 133-136
music reported lower anxiety and treatment-related distress, there was a decline in these outcomes for patients in both groups over the course of RT. Depression, fatigue, and pain were not appreciably affected by music therapy. Within the music group, there was a significant correlation between number of times music was used/week and the change in treatment-related distress, suggesting that higher doses of music produced greater declines in distress. While these findings provided some support for the use of music in reducing distress during RT, further research demonstrating clear differences between intervention and control conditions is needed. Physical symptoms were not affected by the use of music over the course of RT.

11. The influence of music on anxiety and the side effects of chemotherapy. ¹

➢ Chemotherapy


Abstract - Objective: This purpose of this research is to investigate the influence of music on anxiety level and the side effects on the acute patients undergoing chemotherapy.

Methods: The research data is obtained by using Patient Identification Form, State-Trait Anxiety Inventory, Cancer Symptoms Inventory and Chemotherapy Side Effect Inventory on both sample (N=30) and control (N=30) groups. While, the cancer patients in the sample group had undergone the alternative therapy for three times, the control group was excluded. For the assessment of the research data, chi-square, ANOVA and

¹ Yildirim, S., etc., Anadolu Psikiyatri Dergisi, Volume 8, Issue 1, March 2007, Pages 37-45
correlation analysis were carried out. Result: The findings indicated that, music has a meaningful relation with respect to anxiety states of the sample group (p>0.05), and had no such a relation for the side effects of chemotherapy (p<0.001). Conclusion: The investigation showed that, the clinical use of music as an alternative therapy has positive results in the reduction of anxiety in the patients and it is recommended to include the music therapy to regular nursing practices.

12. Music therapy as a non-pharmacological anxiolytic for pediatric radiotherapy patients.¹

Abstract - Outpatient radiotherapy treatment in the pediatric cancer patient can be a traumatic and an anxiety-provoking experience for both the patient and the family. Music therapy has been widely reported to have psychosocial, educational and physical benefits for the pediatric cancer patient. Using individual case reports, this paper shows the successful use of music therapy as a non-pharmacological anxiolytic in the pediatric radiotherapy, outpatient waiting room setting, by providing the patient and the family with a means of communication, self-expression and creativity.

13. The effect of live music on decreasing anxiety in patients undergoing chemotherapy treatment.²

Abstract - The purpose of this study was to investigate the effects of familiar live music on the anxiety levels of patients undergoing chemotherapy treatment. Randomly selected patients were assigned to experimental (n = 25) and control (n = 25) conditions. Pre and posttests consisted of questionnaires and the recording of the patient's heart rate and blood pressures. Subjects in the experimental group received 20 minutes of familiar live music during their chemotherapy treatment. Subjects in the control group received standard chemotherapy. It was assumed that those patients receiving music intervention would: (a) lower their anxiety levels; (b) experience a decrease in heart rate and blood pressure; (c) improve their levels of negative reactions including fatigue, worry, and fear; and (d) improve their levels of positive reactions including comfort and relaxation. Results of the study showed statistically significant improvement for the experimental group on the measures of anxiety, fear, fatigue, relaxation, and diastolic blood pressure.

¹ O'Callaghan, C., etc., Australasian Radiology, Volume 51, Issue 2, April 2007, Pages 159-162
No significant differences between groups were found for heart rate and systolic blood pressure. Descriptive values indicated that, on average, the experimental group was influenced positively by the music intervention, and participants improved their quality of life while undergoing chemotherapy treatment.

14. **Music and cancer pain management.**

Abstract - PROBLEM: When coupled with the often debilitating side-effects of pharmacological interventions, chronic cancer pain may elicit feelings of anxiety and depression and therefore adversely affect patient well-being and quality of life. PURPOSE: This review article is a systematic assessment of the published literature related to music and cancer pain management. METHOD: A comprehensive systematic evaluation of the data based literature was undertaken and analyzed using matrix analysis. RESULTS: As an adjunctive form of pain management, music therapy has been shown to address some of these hardships by providing patients with an alternative effective means by which to reduce their subjective experiences of pain. Studies investigating the efficacy of music therapy during invasive cancer procedures and chemotherapy demonstrated the role that attention states play in distracting patients from, and therefore minimizing their experience of, the pain associated with such treatments. Other studies examining diverse outpatient populations revealed similar findings, illustrating well the cognitive-affective dimensions of pain perception. Although these findings fail to adequately address the ambiguity surrounding music therapy's role in cancer pain management, music therapy has nonetheless been shown to significantly reduce anxiety and, in so doing, indirectly lessen the intensity of pain while improving patient quality of life.

15. **Interventional effects of musical therapy to physiological and psychological conditions in process of radiotherapy for patients with cancer.**

Abstract - Objective: To investigate the effects of musical therapy applied in the process of radiotherapy for patients with cancer. Methods: Ninety-five patients with cancer receiving radiotherapy were randomly assigned to undergo or not the music intervention

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1 Igawa-Silva, W., etc., Hawaii medical journal, Volume 66, Issue 11, November 2007, Pages 292-295
for 30 minutes. The patients were asked to answer the ZUNG Anxiety scale (SAS) and HAMA Anxiety scale (HAMA) before and after the radiotherapy, and physiological indices and resting behaviors were recorded before and after the radiotherapy in both groups. Results: Before the radiotherapy, the physiological indices and SAS and HAMA scores of the musical group were a little lower than those of the control group, but it did not have a significant difference, P> 0.05. After the radiotherapy, the physiological indices and SAS and HAMA scores of the musical group were significantly lower than those before the radiotherapy (P<0.05), and were also significantly lower than those of the control group, P<0.05, and in the control group, there was no significant difference before and after the radiotherapy, P>0.05. Conclusion: Music can provide a confirmed effect on reducing potentially harmful physiological responses and anxiety in the process of radiotherapy for patients with cancer.

16. **The use of music to aid patients' relaxation in a radiotherapy waiting room.** ¹

Abstract - Patient-centered practice and increasing user involvement adds impetus to built environmental research within the health care setting. Much work has been centered on stress reduction initiatives for improving health outcomes for patients and staff. This study examined the influence of music choice on patients' anxiety levels whilst seated in a radiotherapy waiting area. Patients' stress levels and perceptions were assessed in the absence/presence of music. The opinions of patients were elicited through a questionnaire following exposure to a range of music types. Music therapy was shown to have clear benefits when individuals enjoyed the music to which they listened. Although clear preferences were indicated, the results were skewed, by the negative effects of music not enjoyed by patients. Further investigation needs to take account of the impact of personal variables and the value of 'quiet areas.

¹ Cooper, L., Foster, I., Radiography, Volume 14, Issue 3, August 2008, Pages 184-188
17. The conjoint use of music therapy and reflexology with hospitalized advanced stage cancer patients and their families. ¹

Abstract - Advanced stage cancer patients experience debilitating physical symptoms as well as profound emotional and spiritual struggles. Advanced disease is accompanied by multiple changes and losses for the patient and the family. Palliative care focuses on the relief of overall suffering of patients and families, including symptom control, psychosocial support, and the meeting of spiritual needs. Music therapy and reflexology are complementary therapies that can soothe and provide comfort. When used conjointly, they provide a multifaceted experience that can aid in the reduction of anxiety, pain, and isolation; facilitate communication between patients, family members, and staff; and provide the potential for a more peaceful dying experience for all involved. This article addresses the benefits of the combined use of music therapy and reflexology. Two case studies are presented to illustrate the application and benefits of this dual approach for patients and their families regarding adjustment to the end of life in the presence of anxiety and cognitive impairment.

¹ Magill, L. Berenson, S., Palliative and Supportive Care, Volume 6, Issue 3, September 2008, Pages 289-296
18. **Complementary therapies, herbs, and other OTC Agents.**

Abstract - Music has been used throughout history as a supportive and palliative method in the practice of medicine. It emerged as a formal discipline in the United States in the late 1940s. Music therapists-musicians who also receive intensive training as counselors or mental health therapists - use music instead of words to reach and assist patients. They manage the psychosocial and communication issues faced by patients and family members, and are especially effective in end-of-life care or when patients become withdrawn and non-communicative. Controlled trials indicate that music therapy produces emotional and physiologic benefits by reducing anxiety, [1] stress, [2] depression, and pain. [3] In a large trial of 500 surgical subjects randomized to control, recorded music, jaw relaxation, or a music and jaw relaxation combination, music led to significant decreases in both pain intensity and related distress associated with pain. [4] In a randomized study conducted at Memorial Sloan-Kettering Cancer Center, 62 cancer patients undergoing autologous stem cell transplantation were randomized to receive music therapy or standard care. Anxiety, depression, and total mood disturbance scores were significantly reduced in patients who received music therapy, compared to those in the standard care group. [5] Music was also effective among cancer patients with chronic pain. [6] Data from other studies suggest that music alleviates anxiety in patients receiving radiation therapy, [7] improves the quality of life in those with terminal cancer, [8] and reduces anxiety and increases comfort in pediatric cancer patients [9].

19. **A pilot study on effectiveness of music therapy in hospice in Japan.**

Abstract - This study aims at determining the effectiveness of music therapy in a hospice setting. We employed the salivary Cortisol level, which is widely used to measure stress level, as an objective and physical indicator and the Mood Inventory, which measures mood change, as the subjective and psychological indicators. Though many preceding studies have demonstrated that listening to music lowers Cortisol levels and reduces stress, no study seems to have included hospice patients. This study measured, with the consent of 10 hospice inpatients, their salivary Cortisol levels. Individual interviews,

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1 Cassileth, B., ONCOLOGY, Volume 23, Issue 7, June 2009, Page 647
2 Nakayama, H., etc., Journal of Music Therapy, Volume 46, Issue 2, June 2009, Pages 160-172
according to the Mood Inventory, were conducted before and after a small-group session. Since all the participants had terminal cancer, the 40-minute live session of songs of seasons and the participants' requests was given in a mostly passive manner considering their physical strength. Results showed significant lowering of salivary Cortisol levels after the therapy session. As for the parameters of mood, refreshment was significantly increased. Though fatigue remained unchanged, anxiety and depression decreased while the score for excitement tended to increase. Thus, it was indicated that music therapy in a hospice setting reduces the stress level of patients and thereby plays a positive role in improving patients' quality of life.

20. Effectiveness of music therapy for anxiety reduction in women with breast cancer in chemotherapy treatment. ¹

Abstract - In the last decade, the public use of complementary and alternative therapies for the solution of various health problems has increased dramatically. Listening to music can be considered a support to the traditional medical practice for the reduction of anxiety and stress related to chemotherapy.

21. Music therapy to reduce pain and anxiety in children with cancer undergoing lumbar puncture: A randomized clinical trial. ²

Image Source: http://www.stfranciscare.org/saintfrancisdoctors/cancercenter/nci/media/CDR0000503953.jpg

¹ Bulfone, T., etc., Holistic Nursing Practice, Volume 23, Issue 4, July 2009, Pages 238-242
Abstract - A non-pharmacological method can be an alternative or complement to analgesics. The aim of this study was to evaluate if music medicine influences pain and anxiety in children undergoing lumbar punctures. A randomized clinical trial was used in 40 children (aged 7-12 years) with leukemia, followed by interviews in 20 of these participants. The participants were randomly assigned to a music group (n = 20) or control group (n = 20). The primary outcome was pain scores and the secondary was heart rate, blood pressure, respiratory rate, and oxygen saturation measured before, during, and after the procedure. Anxiety scores were measured before and after the procedure. Interviews with open-ended questions were conducted in conjunction with the completed procedures. The results showed lower pain scores and heart and respiratory rates in the music group during and after the lumbar puncture. The anxiety scores were lower in the music group both before and after the procedure. The findings from the interviews confirmed the quantity results through descriptions of a positive experience by the children, including less pain and fear.

22. Music therapy CD creation for initial pediatric radiation therapy: A mixed methods analysis. ¹

Abstract - A mixed methods research design was used to investigate the effects of a music therapy CD (MTCD) creation intervention on pediatric oncology patients' distress and coping during their first radiation therapy treatment. The music therapy method involved children creating a music CD using interactive computer-based music software, which was "remixed" by the music therapist-researcher to extend the musical material. Eleven pediatric radiation therapy outpatients aged 6 to 13 years were randomly assigned to either an experimental group, in which they could create a music CD prior to their initial treatment to listen to during radiation therapy, or to a standard care group. Quantitative and qualitative analyses generated multiple perceptions from the pediatric patients, parents, radiation therapy staff, and music therapist-researcher. Ratings of distress during initial radiation therapy treatment were low for all children. The comparison between the two groups found that 67% of the children in the standard care group used social withdrawal as a coping strategy, compared to 0% of the children in the

¹ Barry, P., etc., Journal of Music Therapy, Volume 47, Issue 3, September 2010, Pages 233-263
music therapy group; this trend approached significance (p = 0.076). MTCD creation was a fun, engaging, and developmentally appropriate intervention for pediatric patients, which offered a positive experience and aided their use of effective coping strategies to meet the demands of their initial radiation therapy treatment.

23. **A randomized controlled trial of the effect of music therapy and verbal relaxation on chemotherapy-induced anxiety.**

Abstract – Aims: To determine the effect of music therapy and verbal relaxation on state anxiety and anxiety-induced physiological manifestations among patients with cancer before and after chemotherapy. Background. Cancer and its treatment provoke a series of changes in the emotional sphere of the patient's anxiety. Music therapy and verbal relaxation had reported the anxiety reduction effect on patients with cancer receiving chemotherapy. Few studies have been undertaken comparing music therapy and verbal relaxation in differentiating high-normal state anxiety subsample. Design. A randomized controlled trial and permuted block design were used. Outpatient chemotherapy clinic operated by a University medical centre in southern Taiwan. Methods. Ninety-eight patients were randomized into three groups: the music therapy group received one-hour single music session; the verbal relaxation group received 30 minutes of guided relaxation; the control group received usual care. Spielberger State-Trait Anxiety Instrument, Emotional Visual Analog Scale, three biobehavioural indicators: skin temperature, heart rate and consciousness level were measured during and after chemotherapy. Result. Music therapy had a greater positive effect on post chemotherapy anxiety than verbal relaxation and control groups and a significantly increase in skin temperature. Patients with high state anxiety receiving music therapy had a greater drop in post chemotherapy anxiety than did the normal state anxiety subsample. Conclusions. Both music and verbal relaxation therapy are effective in reducing chemotherapy-induced anxiety. Thirty minutes of intervention initiates anxiety reduction. Patients with high state anxiety receiving chemotherapy obtain the most benefit from music or verbal relaxation. Relevance to clinical practice: Prior to chemotherapy, patients with high state anxiety

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1 Lin, M.-F., Hsieh, Y.-J., etc., Journal of Clinical Nursing, Volume 20, Issue 7-8, April 2011, Pages 988-999
must be sorted from all patients as they are more responsive to interventions. Oncology nurses can offer music and verbal relaxation as adjuvant interventions to reduce chemotherapy-induced anxiety and enhance the quality of care.

Observations: These 22 researches studied the effect of music therapy intervention on one or more variables like anxiety, stress, pain, mood disturbances, relaxation, overall well being and others, in cancer patients undergoing medical treatment.

12 of these reported in effectiveness of music in reducing anxiety, 7 abstracts informed the overall well being of the patient, 6 said music helps to lower mood disturbances, 5 marked a significant decrease in stress levels, whereas 5 proclaimed music enhanced relaxation. 3 agreed that it lowers pain, fear and irritation. 1 research showed improvement in falling asleep & less consumption of analgesic through music.

Music Therapy has been complementing the treatment of cancer by a being a distractor and comfier for the patients.
F) CARDIOVASCULAR PROBLEMS

1. Effects of music on patient anxiety in coronary care units.  

   - Coronary Care Unit

Image Source: http://www.martinhealth.org/upload/images/Heart/HeartICUSMALL.jpg

Abstract - In this experimental study we examined the effects of listening to relaxation-type music on self-reported anxiety and on selected physiologic indices of relaxation in patients with suspected myocardial infarction. Seventy-five patients were randomly assigned to one of two experimental groups, one listening to music and the other to 'white noise', or to a control group. The State Anxiety Inventory was administered before and after each testing session, and blood pressure, heart rate, and digital skin temperature were measured at baseline and at 10-minute intervals for the 30-minute session. There was no significant difference among the three groups for state anxiety scores or physiologic parameters. Because no differences were found, analyses were conducted of the groups combined. Significant improvement in all of the physiologic parameters was found to have occurred. This finding reinforces the need for nurses to plan care that allows for uninterrupted rest for patients in the coronary care unit.

1 Zimmerman, L.M., etc., Heart and Lung: Journal of Critical Care, Volume 17, Issue 5, 1988, Pages 560-566
2. The effects of music interventions on anxiety in the patient after coronary artery bypass grafting. ¹

Image Source:

Abstract - Objective: To examine the influence during the early postoperative period of selected nursing interventions on mood and anxiety of patients undergoing heart surgery.

Design: Prospective, repeated measures, quasiexperimental, random assignment. Setting: The cardiovascular intensive care and progressive care units of a Midwestern community hospital were used as the setting for this study. Patients: Ninety-six patients who underwent elective, heart bypass surgery; the mean age of the subjects was 67 years, with an age range of 37 to 84 years. Most subjects were men (n = 65, 68%).

¹ Zimmerman, L., etc., Heart and Lung: Journal of Critical Care, Volume 24, Issue 2, 1995, Barnason, S., Pages 124-132
Outcome Measures: Physiologic measures of anxiety and mood include blood pressure and heart rate. Additional measures included the use of Spielberger's state-trait anxiety inventory (STAI) and patient verbal ratings of both mood and anxiety with use of a numeric rating scale (NRS). Intervention: Patients were randomly assigned to one of three groups: (1) music therapy, (2) music-video therapy, or (3) scheduled rest group. Subjects in the groups received their assigned 30-minute intervention at two episodes on postoperative days 2 and 3. Subjects had physiologic measures of blood pressure and heart rate measured immediately before the intervention and at 10-minute intervals throughout the intervention. Mood and anxiety were evaluated by having subjects use a NRS (i.e., 0 to 10) to give rating of mood and anxiety immediately before and after each session. Anxiety was further measured with the STAI. A baseline measure of STAI was taken before surgery; patients also completed the 'state' anxiety tool before the intervention session on postoperative day 2 and on completion of the session on postoperative day 3. Results: With use of an analysis of covariance (ANCOVA), subjects' mood ratings showed significant improvement in mood among subjects in the 'music intervention' group after the second intervention when controlling for the pre-intervention rating of mood, $F(2, 87) = 4.33, p = 0.016$. However, no significant differences were reported for anxiety ratings as measured by the NRS and state anxiety instruments. With use of repeated measures analysis of variance (ANOVA), there were no significant interactions between the intervention groups and time for any of the physiologic variables. However, there were significant main effects over time for heart rate and systolic and diastolic blood pressure, which indicated a generalized physiologic relaxation response. Conclusions: Although none of the three interventions was overwhelmingly superior, the overall response by all intervention groups demonstrated a generalized relaxation response. It is also important to note that there was reduced anxiety and improved mood within all three groups.
3. **Using heart rate variability analysis to assess the effect of music therapy on anxiety reduction of patients.**

Abstract - Music therapy has been considered to reduce the anxiety of patients, but the mechanism of music therapy remains to be investigated. Psychophysiological researchers have revealed that the autonomic activities relate to the anxiety. Heart rate variability (HRV) analysis has been used to assess the autonomic activities hence it may be a useful tool for evaluate the effects of music therapy on anxiety reduction of patients. In this study, we attempted using HRV analysis to display the effect of music therapy on autonomic balance. 68 patients attending extracorporeal shock wave lithotripsy (ESWL) were included, among them 34 patients (music therapy group) were randomly selected to undergo a music therapy (listening to a natural music) to reduce their anxiety for upcoming operation, the rest patients were be the control group. The short-term (5 minutes) HRV parameters of all patients before and undergoing music therapy were computed. The results revealed that the standard deviation of RR intervals (SDRR) and high frequency spectral power (HF power) of HRV significantly increased in the music therapy group while they did not change in the control group. Since SDRR and HF power of HRV are considered as markers for vagal activities music therapy seems to increase the vagal activity of patients. This study demonstrated that listening to the music has the influences on autonomic control. Using HRV analysis can help evaluating the effects of music therapy.

4. **Music accompanying treatment of coronary heart disease: Therapeutic music lowers anxiety, stress and β-endorphin concentration in patients of a coronary sport unit.**

Abstract - Background: In a study with coronary patients it was estimated that music is able to lower stress and fear and contributing to relaxation in spite of physical exercise. Patients and methods: 15 patients (13 male, two female, mean age 62.2 ± 7.6 years) of a

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1 Chiu, H.-W., etc., Computers in Cardiology, Volume 30, 2003, Pages 469-472
coronary sport unit were listening to especially composed relaxation music while training their common heart-frequency adapted exercises. Before the exercises and after listening to music blood pressures were measured and blood was collected for determination of β-endorphin. Simultaneous to blood collection the participants had to perform two psychometric test: the perceived stress experience questionnaire (PSQ) of Levenstein to measure the graduation of subjective perceived stress and the state-anxiety inquiry (STAI) of Spielberger as an indicator of coping. To practice the trial ("test trial"), the whole protocol was performed one week prior to the mean trial, but without listening to music and without blood collections and blood pressure measurements. Results: In the test trial without music there were no significant changes in PSQ-data. In the mean trial, under the influence of music, values in the section "worries" decreased as a sign of lower worries (26.6 versus 27.6; \( \rho = 0.039 \)). STAI-values were significantly lower as a sign of reduced fear after listening to music (31 versus 34; \( \rho = 0.045 \)). β-endorphin concentration (10.91 μg/l versus 15.96 μg/l, \( \rho = 0.044 \)) and systolic blood pressure (130mmHg versus 140mmHg; \( \rho = 0.007 \)) decreased significantly after listening to music. Conclusions: Regarding worries and fear, patients seemed to benefit by the intervention of music, β-endorphin was lowered significantly after music despite physical activity.

5. Music therapy for patients with cardiovascular diseases - A systematic review. ¹

Abstract - Background and objective: It has been suggested that patients recovering from acute myocardial infarction and acute cardiac disease may benefit from music therapy. This review is aimed to assess whether adjunctive music therapy is effective in patients suffering from various cardiac conditions. Methods: Electronic literature searches were performed using Medline, the Cochrane Library, Embase, CISCOM, CINAHL, AMED, the British Nursing Index and Psych info. References of identified articles were checked for further potential trials. Randomized clinical trials of adjunctive music therapy that involved patients with cardiac conditions were considered. Music therapy was defined as

¹ Schmidt, K., etc., Perfusion, Volume 17, Issue 4, April 2004, Pages 136-144
passively listening to music in addition to standard care. Data on study design, experimental intervention, control intervention, primary outcome parameters, statistics and results were extracted in a standardized manner. To be included, studies had to quantify endpoints relevant for cardiac conditions. Results: Twelve randomized clinical trials were included in the systematic review. Eight of these showed significant benefits in a range of endpoints of music therapy over no such treatment. Music therapy was seen as superior to no treatment in three studies measuring physiological outcomes. In six trials, music therapy was superior to the control condition for psychological outcome measures. In three of the included studies music therapy was not superior to the control condition in any of the outcome measures. Conclusion: Collectively, these suggest that music therapy shows some promise to lower patient anxiety, heart rate and possibly blood pressure of patients with cardiac conditions. The use of music therapy for cardiac patients warrants further rigorous investigation.

6. Sedative music reduces anxiety and pain during chair rest after open-heart surgery. ¹

Abstract - Open-heart surgery patients report anxiety and pain with chair rest despite opioid analgesic use. The effectiveness of non-pharmacological complementary methods (sedative music and scheduled rest) in reducing anxiety and pain during chair rest was tested using a three-group pretest-posttest experimental design with 61 adult postoperative open-heart surgery patients. Patients were randomly assigned to receive 30 min of sedative music (N=19), scheduled rest (N=21), or treatment as usual (N=21) during chair rest. Anxiety, pain sensation, and pain distress were measured with visual analogue scales at chair rest initiation and 30 min later. Repeated measures MANOVA indicated significant group differences in anxiety, pain sensation, and pain distress from pretest to posttest, P<0.001. Univariate repeated measures ANOVA (P≤0.001) and post hoc dependent t-tests indicated that in the sedative music and scheduled rest groups, anxiety, pain sensation, and pain distress all decreased significantly, P<0.001-0.015;

¹ Voss, J.A., etc., Pain, Volume 112, Issue 1-2, November 2004, Pages 197-203
while in the treatment as usual group, no significant differences occurred. Further, independent t-tests indicated significantly less posttest anxiety, pain sensation, and pain distress in the sedative music group than in the scheduled rest or treatment as usual groups (P<0.001-0.006). Thus, in this randomized control trial, sedative music was more effective than scheduled rest and treatment as usual in decreasing anxiety and pain in open-heart surgery patients during first time chair rest. Patients should be encouraged to use sedative music as an adjuvant to medication during chair rest.

7. **Effects of music therapy on physiological and psychological outcomes for patients undergoing cardiac surgery.**

Abstract - BACKGROUND: Cardiac surgery is a common interventional procedure for ischemic and valvular heart disease. Cardiac surgery is accompanied by postoperative pain and anxiety. The use of music therapy has been shown to reduce pain, anxiety, and physiological parameters in patients having surgical procedures. OBJECTIVES: To compare the effects of music therapy versus a quiet, uninterrupted rest period on pain intensity, anxiety, physiological parameters, and opioid consumption after cardiac surgery. SUBJECTS AND METHODS: An experimental design was used. A total sample of 86 patients (69.8% males) were randomized to 1 of 2 groups; 50 patients received 20 minutes of music (intervention), whereas 36 patients had 20 minutes of rest in bed (control). Anxiety, pain, physiologic parameters, and opioid consumption were measured before and after the 20-minute period. RESULTS: A significant reduction in anxiety (P ≤ .001) and pain (P = .009) was demonstrated in the group that received music compared with the control group, but no difference was observed in systolic blood pressure (P = .17), diastolic blood pressure (P = .11), or heart rate (P = .76). There was no reduction in opioid usage in the 2 groups. CONCLUSIONS: Patients recovering from cardiac surgery may benefit from music therapy.

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1 Sendelbach, S.E., etc., Journal of Cardiovascular Nursing, Volume 21, Issue 3, May 2006, Pages 194-200
8. A music intervention to reduce anxiety before vascular angiography procedures


Abstract - Patients scheduled for vascular angiography are often anxious and frightened. High levels of anxiety may result in more difficult and painful procedures. Past research has reported mixed results for anxiety reduction techniques in other procedures settings, such as education, cognitive-behavioral skills, coping and relaxation skills, combinations of techniques, and music. Music as an intervention for pre-procedural anxiety prior to vascular angiography has not been studied. A randomized controlled trial of 170 patients was undertaken to determine whether 15 minutes of self-selected music reduced pre-procedure anxiety. The State Trait Anxiety Inventory was used to measure patients' anxiety. One hundred sixty-six men and 4 women comprised the sample with an average age of 66.8 years (SD 9.95, range 37 to 85 years). Patients who listened to music (n=89) reduced their anxiety score from 38.57 (SD 10.46) to 35.2 (SD 9.7), while those who did not.

not listen to music (n=81) reduced their anxiety score from 36.23 (SD 10.54) to 35.1 (SD 10.59); the difference between the groups was statistically significant (t=1.95, df 161, p=0.05). Pulse achieved a statistically significant reduction in the music group (t=2.45, df 167, p=0.02). Music is a noninvasive nursing intervention that patients enjoy and reduces their anxiety and their pulse rate. Further research should address using music to reduce anxiety in other interventional vascular angiography settings with equal numbers of men and women and comparing self-selected versus investigator-selected music.

9. The effect of music listening on older adults undergoing cardiovascular surgery. ¹

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 U.K. 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.

¹ Twiss, E., etc., Nursing in critical care, Volume 11, Issue 5, September 2006, Pages 224-231
10. **Study of the effectiveness of musical stimulation during intra-cardiac catheterization.**

Abstract - Background: Intracardiac catheterization is a routine physical examination. Due to psychological strains, several psychosocial interventions, including music therapy, have been proposed. The aim of the present study was to examine whether the preventive or adjuvant use of music therapy results in a reduction in both subjective and objective anxiety and thus leads to a reduction in sedative medication. Methods of assessment: N=83 patients (48 male, 35 female, 66±11 yrs) waiting for scheduled cardiac catheterization were randomly allocated to one of three groups: control group (standard care), exposure group (music stimulation during the procedure), or coaching group (additional music therapeutic coaching). Target variables were subjective anxiety and physiological parameters. Results: Music intervention did effectively reduce subjective anxiety (STA-I-S reduction pre-post: exposure 11 pt, coaching: 4 pt, control: 6 pt; p=0.033). Physiological values and medication did not differ between groups. Conclusion: The use of music stimulation during the catheterization has a relaxing and calming effect on patients. It seems to be especially beneficial in a subgroup of patients with higher-than-average psychological strains.

11. **Effects of music therapy on health-related outcomes in cardiac rehabilitation: A randomized controlled trial.**

Abstract - This study tested effectiveness of music therapy in improving health-related outcomes of cardiac rehabilitation patients. Using a randomized, controlled trial with follow-up, the study was conducted in an outpatient cardiac rehabilitation program in Ohio. Sixty-eight of 103 recruited patients, 30 to 80 years of age, completed the protocol through post treatment. Physiological and psychological outcomes were measured. Cardiac rehabilitation patients were randomly assigned to cardiac rehabilitation only or to music therapy plus cardiac rehabilitation. Music therapy included musical experiences, counseling, and Music-Assisted Relaxation and Imagery. The null hypothesis of no differences in health-related outcomes between cardiac rehabilitation patients who

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1 Argstatter, H., etc., Clinical Research in Cardiology, Volume 95, Issue 10, October 2006, Pages 514-522
experienced cardiac rehabilitation with and without music therapy was rejected due to changes in systolic blood pressure pre to post treatment. Interpretation of changes at 4 months post treatment in anxiety, general health, and social functioning are limited, due to small sample sizes at follow-up. Pre to post- music therapy session improvements were also reported. Findings suggest that some health-related outcomes may be affected positively by participation in music therapy in addition to cardiac rehabilitation. Attrition contributed to limitations in statistical power.

12. **PICC, the Music and Travel to the Port of Relaxation: The Effects of Music on Perceived Pain and Anxiety in Patients Receiving PICCs and Port-A-Caths.**


Abstract - Patients often verbalize great anxiety on arrival to the Interventional Radiology (IR) setting for placement of vascular access devices. IR nurses at the University of Virginia Health System studied the effects of music on pain and anxiety scores in 154 patients receiving peripherally inserted central catheters (PICCs) and Port-A-Caths. The study showed that music had little effect on patients receiving PICCs. Port-A-Cath

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patients given headphones with self-selected music rated their anxiety significantly lower at the end of the procedure.

13. **Effect of music on anxiety, stress, and depression levels in patients undergoing coronary angiography.**

Abstract - Control of stress and anxiety and the promotion of comfort are challenges facing health practitioners involved in catheterization. The aim of this case-control study was to examine the effect of music on the levels of anxiety, stress, and depression experienced by patients undergoing coronary angiography, as measured by the 21-item Depression Anxiety Stress Scales. Differences in pre and post-intervention scores demonstrated that there were significant decreases in mean scores of state anxiety (P = 0.006), stress (P = 0.001) and depression (P = 0.02) in the intervention group, who listened to 20 minutes of relaxing music, as compared with the control group who had 20 minutes of bed rest.

14. **The effect of music intervention in stress response to cardiac surgery in a randomized clinical trial.**

Abstract - Objective: To evaluate the effect of bed rest with music on the first postoperative day to decrease stress for patients who have undergone heart surgery. Methods: A repeated-measures randomized controlled trial was used. The study took place in a cardiothoracic intermediary unit of a university hospital in Sweden. Fifty-eight patients who had undergone open coronary artery bypass grafting or aortic valve replacement surgery were included. Stress response was assessed by determining the serum cortisol, heart rate, respiratory rate, mean arterial pressure, arterial oxygen tension, arterial oxygen saturation, and subjective pain and anxiety levels. At 12:00 noon on postoperative day 1, patients were allocated to receive 30 minutes of uninterrupted bed rest with music and then 30 minutes of bed rest or alternatively 60 minutes of uninterrupted bed rest. The music was soft and relaxing, included different melodies in

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new-age style, played with a volume at 50 to 60 dB, and distributed through a music pillow connected to an MP3 player. Results: After 30 minutes of bed rest, there was a significant difference in s-cortisol levels between the groups; 484.4 mmol/L in the music group versus 618.8 mmol/L in the control group (P < .02). However, this difference in s-cortisol levels was not found 3 minutes later (i.e., after a total of 60 minutes). There was no difference in heart rate, respiratory rate, mean arterial pressure, arterial oxygen tension, arterial oxygen saturation, and subjective pain and anxiety levels between the groups. Conclusion: There is sufficient practical evidence of stress reduction to suggest that a proposed regimen of listening to music while resting in bed after open-heart surgery be put into clinical use.


Abstract - Individuals with coronary heart disease (CHD) often suffer from severe distress putting them at greater risk for complications. Music interventions have been used to reduce anxiety and distress and improve physiological functioning in medical patients, however its efficacy for CHD patient’s needs to be evaluated. OBJECTIVES: To examine the effects of music interventions with standard care versus standard care alone on psychological and physiological responses in persons with CHD. 

SEARCH STRATEGY: We searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, CINAHL, EMBASE, PSYCINFO, LILACS, Science Citation Index, www.musictherapyworld.net, CAIRSS for Music, Proquest Digital Dissertations, ClinicalTrials.gov, Current Controlled Trials, and the National Research Register (all to May 2008). We hand searched music therapy journals and reference lists, and contacted relevant experts to identify unpublished manuscripts. There was no language restriction.

SELECTION CRITERIA: We included all randomized controlled trials that compared music interventions and standard care with standard care alone for persons with CHD.

DATA COLLECTION AND ANALYSIS: Data were extracted, and the two reviewers assessed methodological quality independently. Additional information was sought from the trial researchers when necessary. Results are presented using weighted mean differences for outcomes measured by the same scale and standardized mean differences

1 Bradt, J., etc., Cochrane database of systematic reviews (Online), Issue 2, 2009, Pages CD006577
for outcomes measured by different scales. Posttest scores were used. In cases of significant baseline difference, we used change scores. MAIN RESULTS: Twenty-three trials (1461 participants) were included. Music listening was the main intervention used, and 21 of the studies did not include a trained music therapist. Results indicated that music listening has a moderate effect on anxiety in patients with CHD, however results were inconsistent across studies. This review did not find strong evidence for reduction of psychological distress. Findings indicated that listening to music reduces heart rate, respiratory rate and blood pressure. Studies that included two or more music sessions led to a small and consistent pain-reducing effect. No strong evidence was found for peripheral skin temperature. None of the studies considered hormone levels and only one study considered quality of life as an outcome variable. AUTHORS’ CONCLUSIONS: Music listening may have a beneficial effect on blood pressure, heart rate, respiratory rate, anxiety, and pain in persons with CHD. However, the quality of the evidence is not strong and the clinical significance unclear. Most studies examined the effects of listening to pre-recorded music. More research is needed on the effects of music offered by a trained music therapist.


Abstract - Several studies have evaluated music interventions prior and after coronary angiography and percutaneous coronary intervention (PCI), but there is no clear evidence showing that music has an effect on patients during these procedures. The purpose was to investigate the effects of music on anxiety, angina, pain, relaxation, and comfort in patients during angiographic procedures and to evaluate gender differences. The study was a four-armed, prospective randomized controlled trial included 240 patients undergoing coronary angiography and/or PCI. Patients were allocated to receive relaxing music, MusiCure® or standard care during the procedure. Outcome measures were; puncture pain and the discomfort related to it, angina and the discomfort related to it, anxiety, experience of the sound environment, discomfort of lying still, and the doses of

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1 Nilsson, U., etc., European Journal of Cardiovascular Nursing, Volume 8, Issue 3, August 2009, Pages 200-206
anxiolytics and analgesics during the procedure. No differences were found between the music and control groups regarding any of the trial endpoints or gender-related differences. The overall rating of the sound environment and feeling of relaxation was high. In conclusion, music intervention in patients undergoing angiographic procedures was highly feasible, but not effective in this study though the delivery of music went smoothly and did not disturb the examination and patients and staff alike looked favorably on it.

17. **Soothing music can increase oxytocin levels during bed rest after open-heart surgery: A randomized control trial.**

Abstract – Aim: To evaluate the effect of bed rest with music on relaxation for patients who have undergone heart surgery on postoperative day one. Background: Music intervention has been evaluated, as an appropriate nursing intervention to reduce patients' pain, stress and anxiety levels in several clinical settings, but its effectiveness in increasing patients' subjective and objective relaxation levels has not been examined. Design: A randomized controlled trial. Method: Forty patients undergoing open coronary artery bypass grafting and/or aortic valve replacement surgery were randomly allocated to either music listening during bed rest (n = 20) or bed rest only (n = 20). Relaxation was assessed during bed rest the day after surgery by determining the plasma oxytocin, heart rate; mean arterial blood pressure, PaO2, SaO2 and subjective relaxation levels. Results: In the music group, levels of oxytocin increased significantly in contrast to the control group for which the trend over time was negative i.e., decreasing values. Subjective relaxation levels increased significantly more and there were also significant higher levels of PaO2 in the music group compared to the control group. There was no difference in mean arterial blood pressure, heart rate and SaO2 between the groups. Conclusion: Listening to music during bed rest after open-heart surgery has some effects on the relaxation system as regards s-oxytocin and subjective relaxations levels. This effect seems to have a causal relation from the psychological (music makes patients relaxed) to the physical (oxytocin release). Relevance to clinical practice: Music intervention should be offered as an integral part of the multimodal regime administered.

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to the patients that have undergone cardiovascular surgery. It is a supportive source that increases relaxation.


Abstract - The article is based on the authors' own research and constitutes a presentation of activities connected with music therapy among patients of a children's ward of different age and with various disorders. The study was focused on cardiological patients since in this category of patients the positive impact of music therapy was particularly visible due to the fact that in the case of these patients the treatment was both long-lasting and systematic, so it was possible to observe the effects. The research is conducted in the Children's Clinical Hospital (CCH) in Lublin, beginning in February 2006.

19. Music in the cath lab: who should select it? 

Abstract - Objectives: The ALMUT study wants to evaluate the anxiolytic effects of different music styles and no music in 200 patients undergoing cardiac catheterization and to assess if there is a difference if patients select one of these therapies or are randomized to one of them. Background: The anxiolytic and analgesic effects of music have been described in previous trials. Some authors have suggested evaluating whether patient-selected music is more effective than the music selected by the physician in reducing anxiety and stress levels. Methods and results: After randomization 100 patients (group A) were allowed to choose between classical music, relaxing modern music, smooth jazz, and no music. One hundred patients (group B) were randomized directly to one of these therapies (n = 25 each). Complete data were available for 197 patients (65 ± 10 years; 134 male). Using the State-Trait Anxiety Inventory (STAI) all patients in group B who listened to music showed a significantly higher decrease of their anxiety level (STAI-State difference pre-post of 16.8 ± 10.2) compared to group A (13.3 ± 11.1; p = 0.0176). Patients without music (6.2 ± 6.7) had a significantly weaker reduction of anxiety compared to all music-listeners (14.9 ± 10.7, p < 0.0001). Conclusions: The

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1 Muzyczka, K., etc., Annales Universitatis Mariae Curie-Sklodowska, Sectio DDD: Pharmacia, Volume 22, Issue 2, 2009, Pages 157-161
2 Goertz, W., etc., Clinical Research in Cardiology, 2010, Pages 1-8
positive effects of music in the cath lab support previous reports. Surprisingly, the hypothesis that the patient's choice of preferred music might yield higher benefits than a randomized assignment could be dismissed.

20. **The effects of music on the cardiovascular system and cardiovascular health.**

Abstract - Music may not only improve quality of life but may also effect changes in heart rate and heart rate variability. It has been shown that cerebral flow was significantly lower when listening to 'Va pensiero' from Verdi's 'Nabucco' (70.4±3.3 cm/s) compared with 'Libiam nei lieti calici' from Verdi's 'La Traviata' (70.2±3.1 cm/s) (p<0.02) or Bach's Cantata No. 169 'Gott soll allein mein Herze haben' (70.9±2.9 cm/s) (p<0.02). There was no significant difference in cerebral flow during rest (67.6±3.3 cm/s) or when listening to Beethoven's Ninth Symphony (69.4±3.1 cm/s). It was reported that relaxing music significantly decreases the level of anxiety of patients in a preoperative setting (State Trait Anxiety Inventory (STAI)-X-1 score 34) - to a greater extent even than orally administered midazolam (STAI-X-1 score 36) (p<0.001). In addition the score was better after surgery in the music group (STAI-X-1 score 30) compared with the midazolam group (STAI-X-1 score 34) (p<0.001). Higher effectiveness and absence of apparent adverse effects make relaxing, preoperative music a useful alternative to midazolam for premedication. In addition, there is sufficient practical evidence of stress reduction suggesting that a proposed regimen of listening to music while resting in bed after open-heart surgery is important in clinical use. After 30 min of bed rest, there was a significant difference in cortisol levels between the music (484.4 mmol/l) and the non-music group (618.8 mmol/l) (p<0.02). Vocal and orchestral music produce significantly better correlations between cardiovascular or respiratory signals compared with music with a more uniform emphasis (p<0.05). The greatest benefit on health is visible with classical music and meditation music, whereas heavy metal music or techno are not only ineffective but also possibly dangerous and can lead to stress and/or life-threatening arrhythmias. The music of many composers most effectively improves quality of life, will

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1 Trappe, H.-J., Heart, Volume 96, Issue 23, December 2010, Pages 1868-1871
increase health and probably prolong life, particularly music by Bach, Mozart or Italian composers.

Comments: 20 researches recorded the impact of music therapy on either one or multiple variables like anxiety, stress, relaxation, pain, heart rate, BP, analgesic consumption, and others in cases of cardiovascular problems.

11 studies favored music therapy as effective in reducing anxiety amongst the patients, 5 cases support that music enhances relaxation, 4 are of the view that it decreases stress, 2 reports confirmed that music has pain reducing effects and 2 registered that it may decrease heart rate and BP respectively. Only 1 study suggested that music could be an alternative to anxiolytic drug whereas 1 filed lesser consumption of analgesic on exposure to music. 4 abstracts gave unclear clinical significance and recommended further research.

Music therapy here is an adjunctive therapy to cardiovascular treatment procedures, which pacifies the patient and makes the hospital stay comfortable.
G) CHRONIC PAIN

Abstract - Japanese researchers have assessed the potential role of music therapy in the field of pain management. The researchers decided to analyze the effects of music on pain associated with having to keep a compulsory posture. Classical music was chosen in this study. Five healthy adult females kept a supine position for two hours without music. Complaints and variations of heartbeat and respiration were observed in each subject during the two-hour experiment. After five days or more, these subjects had the same experience, but this time with music. Frequency and intensity of complaints were found diminished by music. Although, heart rate was not changed by music but the frequency of irregular respiration significantly decreased. There was therefore a positive correlation

1 Ishii C; etc., Nihon Kango Kagakkaishi (JAPAN) Jul 1993, 13 (1) p20-7
between frequency of irregular respiration and number of complaints in subjects kept without music. The researchers claimed that their study demonstrated that music is effective to relieve a pain associated with a compulsory posture and that music may play a significant role on pain management in palliative therapy.

2. **Active music therapy for chronic pain: A prospective study.**

Abstract - There are only few publications about the effect of music therapy on pain relief. The intention of this prospective study is to demonstrate the influence of the Nordoff/Robbins method of active music therapy in a group of 12 patients with fibromyalgia, myofascial pain syndromes and polyarthritis on pain reduction, life quality and coping. The clinical parameters of each patient were related to the observations in the audio and video-documented music therapy settings and to the self-reported changes in pain intensity and pain behavior. There was a significant reduction of pain intensity and pain-related disability in the music group compared to a control group, but no change in the depression and anxiety score. The influence of music therapy could be even better demonstrated in the systematic analysis of the single cases by individual profiles. Active music therapy affects especially the communicative and emotional dimension of chronic pain. Psychophysiological and psychodynamic models are presented to explain the effectiveness of music therapy on pain reduction. Clinical studies on music therapy as well as on other 'art therapies' should relate the analysis of clinical parameters to the descriptive-phenomenological documentation of the therapeutic process to demonstrate systematically the influence of music and art in the individual case.

3. **Music therapy for assistance with pain and anxiety management in burn treatment.**

Abstract - The management of pain is one of the primary issues in burn care. Pain is not only a physiologic experience, but a psychological one as well. With this in mind, the treatment of burned patients must incorporate a holistic view of pain management and

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1 Müller-Busch, H.C., etc., Volume 11, Issue 2, April 1997, Pages 91-100
2 Prensner, J.D., etc., Journal of Burn Care and Rehabilitation, Volume 22, Issue 1, 2001, Pages 83-88
healing. Cognitive, behavioral, and pharmacologic interventions all have a role in pain management. Studies, as well as clinical experience, have shown that musical intervention has been helpful in assisting patients with pain management in a variety of medical settings. Music is an element of normal life that can be easily adapted for the needs of individual patients and their current environment while providing a means for self-expression and for normalizing the environment. This article examines the rationale for using music therapy with burned patients, describes several protocols that have been adapted to meet the specific needs of burned patients, and summarizes our preliminary findings, which demonstrate significant response to music therapy protocols employed on our patients.

4. **An empirical investigation of the anxiolytic and pain reducing effects of music.**

Abstract - This article reports two empirical experiments investigating the anxiety and pain reducing effects of listening to music via personal stereo following surgical procedures involving general anaesthetic. Both experiments involved participants selecting music of their own choice. In Experiment 1, following minor surgery on the foot, 20 participants in an experimental group listened to music while 20 participants in a control group did not. Results indicate that the music group felt significantly less anxiety than the control group. No differences in pain measurements between the two groups were found. Experiment 2 involved a music listening group of 30 females and a no music control group of 28 females. Both groups underwent a total abdominal hysterectomy. Post-operative measures of pain, anxiety and patient-controlled analgesia were taken. No differences between the groups were obtained on these measurements. The results of both experiments are discussed with reference to subjective responses to musical stimuli.

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Abstract - The usefulness of musicotherapy in the management of acute or chronic pain was recognized in the 1960, being used in dentistry, obstetrics, pre and post-operative care, cancerology ⋯ There has been little work devoted to its use in rheumatology patients. Music induced a number of interactive factors, which activate the endogenous system and modulate pain. We conducted a preliminary open study to demonstrate the feasibility of musicotherapy and evaluate its therapeutic efficacy. Methods: Musicotherapy sessions were organized within the hospital unit. The patients rested in the supine position, eyes closed, in a calm room with minimal lighting for 20-minute sessions twice a week. The music was diffused in a headset and adapted to the patient's tastes. Each session was composed of several phases progressively reaching a soothing phase of relaxation followed by a progressive re-dynamizing phase (U-shaped curve). The patients

1 Guétin, S., etc., Douleurs, Volume 4, Issue 1, February 2003, Pages 37-40
scored their level of pain, physical (muscular) tension, and anxiety on three visual analog scales before and after each session. Forty patients with musculoskeletal pain participated in the musicotherapy sessions. Results: Mean pain level before the sessions was 5.16 points on the 10-point scale. After the musicotherapy sessions, the mean pain level was 3.34/10 (p<0.01, Student's t test for paired series). Physical tension fell from 5.06/10 before the sessions to 2.61/10 after the sessions (p<0.01) and anxiety from 4.46/10 before the sessions to 2.30/10 after the sessions (p<0.001), these three improvements were not correlated with age, gender, occupation, nationality, or type of disease. There was a trend towards a correlation between improvement in pain score and prior duration of pain (Pearson's coefficient = 0.313). Discussion, Tolerance to the musicotherapy sessions was excellent. The patients stated they were highly satisfied and had achieved substantial improvement in their perception of pain, physical tension, and anxiety. This therapeutic technique appears to be more effective on older chronic pain than on acute recent pain. Conclusion: Musicotherapy, applied for patients with pain, has enabled improvement in 88% of them. Musicotherapy appears to be another method to achieve relaxation. A controlled trial is being conducted for validation.

6. **Burn Pain and Anxiety: The Use of Music Relaxation during Rehabilitation.**

Abstract - Pain and anxiety are well-documented problems during the rehabilitation of patients with burns. This study examined the effect of music on anxiety and pain during range of motion. Eleven subjects with partial-thickness or deeper burns were randomly assigned to a control group (without music intervention) or experimental group (with music intervention). Vital signs, pain, and anxiety were recorded before and after treatments. There was no difference in pretest and posttest anxiety across the groups; however, there was a difference in anxiety between the groups. Conversely, there was a difference in pretest and posttest pain across the groups but no difference in pain between the groups. Results showed no significant reduction in anxiety and pain during therapy with music relaxation. Limitations included non-homogenous groups, small sample size,

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1 Ferguson, S.L., etc., Journal of Burn Care and Rehabilitation, Volume 25, Issue 1, January 2004, Pages 8-14
potentially unrepresentative sample, variation in exercise protocol, and small musical selection. Further research is recommended.

7. Effect of selective serotonin reuptake inhibitors and music therapy on emotion and wound healing in burnt patients.

Abstract - Aim: To investigate the effect of selective serotonin reuptake inhibitors (SSRIs) and music therapy on emotion and wound healing in burnt patients. Methods: Thirty moderate or severe burn patients aged 12-60 years were selected from Mianyang Central Hospital and Department of Burn, Staff General Hospital of Pangang Group Chengdu Iron & Steel Co., Ltd. The patients were divided into anxiety-depression group and non-anxiety-depression group according to their anxiety-depression scores 3 days after burn, and then the former group was regrouped treatment group and control 1 group, and the non-anxiety-depression group was served as control 2 group with random sampling method, with 10 cases in each group. The patients in treatment group were treated with routine therapy for burn combined with antidepressant of SSRIs and music intervention, and in control groups with routine therapy for burn. The treatment lasted for 30 days. The scores of anxiety and depression and the degree of wound healing were observed in each group. Results: Both scores of anxiety and depression were decreased in the treatment group, (3.40 ± 0.55) and (5.80 ± 1.09) points respectively, which were significantly different from those in the control groups (F = 12.02, 5.80, both P < 0.05). The time for burn wound healing in treatment group was simultaneously shortened, and it was (11.33 ± 0.82) days in shallow second-degree burn and (21.84 ± 1.87) days in deep second degree burn (F = 5.52, 7.06, both P < 0.05). Conclusion: Combination of SSRIs and music therapy can decrease emotional problems (depression and anxiety), shorten the time for burn wound healing and improve the status of physiological function after burn.

8. Music therapy for pain

Abstract - Selective listening of specific music or melody types with the ordering of vibration phenomena has been shown in scientific studies to produce a clear pain-

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1 Wu, X.-P., etc., Chinese Journal of Clinical Rehabilitation, Volume 8, Issue 35, December 2004, Pages 7936-7938
relieving, psychologically stimulating and stress-reducing effect on living organisms. Therapeutically the decline in pain sensitivity and the suppression of treatment anxiety is significant.

9. The effects of self-selected music on anxiety and pain during burn dressing changes.  

Abstract - The purpose of this study was to examine the effects of music therapy on state anxiety and pain among patients undergoing burn-dressing changes. METHOD: A convenience sample of 32 adult burn patients who were eligible and provided consent were included in the study which was a quasi-experimental study of a nonequivalent control group pretest-posttest design. Fifteen patients in the control group received the routine burn dressing changes but 17 patients in the experimental group listened to self-selected music through headphones connected to a CD player during burn dressing changes for three days. All subjects of the music group chose the type of music that would relax them. Before and after burn dressing changes, subjects completed the State Anxiety Inventory and self-report of pain scores. RESULT: There was a significant reduction in state anxiety before and after burn dressing changes in those who received music therapy in contrast to those who did not receive music therapy. The music group reported lower pain scores before and after burn dressing changes than did the non-music group. CONCLUSION: These findings indicate that music therapy composed of self-selected music is a valuable intervention for the treatment of pain and anxiety in patients undergoing burn dressing changes.

10. Effect of music therapy plus selective serotonin reuptake inhibitors on emotion and burn wound healing in burn patients.  

Abstract - Objective: To investigate the effect of music therapy plus selective serotonin reuptake inhibitors (SS-RIs) on emotion and burn wound healing in burn patients. METHODS: Moderate and severe burn inpatients, aged 12-60 years were selected. The Hamilton Rating Scale then measured emotional problems for Depression and Hamilton

1 Son, J.T., etc., Taehan Kanho Hakhoe chi, Volume 36, Issue 1, February 2006, Pages 159-168
2 Wang, D., etc., Chinese Journal of Evidence-Based Medicine, Volume 6, Issue 2, February 2006, Pages 90-93
Rating Scale for Anxiety within three days after burn injury. Burn patients with depression and anxiety were randomly allocated into the trial group (28 patients) and the control group (27 patients). Music therapy and SSRIs plus conventional burn care were applied to the trial group, and conventional burn care to the control group, both for 30 days. The scores of anxiety, depression and the degree of burn wound healing were assessed. Results: The differences of depression score and anxiety score before and after treatment were $13.7 \pm 6.43$ and $6.43 \pm 2.72$ respectively in the trial group, and $4.74 \pm 6.75$ and $4.44 \pm 3.36$ respectively in the control group. This showed both scores significantly improved compared with the control group ($P < 0.05$). The time for burn wound healing was shortened in the treatment group ($P < 0.05$). The anxiety score was positively correlated with burn index, and so was the depression score ($P < 0.05$). Conclusions: The anxiety and depression scores are positively correlated with the burn index. Music therapy plus SSRIs can ameliorate the emotional problems (depression and anxiety), and shorten the time for burn wound healing.

11. The effects of music therapy on pediatric patients' pain and anxiety during donor site dressing change. ¹

Abstract - The purpose of this study was to assess the effects of music therapy on pain and anxiety in pediatric burn patients during a donor site dressing change. Fourteen subjects were randomly selected to participate in this study. The experiment was conducted in the Reconstructive Unit of Shriners Burns Hospital-Boston. The experimental group's intervention consisted of live music and was compared to a control group whose intervention was verbal interaction. Psychological, behavioral, and physiological data were assessed through the Wong Baker FACES Pain Rating Scale, the Fear Thermometer, the Nursing Assessment of Pain Index, heart rate, and respiration rate. Data were analyzed using the ANCOVA, Mann-Whitney U, and regression analysis. The results were mixed and inconclusive. The members of the experimental group reported anecdotal information about the effects of music on pain and anxiety. An exploration of the limitations of the study and suggestions for further study are discussed.


Abstract - The purpose of this study was to assess the effects of music therapy on pain and anxiety in pediatric burn patients during nursing procedures. Nine subjects were randomly selected to participate in this study. Qualitative and quantitative data was collected on the patients' pain, anxiety, heart rate, blood oxygenation, and engagement level through measurement tools and interviews. The results from the qualitative and quantitative data indicated that music therapy reduced pain, anxiety, and behavioral distress. The quantitative data were analyzed and an inverse relationship between engagement in music therapy and lower behavioral distress scores was noted. Additionally, a linear relationship between engagement and behavioral distress was noted; significance was found but was moderated by the age of the child. However, no significant relationship was found between heart rate and behavioral distress. The results from the qualitative data from the interviews with the patients, parents, nurses and music therapist indicated that music therapy reduced pain and anxiety, and that engagement in music therapy enhanced relaxation. In addition, music therapy positively affected patients' mood, compliance, and the relaxation level. Finally, parents/guardians and nurses involved in the study reported that music therapy helped them to feel more relaxed as well.


Abstract - OBJECTIVE: The experience of venipuncture is seen by children as one of the most fearful experiences during hospitalization. Children experience anxiety both before and during the procedure. Therefore, any intervention aiming to prevent or reduce distress should focus on the entire experience of the procedure, including waiting, actual preparation, and conclusion. This study was designed to determine whether the presence of musicians, who had attended specific training to work in medical settings, could reduce distress and pain in children undergoing blood tests. METHODS: Our sample

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2 Caprilli, S., etc., Journal of Developmental and Behavioral Pediatrics, Volume 28, Issue 5, October 2007, Pages 399-403
population was composed of 108 un-premedicated children (4-13 years of age) undergoing blood tests. They were randomly assigned to a music group (n = 54), in which the child underwent the procedure while interacting with the musicians in the presence of a parent or to a control group (n = 54), in which only the parent provided support to the child during the procedure. The distress experienced by the child before, during and after the blood test was assessed with the Amended Form of the Observation Scale of Behavioral Distress, and pain experience with FACES scale (Wong Baker Scale) only after the venipuncture. RESULTS: Our results show that distress and pain intensity was significantly lower (p < .001; p < .05) in the music group compared with the control group before, during, and after blood sampling. CONCLUSIONS: This controlled study demonstrates that songs and music, performed by "professional" musicians, have a beneficial effect in reducing distress before, during, and after blood tests. This study shows, moreover, that the presence of musicians has a minor, but yet significant, effect on pain due to needle insertion.

14. Selective serotonin reuptake inhibitors plus music therapy for moderate or severe burn patients: Depressive emotion and serum inflammatory factors. 1

Abstract - Aim: To observe the emotion in patients with moderate or severe burn after treated with selective serotonin reuptake inhibitors (SSRIs) combined music therapy, and explore the changes in serum levels of tumor necrosis factor α (TNF-α) and interleukin-6 (IL-6) and their influential factors. Methods: Totally 84 moderate or severe burn inpatients were selected from Mianyang Central Hospital and Department of Burn, General Hospital of Panzhihua Iron & Steel Co., Ltd from April 2003 to April 2005. They were measured with Hamilton Rating Scale for Depression (HAMD), and Hamilton Rating Scale for Anxiety (HAMA), and those with > 9 in HAMD and > 8 in HAMA were diagnosed as depression or anxiety emotion. The patients were divided into anxiety-depression patients and non-anxiety-depression patients, then the former group was randomly subdivided into treatment group (n =28) and depression control group (n =27), and the non-anxiety-depression patients served as normal control group (n =29). 2

patients of each group were treated with similar fluid restoration, nutrient support, anti-
infection and operation treatments. Besides the routine burn treatment, from the fourth
day, the control group was given SSRIs, 20-40 mg daily for 30 days and music therapy of
receptive music, 1 hour daily, 15 days as one course for 2 courses. 3 The scores of two
scales and the degree of wound healing in three groups were observed. The levels of
TNF-α and IL-6 in serum were measured with enzyme linked immunosorbent assay, and
the stepwise regression was adopted to identify the main factors that influenced the levels
of TNF-α and IL-6. Results: One case of the treatment group, three of the depression
control group and two of the burn control group withdrew from the treatment due to the
expensive cost. Finally 27 cases of the treatment group, 24 of the depression control
group and 27 of the burn control group were involved in the result analysis. 1 The scores
of HAMD in the treatment group were lower than the depression control group
(4.74±1.99, 14.79±5.28, P < 0.05), while there were no obvious differences in the scores
of HAMA among each group (P > 0.05). 2 The levels of TNF-α and IL-6 in the treatment
group were significantly lower than those in the depression control group on day 21 after
treatment. 3 Stepwise regression analysis appealed that the main influential factors for the
serum TNF-α level were the scores of depression before and after treatment, and the
serum IL-6 levels after treatment; the main influential factor for the serum IL-6 level was
only the TNF-α levels. Conclusion: SSRIs combined with music therapy could amend
depressive emotion, reduce the levels of TNF-α and IL-6 in serum and improve the status
of physiological function after burn.

15. The Anxiety- and Pain-Reducing Effects of Music Interventions: A
Systematic Review. 1

Abstract – Musical interventions have been used in health care settings to reduce patient
pain, anxiety, and stress, although the exact mechanism of these therapies is not well
understood. This article provides a systematic review of 42 randomized controlled trials
of the effects of music interventions in perioperative settings. Music intervention had
positive effects on reducing patients' anxiety and pain in approximately half of the
reviewed studies. Further research into music therapy is warranted in light of the low cost

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of implementation and the potential ability of music to reduce perioperative patient distress.

16. The impact of a live therapeutic music intervention on patient’s experience of pain, anxiety, and muscle tension. ¹

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.

17. Effects of music therapy on pain and anxiety in patients undergoing bone marrow biopsy and aspiration. ²

Image Source:
http://www.stfranciscare.com/saintfrancisdoctors/cancercenter/nci/media/CDR0000554337.jpg

Abstract - Bone marrow biopsy and aspiration are commonly used for diagnosing, treating, and following up after treatment for blood disorders and solid tumors. For adults, the infiltration of local anesthesia at the biopsy site has been used as the principal

¹ Sand-Jecklin, K., Emerson, H., Holistic Nursing Practice, Volume 24, Issue 1, January 2010, Pages 7-15
² Shabanloei, R., etc., AORN Journal, Volume 91, Issue 6, June 2010, Pages 746-751
form of analgesia for bone marrow biopsy and aspiration. Pain relief during these procedures is often incomplete, especially during aspiration of the bone marrow, and pain is likely to contribute to patient anxiety. Researchers at the Tabriz Hematology and Oncology Center in Iran conducted a study to quantify and evaluate the effectiveness of music therapy interventions on pain and anxiety control for 100 patients undergoing bone marrow biopsy and aspiration. Participants in the study were randomly assigned to one of two groups: one group listened to music during the procedure, and the other did not. Patients completed the Spielberger State-Trait Anxiety Inventory both before and after the procedure and reported pain severity by using a visual analog scale. Results showed that participants who listened to music had lower state anxiety and pain levels than those who did not listen to music.

18. The efficacy of music therapy protocols for decreasing pain, anxiety, and muscle tension levels during burn dressing changes: A prospective randomized crossover trial. ¹

Abstract - The purpose of this study was to explore the efficacy of two music therapy protocols on pain, anxiety, and muscle tension levels during dressing changes in burn patients. Twenty-nine inpatients participated in this prospective, crossover randomized controlled trial. On two consecutive days, patients were randomized to receive music therapy services either on the first or second day of the study. On control days, they received no music. On music days, patients practiced music-based imagery (MBI), a form of music-assisted relaxation with patient-specific mental imagery before and after dressing changes. Also, on music days during dressing changes, the patients engaged in music alternate engagement (MAE), which consisted of active participation in music making. The dependent variables were the patients' subjective ratings of their pain and anxiety levels and the research nurse's objective ratings of their muscle tension levels. Two sets of data were collected before, three sets during, and another two sets after dressing changes. The results showed significant decrease in pain levels before (P < .025), during (P < .05), and after (P < .025) dressing changes on days the patients received music therapy in contrast to control days. Music therapy was also associated

¹ Tan, X., etc., Journal of Burn Care and Research, Volume 31, Issue 4, July 2010, Pages 590-597
with a decrease in anxiety and muscle tension levels during the dressing changes (P < .05) followed by a reduction in muscle tension levels after dressing changes (P < .025). Music therapy significantly decreases the acute procedural pain, anxiety, and muscle tension levels associated with daily burn care.

19. **Assessment and standardization of a new music therapy technique in the management of pain: The "U-based" system.**

Abstract - Many studies have underlined the usefulness of music therapy in the treatment of pain. The "U-based" system is a music therapy technique whose development has taken account of recommendations in the literature. A software program has been developed at the Montpellier University Hospital Centre with the company Music Care©, and enables its standardized use by healthcare professionals. Objectives: The main objective of this study was to report on research efforts that have enabled the standardization and assessment of a new music therapy technique used in the context of pain management. Methods: Following a full review of the literature on the subject, a series of controlled and randomized studies were performed in the rheumatology, functional rehabilitation, intensive care and neurology departments and in the Pain Treatment Centre at the Montpellier University Hospital Centre. Results: The effects of music therapy were assessed in different types of acute or chronic pain of various origins: mechanical, inflammatory, fibromyalgia and neurological. It was thus possible to demonstrate a physiological action (on haemodynamic and respiratory parameters, etc.) as well as a psychological action, in that this therapy encouraged "listening" relationships between careers and patients. This action gave rise to a decrease in pain, anxiety and depression, which in turn enabled a significant decrease in the consumption of anxiolytic and antidepressant agents. Conclusion: A review of the international literature, and the first controlled and randomized studies performed in France, testified to the usefulness of music therapy in the management of pain.

Observations: 19 researches studied the effect of music intervention on one or more variables like pain, anxiety, relaxation and others in cases of chronic pain.

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1 Guétin, S., etc. Douleurs, Volume 11, Issue 5, October 2010, Pages 213-218
12 reports confirmed the efficacy of music in pain relief, 7 abstracts verified the decreased level of anxiety in patients, 4 synopsis stated that music helps in relaxation, 3 extracts support the combination of SSRIs (selective serotonin reuptake inhibitors) and music therapy together decrease emotional problems like depression and anxiety & improve physiological status. Only 1 study negated the effects of music therapy and 3 recommended further research.

Music has been complementing the medical procedures for relieving chronic pain in patients. It tranquilizes him leading to relaxation.
1. A Pilot study of music therapy in the treatment of children with developmental delay. ¹

Abstract - Researchers at the Institute for Music Therapy in Germany recently conducted a pilot crossover study involving 12 children between 4 and 6.5 years of age with developmental ages of between 1 - 3.5 years to monitor the effects of music therapy on the children’s mental development. The children were randomly selected to one of two groups; the children in the first group received individual music therapy for a period of three months, and the children in the second group were, during that period, used as a control group. But, for the subsequent three months, the children in the second group received music therapy whilst the children in the first group were used as controls. The results, after the first three months, revealed significant developmental improvements including better hearing and speech, improved eye-hand co-ordination, and improved

¹ D.Aldridge, etc., Complementory Therapies in Medicine, (1995)3, 4,197-205
communications skills in the children in the music therapy group which were not seen in the control group. Furthermore, when the groups were reversed for the following three months, the second group who were then receiving music therapy were seen to catch in those areas of development. The researchers concluded that ‘music therapy seems to have an effect on personal relationship, emphasizing positive benefits of active listening and performing, and this in turn sets the context for developmental change.’ It was also suggested that the hand-eye co-ordination which was required by the children when playing music was ‘a significant role in developmental changes’. This was a relatively small scale study and, as the researchers themselves acknowledge ‘is best considered as a pointer in a general direction rather than as a conclusive statement.’ However, this research does break new ground in this field of complementary medicine and demonstrates that music therapy may offer a very valuable option in the treatment of developmental delay in children and will provide a platform for more detailed investigations of the potential roles of music therapy in childhood development.

2. **Autism, sympathy of motives and music therapy.**

Abstract - Music therapy helps mental functions and learning of autistic children by engaging with and supporting the core weakness in coordination of motives, not by giving cognitive stimulation or training in the perception of musical time or in communication by melody. The child is guided to make sympathetic responses to the pulse and quality of other persons' movements. The same rhythmic sense and self-expression in narrative as infants show in proto-conversation remains as a receptive resource inside the confused consciousness, wayward emotions and impulsive motility of autism. Improvised musical engagement stimulates episodes of concerted activity and brings this receptivity to life, regulating anxiety, aiding coherent awareness and memory and helping the child to enjoyable contact with persons and more comprehensible communication. Musical acoustic methods allow precise research into how music therapy works as treatment, and can validate its applications in assessment or diagnosis.

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3. The effect of background music and song texts on the emotional understanding of children with autism. ¹

Abstract - The purpose of this study was to examine the effect of background music and song texts to teach emotional understanding to children with autism. Participants were 12 students (mean age 11.5 years) with a primary diagnosis of autism who were attending schools in Japan. Each participant was taught four emotions to decode and encode: happiness, sadness, anger, and fear by the counterbalanced treatment-order. The treatment consisted of the four conditions: (a) no contact control (NCC)-no purposeful teaching of the selected emotion, (b) contact control (CC)-teaching the selected emotion using verbal instructions alone, (c) background music (BM)-teaching the selected emotion by verbal instructions with background music representing the emotion, and singing songs (SS)-teaching the selected emotion by singing specially composed songs about the emotion. Participants were given a pretest and a posttest and received 8 individual sessions between these tests. The results indicated that all participants improved significantly in their understanding of the four selected emotions. Background music was significantly more effective than the other three conditions in improving participants' emotional understanding. The findings suggest that background music can be an effective tool to increase emotional understanding in children with autism, which is crucial to their social interactions.

4. Communication improvement through music: The case of children with developmental disabilities. ²

Abstract - This paper investigates the effect of music on the communication improvement of children with developmental disabilities. Forty subjects (18 boys and 22 girls) 7-12 years old, were divided into an experimental group (n=20) which participated in music therapy activities and a control group (n=20) which was discussing and watching television, both for one hour. The State-Trait Anxiety Inventory Scale for children was used to measure state and trait anxiety respectively. In addition, heart rate response to

¹ Katagiri, J., Journal of Music Therapy, Volume 46, Issue 1, March 2009, Pages 15-31
² Krikeli, V., etc., International Journal of Special Education, Volume 25, Issue 1, 2010, Pages 1-9
music therapy was monitored for assessing probable music therapy effect. Findings from paired t-tests revealed that the State Anxiety Inventory Scale score was significantly influenced by the music therapy (t=5.36, p<0.001) as well as it was not significantly influenced by the discussing and watching television session (t=1.02, p>0.05: NS). Besides, heart rate alteration analysis revealed that music therapy helps calm young children with developmental disabilities. Consequently, music therapy could lead not only to significant improvements in young CWDD's psychological and physical well-being but also could produce mental benefits, and should constitute a part of therapeutically programs that aim both to the improvement of young CWDD's psychological state and quality of life.

**Observations:** The above 4 studies measured the effects of music on the communication, understanding of emotions and overall development of CWDD.

All 4 reports propounded the potential music has in improving their communicative skills, emotional understanding of concepts and all other factors.

Music Therapy has been used in an interactive way with CWDD and plays a supportive role in facilitating self-expression and life skills.
I) DEPRESSION

1. Effects of a music therapy strategy on depressed older adults.  

Abstract - A music-facilitated psycho-educational strategy was developed as a cost-effective and accessible intervention for older adults experiencing symptoms of depression, distress, and anxiety. Thirty older adults who had been diagnosed with major or minor depressive disorder were randomly assigned to one of three 8-week conditions: (1) a home-based program where participants learned music listening stress reduction techniques at weekly home visits by a music therapist; (2) a self-administered program where participants applied these same techniques with moderate therapist intervention (a weekly telephone call); or (3) a wait list control. Participants in both music conditions performed significantly better than the controls on standardized tests of depression, distress, self-esteem, and mood. These improvements were clinically significant and maintained over a 9-month follow-up period. The potential for this type of intervention with homebound elders and others who have limited access to services is discussed.

2. Music Effects on EEG in Intrusive and Withdrawn Mothers with Depressive Symptoms.  

Abstract - THE EEG patterns of 48 intrusive and withdrawn mothers with depressive symptoms were assessed following a 20-minute music session to determine if the music

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1 Hanser, S.B., etc., Journals of Gerontology, Volume 49, Issue 6, 1994, Pages P265-P269
had mood-altering effects. Half the mothers listened to classical music while half listened to rock music. Intrusive mothers were expected to have more positive responses and more symmetrical EEG following the calming classical music, while withdrawn mothers were expected to have a more positive response and symmetrical EEG following the energizing rock music. Although more positive EEGs were noted for rock music in both groups, only the withdrawn mothers showed a significant change in EEG toward symmetry following rock music, and only the intrusive mothers showed a decrease in cortisol levels following the rock music. Their State Anxiety Inventory (STAI) anxiety levels also decreased, while the Profile of Mood States (POMS) depressed mood levels decreased significantly for all four groups following music.

Image Source:

3. **Effect of music on power, pain, depression and disability.**

Abstract - Aim: 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). Background: Chronic non-malignant pain is characterized by pain that persists in spite of traditional

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interventions. Previous studies have found music to be effective in decreasing pain and anxiety related to postoperative, procedural and cancer pain. However, the effect of music on power, pain, depression, and disability in working age adults with chronic non-malignant pain has not been investigated. Method: A randomized controlled clinical trial was carried out with a convenience sample of 60 African American and Caucasian people aged 21-65 years with chronic non-malignant pain. They were randomly assigned to a standard music group (n = 22), patterning music group (n = 18) or control group (n = 20). Pain was measured with the McGill Pain Questionnaire short form; depression was measured with the Center for Epidemiology Studies Depression scale; disability was measured with the Pain Disability Index; and power was measured with the Power as Knowing Participation in Change Tool (version II). Results: 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. The model predicting both a direct and indirect effect for music was supported. Conclusion: Nurses can teach patients how to use music to enhance the effects of analgesics, decrease pain, depression and disability, and promote feelings of power.

4. The Efficacy of Using Music in Children of Divorce Groups: Impact on Anxiety, Depression, and Irrational Beliefs About Divorce. 1

Abstract - This study examined the efficacy of children of divorce group using music as an intervention in comparison to more traditional psycho-educational children of divorce group. It was predicted that children of divorce groups that utilized music would have a significantly greater impact on the children's levels of anxiety, depression, and irrational beliefs about divorce after the group ended and at a 3-month follow-up assessment. Both interventions significantly decreased cognitive and social anxiety and all irrational beliefs about divorce, except hope of reunification. Depression did not decrease for all participants but when the relationship between depression and irrational beliefs was examined, irrational beliefs were found to be mediators of depression for children of divorce. These results suggest that current interventions for children of divorce do

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1 DeLucia-Waack, J.L., etc., Group Dynamics, Volume 11, Issue 4, December 2007, Pages 272-282
decrease anxiety and irrational beliefs in general, but specifically addressing irrational beliefs may also decrease depressive symptoms.

5. Ethnicity, music experience, and depression. 1

Abstract - The researchers studied differences in self-reported music experience and depression across ethnic groups, as well as differences in the relationship between music experience and depression across groups. College participants (78 African Americans, 111 Asian Americans, 218 Whites, and 87 in other ethnic groups) completed the Music Experience Questionnaire (MEQ) and the Center for Epidemiological Studies Depression scale. Statistically significant differences across groups were found on depression as well as on the MEQ factor for Subjective/Physical Reactions to music and on MEQ scales for Commitment to Music, Affective Reactions, Positive Psychotropic Effects, and Reactive Musical Behavior. A distinctive pattern of relationship was found between music variables and depression in the Asian American group, relative to the White and Other group. In particular, among Asian Americans there were negative correlations between depression and the MEQ Subjective/Physical Reactions factor as well as the Affective Reactions scale. Implications were discussed for the literature on ethnicity and depression, music experience, and music therapy.

Observations: 5 abstracts judged the impact of music on one or more variables like anxiety, distress, self-esteem, mood, pain and others to analyze the results on depression.

All 5 studies indicated a positive response of music on depression through decreased levels of anxiety & depressed mood, lessens pain, enhances self-esteem.

Music here has been used as an independent therapeutic intervention, which helps inducing joy and positive emotions in the depressive subjects.

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1. **Intervention effects of music relaxation therapy on the quality of life in patients with diabetic retinopathy.**

Abstract - Aim: The music relaxation therapy was used for intervention the bad mental emotion of the patients with diabetic retinopathy, and to observe the effects on the quality of life. Methods: We had collected 80 diabetes patients, who were all type 2 patients with II - III degree retinal pathological changes, from Dalian Dockyard hospital, Center hospital and Diabetes hospital as objects from April to October 2004. They were randomly divided to 2 groups: mental intervention group and un-intervention group with 40 in each group. The patients in the two groups were matched in the sex, age, education level, visual function classification, body mass, height; body mass index and blood sugar on an empty stomach. The administration treatment method fixed basically was used in the intervention group and the un-intervention group. The music relaxation method was used on the mental intervention, insisting twice a day, 30 minutes every time, and the telephone follow-up was done twice a week, for 28 days a course. We had used Diabetic Quality of Life Specific Scale (DQOL) to evaluate the quality of life of diabetic patients, Visual Quality of Life (VQOL) to evaluate the quality of life of patients with visual function lesion, and Symptom Check list (SCL-90) to evaluate the mental health condition. The time of examination was at the moment of hospitalization and the time of the end of treatment. Using t-test and χ² test we compared the mental condition after treatment with that before treatment, and the difference value of each index in the two groups before and after treatment was compared. The correlation of visual function and diabetic qualify of life was detected by Spearman correlative analysis, in the multi-element gradual regression analysis the difference value of total mark of SCL before and after treatment as the dependent variable, and the sex, age, height, body mass, body mass index, intervention or not, visual function classification, educational degree, blood sugar value, the every factor score of diabetic special scale and the every factor score of visual function scale as the independent variable. Results: All 80 patients joined in voluntarily and had accomplished seriously the study without drop. The comparison of the mental status in the two groups: Before the treatment, there were no significant different between the intervention and un-intervention group in DSQL, Life quality of visual function (P >
0.05). Compared with norm, the difference was significant in somatization factor, interpersonal sensitivity, anxiety, depression, consternation and the positive score value of the SCL of the 80 patients (P < 0.05). 2 The correlation analysis of the quality of life in the ophthalmocace patients with visual functional lesion scale and diabetic specific scale: The score of body function, social function and mental function of the existence quality scale of patients with visual functional lesion and the score of diabetic specific scale were positive correlation (P < 0.05); The mental dimension and social function and mental function of the existence quality scale of the patients with visual functional lesion were positive correlation (P < 0.05); The treatment dimension and social function of the existence quality scale of the patients with visual functional lesion were positive correlation (P < 0.05). 3 The correlation of diabetic quality of life specific scale and SCL: The physical dimension of diabetic quality of life specific scale and the compulsion, depression, anxiety and rivalry of SCL were negative correlation (P < 0.05); The physical dimension and the compulsion, depression, anxiety, rivalry, consternation, crankiness and spirit were negative correlation (P < 0.05); The social dimension and compulsion, interpersonal sensitivity, depression and anxiety were negative correlation (P < 0.05). 4 The amelioration degree of multiple stepwise regression analysis and the SCL had positive correlation with psychological intervention, which indicated that psychological intervention could enhance the level of mentality, and improve the quality of life of the patients with visual functional lesion. Conclusion: There are serious psychological problems in patients with diabetic retinopathy; The lesion of retina leads to the decrease of visual function, which is the main factor of the decrease of quality of life in the patients with diabetic retinopathy; The psychological intervention can enhance the quality of life of the patients with diabetic retinopathy; The psychological intervention combined with drug treatment ameliorate the psychological health of the patients with diabetic retinopathy.

Observations: Limited extracts were obtained leaving further scope of research in the theme.

The report above proves that music intervention along with drug treatment enhances the quality of life in patients with diabetic retinopathy.

Music here plays an accompaniment to drug therapy to achieve desired results.
K)  I.C.U Patients

1. The effects of 'relaxing music' on patients, doctors and nursing staff of a medical intensive care unit.  


Abstract - With the intention of reducing the psychological stress and anxiety of patients during their admission to the medical intensive care unit, specially selected and prepared instrumental music was played over a loudspeaker to the patient cubicles. The patients' opinion on the program and their subjective state of health were determined by a questionnaire. 78% of the patients felt that their well-being was improved by the music. With the exception of 7%, who were disturbed by the music, all other patients found it reassuring, diverting, hypnotic or entertaining. In addition to the patients’ 11 doctors and 16 nurses from the intensive care unit as well as 38 doctors and 80 nurses from 39 medical intensive care units in German university clinics and large hospitals were asked for their opinions on the use of music for intensive care patients.

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1 Neuhof, H., etc, Deutsche Medizinische Wochenschrift, Volume 105, Issue 16, 1980, Pages 556-560
2. Music therapy: a nursing intervention for the control of pain and anxiety in the ICU: a review of the research literature. ¹

Abstract - Critical care patients experience both pain and anxiety related to their acute illness or injury and some painful treatments. Research on music therapy has shown that it can decrease pain and anxiety in critical care patients. This author suggests practice changes based on the body of research, which investigated the use of music.

3. Effectiveness of a music therapy intervention on relaxation and anxiety for patients receiving ventilatory assistance. ²


Abstract - OBJECTIVE: To test the effects of music therapy on relaxation and anxiety reduction for patients receiving ventilatory assistance. DESIGN: Two-group, pretest-posttest experimental design with repeated measures. Subjects randomized to either a 30-minute music condition or a rest period. SETTING: Four urban midwestern intensive care units. SUBJECTS: Fifty-four alert, non-sedated patients receiving mechanical ventilation. OUTCOME MEASURES: State anxiety (pretest and posttest), heart rate, and respiratory rate obtained every 5 minutes for 30 minutes. RESULTS: Subjects who received music therapy reported significantly less anxiety posttest (10.1) than those subjects in the control group (16.2). Heart rate and respiratory rate decreased over time for those subjects in the music group as compared with the control group subjects. CONCLUSIONS: A single music therapy session was found to be effective for decreasing anxiety and promoting relaxation, as indicated by decreases in heart rate and respiratory rate over the intervention period with this sample of patients receiving ventilatory assistance.

4. **Music therapy as a nursing intervention for patients supported by mechanical ventilation.**

Abstract - Music therapy is a non-pharmacologic 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.

5. **Effects of music therapy on anxiety in ventilator-dependent patients.**

Abstract - OBJECTIVE: The purpose of this study was to assess the effectiveness of music therapy in decreasing anxiety in ventilator-dependent patients. DESIGN: A crossover repeated measures design with random assignment was used. SETTING: The intensive care unit of a university hospital in Hong Kong was used as the setting for this

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1 Chlan, L.L., AACN clinical issues, Volume 11, Issue 1, February 2000, Pages 128-138
2 Wong, H.L.C., etc, Heart and Lung: Journal of Acute and Critical Care, Volume 30, Issue 5, 2001, Pages 376-387
study. PATIENTS: Twenty patients who were ventilator-dependent were recruited for the study. They were all Chinese with a mean age of 58.25 years (range, 19-84 y). Most (75%) were men. OUTCOME MEASURES: Physiologic measures of anxiety assessed in this study were mean blood pressure and respiratory rate. An additional measure was the Chinese version of the Spielberger State-Trait Anxiety Inventory. INTERVENTION: Patients were randomized to receive either 30 minutes of uninterrupted rest and then 30 minutes of music therapy or the music therapy first and then the uninterrupted rest period. Patients listened to relaxing music by using audiocassette players and headphones. Subjects selected the music of their choice from a selection including both Chinese and Western music. Subjects had physiologic measures taken immediately before the intervention (or rest period) and at 5-minute intervals throughout the intervention. The Chinese version of Spielberger's State-Trait Anxiety Inventory was completed before the intervention and immediately after the intervention. RESULTS: Findings indicated that music therapy was more effective in decreasing state anxiety than was an uninterrupted rest period (P < .01). As measured by analysis of variance with repeated measures, blood pressure and respiratory rate showed no significant differences in the 2 conditions over time. However, significant differences were observed at the end of the intervention (after 30 minutes) between the 2 conditions, with music therapy being superior to the rest period. CONCLUSION: Music therapy is an effective nursing intervention in decreasing anxiety in ventilator-dependent patients and its use should be incorporated into the care of mechanically ventilated patients. For the Chinese patients, culture and language were the predominant factors in their choice of music.

6. **Music therapy effectiveness to decrease anxiety in mechanically ventilated patients.**

Abstract - The aim of this review is to find out whether or not music therapy is an effective nursing intervention to decrease anxiety and promote relaxation in ventilator-dependent patients. For the purpose of this review, relaxation has been considered as a reduction in state anxiety and physiologic signs (heart rate, blood pressure or respiratory
rate). A comprehensive search has been conducted in electronic databases (Cochrane Library, Medline, CINHAL, Embase and PsycLit) in order to identify systematic reviews on music therapy effectiveness or randomized control trials that compare the effectiveness of music therapy versus no music or other relaxation techniques in patients receiving ventilatory assistance. Three studies, two randomized control trials and a systematic review accomplished the inclusion criteria of this review. All studies found a significant difference between groups on the mean post-test state anxiety, concluding that there was a greater reduction in state anxiety in the experimental condition due to the intervention. Findings in terms of physiologic measures have been contradictory from study to study, reaching different conclusions. None of the three studies have accomplished the quality criteria established for this review. Some methodological limitations make their results be not fully reliable and therefore, it has not been possible to reach a satisfactory answer. Further and more rigorous research is needed on this area, as there is not enough valid research to conclude that music therapy is an effective nursing intervention for decreasing patients' anxiety. As it causes no harm and is a relatively inexpensive intervention, it would be worth exploring its effects on different kind of outcomes and settings.

7. **Effects of music therapy in intensive care unit without sedation in weaning patients versus non-ventilated patients.**

Abstract - Objectives: Music has been found to be an effective non-pharmacologic adjunct for managing anxiety and promoting relaxation in limited trials of critically ill patients. However, its effects have not been compared in intubated patients during weaning from mechanical ventilation with non-intubated patients spontaneously breathing. Study design: A cross-over randomized experimental design. Patients and Methods: Thirty patients were studied (intubated group n = 15, non-intubated group n = 15). Patients were randomized to receive either 20 minutes of uninterrupted rest or then 20 minutes of music therapy or the music therapy first and then the uninterrupted rest period. Patients selected a relaxing music of their choice from a selection including

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1 Jaber, S., etc., Annales Francaises d'Anesthesie et de Reanimation, Volume 26, Issue 1, January 2007, Pages 30-38
different types of music. Heart rate (HR), systolic blood pressure (SAP), respiratory rate (RR) and bispectral index (BIS score) were recorded each 5-min intervals throughout both periods (rest and music). Agitation/sedation state and pain were evaluated by the Richmond-Agitation-Sedation-Scale (RASS) and the Numerical-Rating-Scale (NRS) respectively, before and after each studied periods. Music have not been performed in five patients (5/35 = 14%). Results: Music significantly decreased HR (88 ± 15 vs 82 ± 15, P < 0.05), SAP (137 ± 17 vs 128 ± 14, P < 0.05), RR (25 ± 3 vs 22 ± 4, P < 0.05), BIS (94 ± 5 vs 81 ± 10, P < 0.01), RASS (+0.1 ± 0.7 vs -0.7 ± 0.9, P < 0.05) and NRS (4.4 ± 1.7 vs 1.9 ± 1.3, P < 0.01) in both intubated and non-intubated groups whereas no significant change was observed during the rest period. The variations level studied parameters induced by music were comparable for the two groups. Conclusion: A single music therapy session was found to be effective for decreasing anxiety and promoting relaxation, as indicated by decreases in heart rate, blood pressure, BIS and respiratory rate over the intervention period in intubated patients during weaning phase.

8. The effectiveness of music therapy in reducing physiological and psychological anxiety in mechanically ventilated patients. ¹

Abstract - Anxiety, a common reaction in patients receiving ventilation therapy, often impacts negatively on patient recovery. Music therapy, a non-invasion intervention, is readily accepted by patients and has been used to relieve patient anxiety with encouraging results. The purpose of this study was to investigate the effectiveness of music therapy on reducing anxiety in patients on mechanical ventilators. An experimental design was used and all cases were collected from a medical center in southern Taiwan. While the experimental group patients took a 30-minute music therapy session, control group patients were asked to rest. Both facility anxiety and anxiety visual scales were used as research tools, with other non-invasive medical instruments employed to measure heartbeat and breathing, blood pressure and blood oxygen saturation in both patient groups. When compared with the control group, patients in the experimental group showed significant improvement in sense of anxiety (Brief Anxiety Scale, BAS, t29 = -4.80, p < .001; Visual Analogue Anxiety Scales, VAAS, t29 = -3.38, p = .002), diastolic

¹ Wu, S.-J., etc., Journal of Nursing, Volume 55, Issue 5, October 2008, Pages 35-44
pressure \((t_{29} = -2.74, p = .002)\), mean arterial pressure\((t_{29} = -2.26, p = .031)\) and breathing rate \((t_{29} = -4.84, p < .001)\). In analyzing data from the two groups, we found that the sense of anxiety (BAS, \(t_{58} = -3.21, p = .002\); VAAS, \(t_{58} = -2.90, p = .005\)) and breathing rate \((t_{58} = -3.20, p = .002)\) in the experimental group decreased significantly following music therapy. Study results are hoped to serve as an important reference for clinical nursing staff. Also, it is hoped that the music therapy method may help facilitate achievement of broader humanized nursing goals.

9. Music interventions for mechanically ventilated patients. ¹

Abstract - Mechanical ventilation often causes major distress and anxiety in patients. Music interventions have been used to reduce anxiety and distress and improve physiological functioning in medical patients; however its efficacy for mechanically ventilated patients needs to be evaluated. To examine the effects of music interventions with standard care versus standard care alone on anxiety and physiological responses in mechanically ventilated patients. We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (The Cochrane Library 2010, Issue 1), MEDLINE, CINAHL, AMED, EMBASE, PsycINFO, LILACS, Science Citation Index, www.musictherapyworld.net, CAIRSS for Music, Proquest Digital Dissertations, ClinicalTrials.gov, Current Controlled Trials, the National Research Register, and NIH CRISP (all to January 2010). We handsearched music therapy journals and reference lists and contacted relevant experts to identify unpublished manuscripts. There was no language restriction. We included all randomized and quasi-randomized controlled trials that compared music interventions and standard care with standard care alone for mechanically ventilated patients. Two authors independently extracted the data and assessed the methodological quality. Additional information was sought from the trial researchers, when necessary. Results were presented using mean differences for outcomes measured by the same scale and standardized mean differences for outcomes measured by different scales. Post-test scores were used. In cases of significant baseline difference, we used change scores. We included eight trials (213 participants). Music listening was the main intervention used, and seven of the studies did not include a

¹ Bradt, J., etc., Cochrane database of systematic reviews (Online), Volume 12, 2010, Pages CD006902
trained music therapist. Results indicated that music listening may be beneficial for anxiety reduction in mechanically ventilated patients; however, these results need to be interpreted with caution due to the small sample size. Findings indicated that listening to music consistently reduced heart rate and respiratory rate, suggesting a relaxation response. No strong evidence was found for blood pressure reduction. Music listening did not improve oxygen saturation level. No studies could be found that examined the effects of music interventions on quality of life, patient satisfaction, post-discharge outcomes, mortality, or cost-effectiveness. Music listening may have a beneficial effect on heart rate, respiratory rate, and anxiety in mechanically ventilated patients. However, the quality of the evidence is not strong. Most studies examined the effects of listening to pre-recorded music. More research is needed on the effects of music offered by a trained music therapist.

10. Effects of music intervention on physiological stress response and anxiety level of mechanically ventilated patients in China: A randomized controlled trial. ¹

Abstract - Aim: To examine the effects of music intervention on the physiological stress response and the anxiety level among mechanically ventilated patients in intensive care unit. Background: Despite the fact that previous studies have found music interventions to be effective in stress and anxiety reduction, effects of music on the Chinese population are inconclusive and warranted systematic study to evaluate its effect fully for a different Asian culture. Design: A randomized placebo-controlled trial. Methods: A total of 137 patients receiving mechanical ventilation were randomly assigned to either music listening group, headphone group or control group. Outcome measures included the Chinese version of Spielberger State-Trait Anxiety Scale and physiological parameters (heart rate, respiratory rate, saturation of oxygen and blood pressure). Results: Comparison of mean differences (pretest score-posttest score) showed significant differences in heart rate, respiratory rate, systolic blood pressure and diastolic blood pressure as well as the Chinese version of Spielberger State-Trait Anxiety Scale, but not in SaO2 among the three groups (ranging from p < 0.001 to p = 0.007), of which greater

¹ Han, L., etc., Journal of Clinical Nursing, Volume 19, Issue 7-8, April 2010, Pages 978-987
mean differences were found in music listening group. A significant reduction in physiological stress response (heart rate and respiratory rate) over time was found in music listening group (p < 0·001 for both variables) and a significant increase in heart rate and respiratory rate over time in control group (p < 0·001 and p = 0·032), with no significant change over time in headphone group. Within group pretest-posttest comparison of the Chinese version of Spielberger State-Trait Anxiety Scale demonstrated a significant reduction in anxiety for the music listening group (p < 0·001) and headphone group (p < 0·001) but not the control group. Conclusions: Our findings confirm that short-term therapeutic effects of music listening results in substantial reduction in physiological stress responses arising from anxiety in mechanically ventilated patients. Relevance to clinical practice: Music as a non-pharmacological nursing intervention can be used as complementary adjunct in the care of patients with low-energy states who tire easily, such as those requiring mechanical ventilator support.

11. The effects of music on physiological responses and sedation scores in sedated, mechanically ventilated patients. ¹

Abstract - Aims and objectives: A pilot study designed as future randomized controlled trial was carried out to determine the effects of music on physiological responses and sedation scores in sedated, mechanically ventilated patients. Background: Mechanically ventilated ICU patients, even when receiving intravenous sedatives, may experience stress and anxiety. One possible intervention to reduce stress and anxiety is listening to music. Design: A randomized controlled trial design with repeated measures was used. Methods: Data were collected over a six-month period in 2006. Twenty subjects were randomly assigned to either the experimental or control group. Subjects in the experimental group listened to music three times for 30 minutes over two days; subjects in the control group undertook three 30-minute rest periods. Physiological effects of music on systolic, diastolic and mean arterial blood pressure and heart and respiratory rate were assessed. Sedation scores were also measured. Results: Physiological parameters did not show a significant difference between the groups. Patients in the experimental group showed significantly higher Ramsay (sedation) scores than patients in

¹ Dijkstra, B.M., etc., Journal of Clinical Nursing, Volume 19, Issue 7-8, April 2010, Pages 1030-1039
the control group after the first session. The higher scores indicate that patients were less responsive to external stimuli. Conclusion: Our results suggest that listening to music leads to higher sedation scores in sedated, mechanically ventilated ICU patients. No significant decreases in physiological parameters were observed. Listening to music showed no negative changes in the condition of these patients. Future research should focus on the use of other measures, such as stress hormones, to assess stress in sedated, mechanically ventilated ICU patients. Relevance to clinical practice: For the sedated, mechanically ventilated ICU patient, the benefit of music may lie in the associated (deeper) level of sedation that is achieved, which in turn may make the patient less susceptible to stress and anxiety.

12. The effect of music therapy on physiological signs of anxiety in patients receiving mechanical ventilatory support.

Abstract – Aims: The aim of this study was to investigate if relaxing music is an effective method of reducing the physiological signs of anxiety in patients receiving mechanical ventilatory support. Background. Few studies have focused on the effect of music on physiological signs of anxiety in patients receiving mechanical ventilatory support. Design. A study-case-control, experimental repeated measures design was used. Method. Sixty patients aged 18-70 years, receiving mechanical ventilatory support and hospitalized in the intensive care unit, were taken as a convenience sample. Participants were randomized to a control group or intervention group, who received 60 minutes of music therapy. Classical music was played to patients using media player (MP3) and headphones. Subjects had physiological signs taken immediately before the intervention and at the 30th, 60th and 90th minutes of the intervention. Physiological signs of anxiety assessed in this study were mean systolic and diastolic blood pressure, pulse rate, respiratory rate and oxygen saturation in blood measured by pulse oxymetry. Data were collected over eight months in 2006-2007. Results. The music group had significantly lower respiratory rates, and systolic and diastolic blood pressure, than the control group. This decrease improved progressively in the 30th, 60th and 90th minutes of the intervention, indicating a cumulative dose effect. Conclusion. Music can provide an

1 Korhan, E.A., etc., Journal of Clinical Nursing, Volume 20, Issue 7-8, April 2011, Pages 1026-1034
effective method of reducing potentially harmful physiological responses arising from anxiety. Relevance to clinical practice: As indicated by the results of this study, music therapy can be supplied to allay anxiety in patients receiving mechanical ventilation. Nurses may include music therapy in the routine care of patients receiving mechanical ventilation.

Observations: 12 studies about the impact of music on mechanically ventilated / I.C.U patients noted the fluctuations in one or more physiological parameters like anxiety, stress, heart rate, blood pressure, respiratory rate, relaxation and others.

9 reports confirmed the positive effect of music in anxiety reduction, 4 cases assume it to help in relaxation, in 5 extracts music was helpful in lowering respiratory rate, 4 investigations said music efficiently reduces heart rate, for 3 abstracts it is equally good for decreasing blood pressure, whereas 2 studies says music decreases stress. There were no significant results were found in 2 experiments regarding BP and respiratory rates. 4 abstracts recommended further research.

Needless to say that music intervention is a supportive therapy to mechanical ventilation system.
1. **Music for sleep disturbance in the elderly.**

Abstract - It might seem surprising in the age of the ghetto blaster and ‘acid music’ that music might be associated as aiding people with insomnia, but a report earlier this year in the Journal of Holistic Nursing revealed that the right music can actually help induce sleep. Twenty-five elderly people with self-reported sleep disturbances participated in a pilot study. All of the participants were given classical and New Age music to listen to before bedtime and whenever a sleep disturbance was identified. The participants were asked to keep daily records to assess the efficacy of the music in inducing sleep. When the results were analyzed the researchers found that twenty-four (96%) of the participants reported improved sleep after listening to the music.

2. **Music improves sleep quality in older adults.**

Abstract – Aim: The aim of this paper is to report an investigation of the effects of soft music on sleep quality in older community-dwelling men and women in Taiwan. Background: Sleep is a complex rhythmic state that may be affected by the ageing process. Few studies have focused on the effects of music, a non-pharmacological method of improving the quality of sleep in older adults. Method: A randomized controlled trial was used with a two-group repeated measures design. Sixty people aged 60-83 years with difficulty in sleeping were recruited through community leaders and

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1 Mornhinweg GC; etc., Journal of Holistic Nursing; Sep 1995, 13 (3) p248-54
screened using the Pittsburgh Sleep Quality Index (PSQI) and Epworth Sleepiness Scale. Those reporting depression, cognitive impairment, medical or environmental problems that might interfere with sleep; and those who used sleeping medications, meditation, or caffeine at bedtime were excluded. Participants listened to their choice among six 45-minute sedative music tapes at bedtime for 3 weeks. There were five types of Western and one of Chinese music. Sleep quality was measured with the PSQI before the study and at three weekly post-tests. Groups were comparable on demographic variables, anxiety, depressive symptoms, physical activity, bedtime routine, herbal-tea use, napping, pain, and pretest overall sleep quality. Results: Music resulted in significantly better sleep quality in the experimental group, as well as significantly better components of sleep quality: better perceived sleep quality, longer sleep duration, greater sleep efficiency, shorter sleep latency, less sleep disturbance and less daytime dysfunction (P = 0.04-0.001). Sleep improved weekly, indicating a cumulative dose effect. Conclusion: The findings provide evidence for the use of soothing music as an empirically based intervention for sleep in older people.

3. **Music improves sleep quality in students.**

Abstract - Aim: This paper is a report of a study to investigate the effects of music on sleep quality in young participants with poor sleep. Background: Sleep disorders may result in fatigue, tiredness, depression and problems in daytime functioning. Music can reduce sympathetic nervous system activity, decrease anxiety, blood pressure, heart and respiratory rate and may have positive effects on sleep via muscle relaxation and distraction from thoughts. Control groups have not been used in most previous studies. Methods: We used a three-group repeated measures design. Ninety-four students (aged between 19 and 28 years) with sleep complaints were studied in 2006. Participants listened for 45 minutes either to relaxing classical music (Group 1) or an audiobook (Group 2) at bedtime for 3 weeks. The control group (Group 3) received no intervention. Sleep quality was measured using the Pittsburgh Sleep Quality Index before the study and weekly during the intervention. Depressive symptoms in experimental group participants were measured using the Beck Depression Inventory. Results. Repeated measures anova

revealed a main effect of TIME (P < 0·0001) and an interaction between TIME and GROUPS (P < 0·0001). Post hoc tests with Bonferroni correction showed that music statistically significantly improved sleep quality (P < 0·0001). Sleep quality did not improve statistically significantly in the audiobook and the control group. Depressive symptoms decreased statistically significantly in the music group (P < 0·0001), but not in the group listening to audiobooks. Conclusion: Relaxing classical music is an effective intervention in reducing sleeping problems. Nurses could use this safe, cheap and easy to learn method to treat insomnia.

4. The effect of music relaxation versus progressive muscular relaxation on insomnia in older people and their relationship to personality traits. ¹

Abstract - A large percentage of older people suffer from chronic insomnia, affecting many aspects of life quality and well-being. Although insomnia is most often treated with medication, a growing number of studies demonstrate the efficiency of various relaxation techniques. The present study had three aims: first, to compare two relaxation techniques - music relaxation and progressive muscular relaxation - on various objective and subjective measures of sleep quality; second, to examine the effect of these techniques on anxiety and depression; and finally, to explore possible relationships between the efficiency of both techniques and personality variables. Fifteen older adults took part in the study. Following one week of base-line measurements of sleep quality, participants followed one week of music relaxation and one week of progressive muscular relaxation before going to sleep. Order of relaxation techniques was controlled. Results show music relaxation was more efficient in improving sleep. Sleep efficiency was higher after music relaxation than after progressive muscular relaxation. Moreover, anxiety was lower after music relaxation. Progressive muscular relaxation was related to deterioration of sleep quality on subjective measures. Beyond differences between the relaxation techniques, extraverts seemed to benefit more from both music and progressive muscular relaxation. The advantage of non-pharmacological means to treat insomnia, and the importance of taking individual differences into account are discussed.

¹ Ziv, N., etc., Journal of Music Therapy, Volume 45, Issue 3, September 2008, Pages 360-380
5. The effects of music relaxation on sleep quality and emotional measures in people living with schizophrenia.¹

Abstract - The aim of the present study was to examine the effects of music relaxation on insomnia and emotional measures in people living with schizophrenia. Twenty-four people living with schizophrenia participated in the study. The study involved a 7-day running-in no-treatment period, followed by a 7-day experimental period. Treatment consisted of music relaxation played at bedtime. During each of these periods, participants' sleep was continuously monitored with a wrist actigraph, and participants completed a wide spectrum of questionnaires. Results showed an improvement in sleep latency and sleep efficiency after the music relaxation was played. Likewise, music relaxation was shown to improve participants' total psychopathology score (PANSS) as well as their level of depression. Moreover, a significant correlation was found between reduction in level of situational anxiety and improvement in sleep efficiency. The findings suggest the beneficial effect of music relaxation as a treatment both for insomnia and for emotional measures in people living with schizophrenia.

Observations: 5 abstracts studied the sleep inducing effect of music in insomnia patients.

¹ Bloch, B., etc., Journal of Music Therapy, Volume 47, Issue 1, March 2010, Pages 27-52
All of them found that soothing or relaxing music leads to reduction in anxiety levels thereby reaching to a more relaxed state. In 2 cases music has worked as an anti-depressant also.

Music therapy is an independent healing technique, which lulls the patient to sleep.
M) INVASCIVE & NON-INVASIVE MEDICAL PROCEDURES

1. Effect of music on state anxiety scores in patients undergoing fiberoptic bronchoscopy.  

Image Source: http://www.lhsc.on.ca/_images/Thoracic_Surgery/bronchoscopy_000.jpg

Abstract - Objective: To study the effect of music on state anxiety levels in patients undergoing flexible fiberoptic bronchoscopy (FFB). Design: Randomized clinical trial using pretests, posttests, and two groups. Setting: Pulmonary special-procedures unit of a tertiary-care referral center. Patients: Sixty adult patients: 30 patients received music during bronchoscopy and 30 control subjects received no music. Results: The study population had baseline state anxiety levels similar to those previously reported in surgical patients (42.6 ± 13 vs 42.7 ± 14; p value, not significant [NS]) and higher than those reported in normal working adults (42.6 ± 13 vs 34.4 ± 10; p < 0.001). Experimental and control groups were similar in patient and procedure-related characteristics and baseline pre-FFB state and trait anxiety scores. Although trait anxiety

scores decreased significantly after the procedure (pooled post-FFB scores of 32.6 ± 10 vs pre-FFB scores of 35.5 ± 11; p < 0.001), no reductions were noted in state anxiety (pooled post-FFB scores of 42.8 ± 13 vs pre-FFB scores of 42.6 ± 13; p value, NS). More importantly, playing music through headphones during FFB did not result in a statistically or clinically significant reduction in either state or trait anxiety when compared to control subjects. Conclusion: Relaxation music administered through headphones.

2. Introducing music as a means of habilitation for children with cochlear implants.¹


Abstract - Objective: To investigate the feasibility, methods and the primary results of utilizing music as a means of habilitation of children with cochlear implant. Study Design: A habilitation program based on music training is developed. The results are presented as a case-series. Methods: Music Training Program is introduced as a new habilitation program. Methods of training (based on Orff method) and measuring the outcomes are introduced in this paper. Effects of this program on other habilitation

¹ Abdi, S., etc., International Journal of Pediatric Otorhinolaryngology, Volume 59, Issue 2, 14 June 2001, Pages 105-113
programs and overall hearing related skills of children were also investigated by open
questioning of the parents and the habilitation staff. Results: Twenty-three children, (age:
2.5-12.5 years) were selected. All children showed appreciable progress in playing a
musical instrument. The effects on other habilitation processes were significant and all
parents expressed their satisfaction with the program, as they perceived its benefits.
Discussion: The necessity of adding Music Training Program to the routine habilitation
may be summarized as follows: Music is a feature of sound, which should be mastered.
The psychological effects of being able to accomplish a hearing-related task can add to
the self-esteem of children and help prevent and reduce anxiety. Music is a habilitation
method: Introducing new concepts of sound, like temporal and frequency-related
characteristics, is a crucial part of the habilitation of a child with cochlear implant.
Practicing new concepts needs motivation, too. We emphasize on using all means of
rehabilitation and encourage teaching music to cochlear implant children between 4 and 5
years of age having ~4 months of experience with cochlear implant.

3. The Effect of Self-Selected Music during Colonoscopy on Anxiety, Heart
Rate, and Blood Pressure. ¹


Image Source: http://findmeacure.com/2008/12/20/colonoscopy/
Abstract - The purpose of this study was to examine the effects of music therapy on self-reported and physiological signs of anxiety among ambulatory patients undergoing colonoscopy. Thirty-two patients were randomly assigned to either an experimental group who listened to music during the colonoscopy or a standard procedure no music control group. Before and after the procedure, subjects completed the State Anxiety Inventory. Physiological signs of anxiety, including heart rate and blood pressure, were monitored at four time points during the procedure. Repeated measures analysis of variance indicated a significant group by time interaction on the physiological signs of anxiety. Post hoc analysis indicated that heart rate and systolic and diastolic blood pressure significantly decreased among the music intervention group during the procedure while remaining unchanged in the control group. No significant effect of the treatment was observed on the State Anxiety Inventory, although a trend indicated that the music intervention decreased state anxiety. Finally, the group who received the music intervention required less physician-administered sedation during the procedure than did the control group. These findings indicate that music therapy has the potential to reduce physiological indicators of anxiety and the need for sedation among individuals undergoing a colonoscopy.

4. Music decreases anxiety and provides sedation in extracorporeal shock wave lithotripsy.  


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1 Yilmaz, E., etc, Urology, Volume 61, Issue 2, 1 February 2003, Pages 282-286
Abstract – Aim: To evaluate the efficacy of music on sedation in extracorporeal shock wave lithotripsy (ESWL) treatment to compare its anxiolytic effects with those of midazolam. Methods: Ninety-eight urolithiasis patients were randomly divided into two groups. Hemodynamic parameters, including mean arterial pressure, heart rate, respiration rate, and oxygen saturation, were recorded in all patients. In 50 patients (group 1), 2 mg of midazolam was administered intravenously 5 minutes before ESWL. In-group 2 (n = 48), music chosen by the patients was listened to with a headset and continued during the treatment. The visual analog scale (0 to 100 mm), Observer's Assessment of Alertness/Sedation Scale, State and Trait Anxiety Inventory-Trait Anxiety test, and State and Trait Anxiety Inventory-State Anxiety test were administered for the evaluation of pain, sedation level, and patient anxiety. Results: For the hemodynamic parameters, a statistically significant decrease in mean arterial pressure was noted at the end of the ESWL procedure in-group 2 and in oxygen saturation from the 10th minute to the end of the treatment in group 1. Although the visual analog scale, Observer's Assessment of Alertness/Sedation Scale, and State and Trait Anxiety Inventory-State Anxiety test did not show statistically significant differences, the State and Trait Anxiety Inventory-Trait Anxiety score was found to be lower in the music group (group 2) than in the midazolam group (group 1). Conclusions: With the anxiolytic effects of music, ESWL can be performed more effectively with the patient in a comfortable state. Listening to music by patients during the ESWL session is a feasible and convenient alternative to sedatives and anxiolytics.
5. A music intervention to reduce anxiety prior to gastrointestinal procedures.  


Abstract - Patients scheduled for gastrointestinal procedures such as colonoscopy or esophagogastroduodenoscopy are often anxious and frightened. High levels of anxiety may result in more difficult and painful procedures. Past research has reported education, coping skills, relaxation techniques, and combinations of these including music, have decreased anxiety in patients across many settings. Self-selected music therapy for pre-procedural anxiety has not been studied. A randomized controlled trial of 198 patients was undertaken to determine whether 15 minutes of self-selected music reduced pre-procedure anxiety. The State Trait Anxiety Inventory was used to measure patients' anxiety. One-hundred ninety-three men and 5 women comprised the sample with an average age of 61 (SD 10.5). Patients who listened to music (n = 100) reduced their anxiety score from 36.7 (SD 9.1) to 32.3 (SD 10.4), while those who did not listen to music (n = 98) reduced their anxiety score from 36.1 (SD 8.3) to 34.6 (SD 11.5). These differences were statistically significant (F = 7.5, p =.007) after controlling for trait anxiety. There were no significant vital sign changes pre-music and post-music. Music is a noninvasive nursing intervention that can significantly reduce patients' anxiety prior to gastrointestinal procedures. Further research should address using music to reduce

1 Hayes, A., etc., Gastroenterology nursing, Volume 26, Issue 4, July 2003, Pages 145-149
anxiety in other procedure areas and testing effectiveness of self-selected versus investigator-selected music in reducing anxiety.

6. **The use of music to reduce anxiety for patients undergoing colposcopy: A randomized trial.**

Abstract - The goal of this work was to investigate the impact of music on women's anxiety and perceived pain during colposcopy examination. Methods. This was a prospective randomized study. Two hundred and twenty women referred for colposcopy for the first time were recruited. They were randomized to either the music or no-music group. Before colposcopy examination, each subject completed a Chinese version of the state anxiety questionnaire (STAI) and assessed the anticipated pain for colposcopy with a visual analog scale (VAS). Slow-rhythm music was played during colposcopy examination in the music group. Subjects in the no-music group were examined in the same setting without music. After colposcopy, each subject completed the STAI form again and assessed their pain during examination by the VAS. Results. Women in the music group experienced significantly less pain (mean VAS 3.32 [95% CI 2.86-3.78] vs 5.03 [4.54-5.52], \( P < 0.001 \)) and lower anxiety (mean STAI 39.36 [95% CI 37.33-41.39] vs 44.16 [41.82-46.49], \( P = 0.002 \)) during colposcopy examination than women in the no-music group. On linear regression analysis, the factors significantly affecting anxiety during colposcopy were anxiety score at enrollment, pain score during colposcopy, and whether or not the women had listened to music during the colposcopy examination. The factors significantly affecting the pain scores were whether the women had listened to music during the procedure and the final anxiety scores. Conclusion. Music is a simple, inexpensive, and easily used strategy to minimize anxiety and pain during colposcopy examination.

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1 Chan,Y.M., etc., Gynecologic Oncology, Volume 91, Issue 1, 1 October 2003, Pages 213-217
7. Relaxation techniques for reducing pain and anxiety during screening mammography.  

Abstract - The purpose of this study was to determine whether listening to a relaxation audiotape before and during mammography decreases subjective reports of pain and anxiety. CONCLUSION: Listening to a relaxation or music audiotape before and during mammography does not reduce subjective reports of anxiety or pain. Women undergoing screening mammography report minimal levels of distress.

8. The effect of music therapy on anxiety and depression in patients undergoing hemodialysis

Abstract - The purpose of this study was to determine the effects of music therapy on anxiety and depression in patients undergoing hemodialysis. METHOD: The study was designed using a nonequivalent control group pretest-posttest design. The subjects consisted of 36 patients (Experimental group: 18, Control group: 18) who received

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1 Domar, A.D., etc, American Journal of Roentgenology, Volume 184, Issue 2, February 2005, Pages 445-447
2 Kim, K.B., etc. Taehan Kanho Hakhoe chi, Volume 36, Issue 2, April 2006, Pages 321-329
hemodialysis in three hospitals located in Seoul. The measures were a Music Preference Questionnaire (MPQ), anxiety measurement, and depression measurement. Data was collected from December 26, 2004 to April 2, 2005 through questionnaires. The collected data was analyzed by the SPSS 10.0 program. RESULT: The first hypothesis that patients undergoing hemodialysis who received music therapy would have less anxiety than patients undergoing hemodialysis who did not receive music therapy was supported ($F=8.05$, $p=.008$). The second hypothesis that patient undergoing hemodialysis who received music therapy would have less depression than patients undergoing hemodialysis who did not receive music therapy was supported ($F=11.86$, $p=.002$). CONCLUSION: The results of this study suggest that music therapy may be applied as a method of nursing intervention contributing to the improvement of quality of life by reducing their anxiety and depression of patients undergoing hemodialysis.

9. **Effect of the somatosensory vibro-music relaxation therapy on treatment of physical and psychological symptoms on sub-health patients: A randomized controlled clinical trial.**

![Image of a person lying on a vibro-music therapy device](http://www.topblogposts.com/files/2008/11/sonic-lounger/1.jpg)


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1 Liu, W., etc., Chinese Journal of Rehabilitation Medicine, Volume 21, Issue 11, November 2006, Pages 1008-1011
Abstract - Objective: To evaluate the effect of somatosensory vibro-music relaxation therapy on intervention of sub health patients. Method: Randomly divided half of 384 subjects into intervention group (n=81) and control group (n= 81). All subjects whom were screened from 680 hospital employees by the sample sub-health physical syndrome scale (SSPS) and Pittsburg sleep exponent measuring scale(PSQI). All subjects were accepted health education by the health guidance handbook of facility, and intervention group was added with somatosensory vibro-music relaxation therapy. SSPS and SCL-90 were used to assess for curative effect before and after treatment. Result: Circled digit one. The decrease rate of measuring score ≥ 30% was defined as the standard for curative effect. The total effective rates of physical and psychological symptoms in intervention group were 67.9% and 50.6% respectively, which were much better than control group (P<0.05). Circled digit two The factor scores of fatigue, pain, depression, anxiety, somatization, compulsion, psychosis and hostility after intervention in intervention group were lower than those in control group, and the differences were significant (P<0.05). Conclusion: The somatosensory vibro-music relaxation therapy can simultaneously alleviate physical and psychological symptoms. It can be applied conveniently, accepted by the patient easily and no damage.

10. Listening to Turkish classical music decreases patients' anxiety, pain, dissatisfaction and the dose of sedative and analgesic drugs during colonoscopy: A prospective randomized controlled trial.  

Abstract - Aim: To determine whether listening to music decreases the requirement for dosages of sedative drugs, patients' anxiety, pain and dissatisfaction feelings during colonoscopy and makes the procedure more comfortable and acceptable. Methods: Patients undergoing elective colonoscopy between October 2005 and February 2006 were randomized into either listening to music (Group 1, n = 30) or not listening to music (Group 2, n = 30). Anxiolytic and analgesic drugs (intravenous midazolam and meperidine) were given according to the patients' demand. Administered medications were monitored. We determined their levels of anxiety using the State-Trait Anxiety

Inventory Test form. Patients' satisfaction, pain, and willingness to undergo a repeated procedure were self-assessed using a visual analog scale. Results: The mean dose of sedative and analgesic drugs used in-group 1 (midazolam: 2.1 ± 1.4, meperidine: 18.1 ± 11.7) was smaller than group 2 (midazolam: 2.4 ± 1.0, meperidine: 20.6 ± 11.5), but without a significant difference (P > 0.05). The mean anxiety level in-group 1 was lower than group 2 (36.7 ± 2.2 vs 251.0 ± 1.9, P < 0.001). The mean satisfaction score was higher in-group 1 compared to group 2 (87.8 ± 3.1 vs 58.1 ± 3.4, P < 0.001). The mean pain score in-group 1 was lower than group 2 (74.1 ± 4.7 vs 39.0 ± 3.9, P < 0.001). Conclusion: Listening to music during colonoscopy helps reduce the dose of sedative medications, as well as patients' anxiety, pain, dissatisfaction during the procedure. Therefore, we believe that listening to music can play an adjunctive role to sedation in colonoscopy. It is a simple, inexpensive way to improve patients' comfort during the procedure.

11. Music or guided imagery for women undergoing colposcopy: A randomized controlled study of effects on anxiety, perceived pain, and patient satisfaction.\(^1\)

Abstract - It was hypothesized that music or guided imagery versus usual care would result in less anxiety and perceived pain for colposcopy patients. MATERIALS AND METHODS: Patients were randomized to music, guided imagery, or usual care after completing a baseline questionnaire. All patients completed a post procedure questionnaire. RESULTS: Study participants (N = 170) had a mean age of 28.4 years (SD = 9.6; range 18-60) and formed a racially diverse group. Education/income levels were low. No between-group differences were found for post procedure anxiety or pain rating. CONCLUSIONS: Mind-body interventions had no statistically significant impact on reported anxiety, perceived pain, or satisfaction with care, even for those who anticipated the most pain or started with high anxiety.

\(^1\) Danhauer, S.C., etc., Journal of Lower Genital Tract Disease, Volume 11, Issue 1, January 2007, Pages 39-45
12. **Does Music Reduce Anxiety During Invasive Procedures With Procedural Sedation? An Integrative Research Review** ¹

Abstract - Undergoing interventional radiology (IR) procedures with procedural sedation can be anxiety provoking. To understand more clearly if music can reduce anxiety, an integrative research review was conducted to compare music during invasive procedures or peri-operatively without general anesthesia to standard care. This review reveals that music may be effective in lowering blood pressure and reducing medication requirements. Practice guidelines and suggestions for future research are offered to help IR nurses examine this intervention in more detail.

13. **The effect of music on the anxiety levels of patients undergoing hysterosalpingography.** ²

Abstract - Objectives: To determine the effect of music on the anxiety levels of patients undergoing a hysterosalpingography procedure. Patients and methods: One hundred hysterosalpingography referrals were randomly assigned to either the experimental or control group. Music chosen earlier by the patients was played during the hysterosalpingography procedure for the experimental group. The control group was studied without music. Certain physiological parameters and the State-Trait Anxiety Inventory were used to assess the patients' anxiety levels before and during the investigation. Patient's willingness to have a repeat procedure, should it become necessary, was also assessed in both groups as a measure of acceptability of the investigation. The z-test was used to analyze the results for any statistically significant differences between the experimental and the control groups. Results: The blood pressure (BP) monitored during the procedure was reduced in 31 (62%) of the patients in the experimental group compared to their pre-investigation values. Reduction in the pulse rate (PR) in 28 (56%) of the patients was also noted in the experimental group. On the other hand, the blood pressure of 37 (74%) of the patients and the pulse rate of 32 (64%) patients in the control group were increased from their pre-investigation values. The physiological parameters in the experimental group were significantly lower than the

² Agwu, K.K., etc., Radiography, Volume 13, Issue 2, May 2007, Pages 122-125
values in the control group during the investigation (p < 0.05). A comparison of the State-Trait Anxiety Inventory scores taken before and during the procedure shows significantly lower scores for the experimental group compared to those for the control group (p < 0.05). More patients, 41 (82%) in the experimental group were also willing to have a repeat procedure compared to 16 (32%) patients in the control. Conclusion: Music reduces the physiological and cognitive responses of anxiety in patients undergoing hysterosalpingography and can be harnessed for clinical use. The use of music therapy made the procedure to be more acceptable by the patients.

14. **Music in the endoscopy suite: A meta-analysis of randomized controlled studies.**

Abstract - Background and study aim: Prior studies have suggested that music therapy can provide stress relief and analgesia. In this meta-analysis we focused on the effects of music therapy on patients undergoing gastrointestinal endoscopic procedures. Materials and methods: A literature search using the PubMed and Cochrane Library databases and a manual search led to the inclusion of six randomized controlled trials that examined the effects of music therapy on patients undergoing gastrointestinal endoscopic procedures. After data extraction, four separate meta-analyses were performed: in the three studies

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Image Source: http://www.harmonyasc.com/images/pain_room.jpg

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1 Rudin, D., etc., Endoscopy, Volume 39, Issue 6, June 2007, Pages 507-510
that did not use pharmacotherapy (group A), anxiety levels were used as a measure of efficacy; in the three studies in which pharmacotherapy was used (group B), sedation and analgesia requirements and procedure duration times were analyzed. Results: A total of 641 patients were included in the analysis. In group A, patients receiving music therapy exhibited lower anxiety levels (8.6% reduction, \( P=0.004 \)), compared with controls. In group B, patients receiving music therapy exhibited statistically significant reductions in analgesia requirements (29.7% reduction, \( P=0.001 \)) and procedure times (21% reduction, \( P=0.002 \)), and a reduction in sedation requirements that approached significance (15% reduction, \( P=0.055 \)), in comparison with controls. Conclusions: Music therapy is an effective tool for stress relief and analgesia in patients undergoing gastrointestinal endoscopic procedures.

15. A randomized prospective study of music therapy for reducing anxiety during cast room procedures. ¹

Abstract - BACKGROUND: Cast room procedures, such as cast application and removal, pin removal, and suture removal can cause significant anxiety in young children. The use of music therapy in the cast room to decrease anxiety has not been previously reported. METHODS: We performed a randomized, prospective study of soft lullaby music compared with no music in 69 children 10 years or younger undergoing cast room procedures. Heart rates (beats per minute) were recorded in the waiting room and cast room using a pulse oximeter. RESULTS: A total of 28 children were randomized to music and 41 children to no music. The mean rise in heart rate between the waiting room and entering the cast room was -2.7 beats/min in the music group and 4.7 beats/min in the no music group (\( P = 0.001 \)). The mean difference in heart rate between the waiting room and during the procedure was 15.3 beats/min in the music group and 22.5 beats/min in the no music group (\( P = 0.05 \)). There were 7 patients in the no music group with heart rate increases of greater than 40 beats/min. No patient in the music group had an increase of this magnitude. CONCLUSIONS: Playing soft music in the cast room is a simple and inexpensive option for decreasing anxiety in young children during cast room procedures.

¹ Liu, R.W., etc., Journal of Pediatric Orthopaedics, Volume 27, Issue 7, October 2007, Pages 831-833

Abstract - Objective: The aim of this study was to conduct a systematic review of the efficacy of music therapy (MT) on pain and anxiety in children undergoing clinical procedures. Methods: We searched 16 electronic databases of published and unpublished studies, subject bibliographies; reference lists of relevant articles, and trials registries. Two reviewers independently screened 4559 citations and reviewed the full manuscript of 393 studies. Nineteen studies met the inclusion criteria: randomized controlled trial, children aged 1 month to 18 years were examined, music was used as an intervention, and the study measured pain or anxiety. Music therapy was considered active if a music therapist was involved and music was used as a medium for interactive communication. Passive music therapy was defined as listening to music without the involvement of a music therapist. Results: The 19 included trials involved 1513 subjects. The methodological quality of the studies was generally poor. Overall, MT showed a significant reduction in pain and anxiety (standardized mean difference [SMD] -0.35; 95% confidence interval [CI], -0.55 to -0.14; 9 studies; N = 704; I² = 42%). When analyzed by outcome, MT significantly reduced anxiety (SMD -0.39; 95% CI, -0.76 to -0.03; 5 studies; n = 284; I² = 52.4%) and pain (SMD -0.39; 95% CI, -0.66 to -0.11; 5 studies; N = 465; I² = 49.7%). There was no evidence of publication bias. Conclusions: Music is effective in reducing anxiety and pain in children undergoing medical and dental procedures. Music can be considered an adjunctive therapy in clinical situations that produce pain or anxiety.

17. Effect of music on procedure time and sedation during colonoscopy: A meta-analysis. 

Abstract - Aim: To integrate results from different studies in examining the effectiveness of music in reducing the procedure time and the amount of sedation used during colonoscopic procedure. Methods: An electronic search in various databases was

1 Klassen, J.A., etc., Ambulatory Pediatrics, Volume 8, Issue 2, 17 March 2008, Pages 117-128

166
performed to identify related articles. Study quality was evaluated by the Jadad's scale. The random effect model was used to pool the effect from individual trials and the Cohen Q-statistic was used to determine heterogeneity. Egger's regression was used to detect publication bias. Results: Eight studies with 722 subjects were included in this meta-analysis. The combined mean difference for the time taken for the colonoscopy procedure between the music and control groups was -2.84 with 95% CI (-5.61 to -0.08), implying a short time for the music group. The combined mean difference for the use of sedation was -0.46 with 95% CI (-0.91 to -0.01), showing a significant reduction in the use of sedation in the music group. Heterogeneity was observed in both analyses but no publication bias was detected. Conclusion: Listening to music is effective in reducing procedure time and amount of sedation during colonoscopy and should be promoted.


Abstract - The purpose of this randomized investigator-blind controlled trial is to examine the effects of music on the state anxiety and physiological indices among patients undergoing root canal treatment. Design: Randomized controlled trial. Methods:

Purposive sampling was used to recruit 44 adult subjects. The subjects were randomly assigned to the treatment and the control group. There were 22 subjects in each group. Subjects in the music group listened to selected sedative music using headphones throughout the root canal treatment procedure. The control group subjects worn headphones but without the music. Using a repeated measures design with a single pretest and five posttests, the subjects' heart rate, blood pressure and finger temperature were measured before the study and every 10 minutes until the end of the root canal treatment procedure. Anxiety was measured before the study and at the end of the 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. However, the subjects in the music group 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. Relevance to clinical practice: The findings provide evidence for nurses and dentists that the use of soothing music for anxiety reduction in patients undergoing root canal treatment procedures is supported by research findings.

19. An investigation of the effects of music on anxiety and pain perception in patients undergoing hemodialysis treatment. ¹

Abstract - This study aimed to investigate the effects of preferred music listening on anxiety and pain perception in patients undergoing hemodialysis. A two group experimental design was used. Sixty people diagnosed with end stage renal failure undergoing hemodialysis treatment participated in this study. Preferred music listening was applied as an intervention. Anxiety and pain were measured pre-test and post-test. The control group scored significantly higher in state anxiety than the experimental group and experienced significantly higher pain intensity in post-test phase. Findings provide experimental evidence to support the effectiveness of preferred music listening in medical settings.

¹ Pothoulaki, M., etc., Journal of Health Psychology, Volume 13, Issue 7, October 2008, Pages 912-920
20. **Music Reduces Patient Anxiety During Interfacility Ground Critical Care Transport.**

Abstract - Introduction: Interfacility ground critical care transport (CCT) of patients by ambulance may be stressful. This study evaluated whether playing music during CCT reduces patient anxiety and whether objective evidence is manifested by a change in vital signs. Setting: Urban teaching hospital. Methods: In this prospective cohort study, music

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1 Stuhlmiller, D.F.E., etc., Air Medical Journal, Volume 28, Issue 2, March 2009, Pages 88-91
was played for eligible adult patients during CCT while recording vital signs. A questionnaire was subsequently mailed to patients to rate whether the ambulance transport was stressful, the impact music had on transport, whether music changed their anxiety, whether music made them comfortable and relaxed, and whether they would prefer music to be played on future transports. Vital signs were compared between respondents who perceived transport as stressful and those who did not. Results: One hundred two patients were enrolled; 23 respondents (22.5%) constituted the study group. Four patients (17.4%) reported CCT as stressful (average response, 4.75). Nineteen (82.6%) rated CCT as not stressful (average response, 1.63). Subjectively, patients reported a positive impact of music on transport, with improved comfort and relaxation but only a minimal decrease in anxiety. No statistically significant change in vital signs was observed between cohorts; too few patients were enrolled to generate power to detect any difference. Conclusions: Music therapy is a simple adjunct for use during CCT that may increase patient comfort and alleviate anxiety. The small number of patients in this preliminary report limits the strength of any conclusions. Larger studies are needed.

21. The effect of the music-therapy under spinal anesthesia.  


Abstract - Background: Since no pre-medication has been widely accepted especially in spinal anesthesia, anesthesiologists should manage the control of patient's anxiety during surgery. Instead of sedatives, we have been using music-therapy during spinal anesthesia.

Bispectral index monitoring (BIS) is used as one of the sedation indices in spinal anesthesia. The aim of this study was to assess the music-therapy on reducing anxiety of patients under spinal anesthesia using BIS and interview type psychology test, State Trait Anxiety Inventory (STAI). Methods: Fifty-eight ASA physical status I-II patients scheduled for spinal anesthesia, were randomly allocated into M group (music group, n=29) or C group (control, n=29). BIS, EMG, and SQI of both groups were obtained continuously with computer system. Patients in M group listened to music by headphone and those in C group were left free under ordinary operating theater environment. Trait Anxiety Inventory (STAI-TA) score was obtained preoperatively for property-based anxiety and the State Anxiety Inventory (STAI-SA) score was obtained postoperatively for condition-based anxiety. Time averaged BIS scores (pre-surgery, during-surgery and post-surgery period) were obtained during operation. Results: Time averaged BIS values of M and C group in pre-surgery period, during-surgery period, and post-surgery period were 95.3±0.4 vs 95.8±0.4 (NS), 87.6±7.5 vs 95.1±2.8 (P<0.01) and 96.0±0.4 vs. 96.2±0.4 (NS), respectively. Post-surgery STAI-SA was 29.7±7.2 in M group vs 38.8±10.3 in C group (P <0.01) while pre-surgery STAI-SA scores of both groups were not different. Conclusions: Music-therapy reduced BIS value and was effective to reduce patient's anxiety during spinal anesthesia.

22. Clinical trial: Music reduces anxiety levels in patients attending for endoscopy.¹

Abstract - Background: Patients attending for endoscopy are generally anxious and worried. Aims: To examine whether music reduced anxiety levels in patients attending for endoscopic procedures. Methods: Prospective randomized controlled trial of 180 patients (M:F 81:99). The effect of age (< or >51 years) and procedure (gastroscopy or flexible sigmoidoscopy/colonoscopy) on anxiety levels (state-trait anxiety inventory) on

¹ El-Hassan, H., etc., Alimentary Pharmacology and Therapeutics, Volume 30, Issue 7, October 2009, Pages 718-724
arrival in the unit and immediately before the endoscopy procedure, after listening to music or no music (control group) for the same period. Results: At baseline, anxiety levels were not influenced by age (≤51 years, n = 56:42.21 ± 9.18; >51 years, n = 124:39.99 ± 10.13 (P = 0.15) or procedure: gastroscopy, n = 87:39.43 ± 9.9, flexible sigmoidoscopy/colonoscopy: n = 93:41.86 ± 9.75 (P = 0.98). No difference was found in anxiety scores in the control group (n = 88) at baseline and immediately pre-endoscopy (P = 0.243), but music led to a significant reduction in anxiety scores (n = 92), which was maintained for all age groups irrespective of procedure (all P < 0.0001). Conclusions: Anxiety levels in patients attending for endoscopy were not influenced by age or procedure, but were significantly reduced by listening to music compared to controls. The availability of music within the endoscopy unit is a simple strategy that will improve the well being of patients.

23. **Comparison of the effectiveness of music and progressive muscle relaxation for anxiety in COPD-A randomized controlled pilot study.**

![Image Source](http://www.anatomystuff.co.uk/repository/product/user/img_img_9780781782371_COPD_chart_200x200.jpg)

1 Singh, V.P., etc., Chronic Respiratory Disease, Volume 6, Issue 4, November 2009, Pages 209-216
Abstract - Acute effects of music and relaxation have not been evaluated in hospitalized subjects with chronic obstructive pulmonary disease (COPD). This study aims to evaluate the acute effects of music and progressive muscle relaxation (PMR) in hospitalized COPD subjects after a recent episode of exacerbation. A Randomized controlled study was performed of pre-test post-test design after recruiting 82 COPD subjects from K.M.C hospitals. All patients were admitted for acute exacerbation and were medically stabilized. After being screened for the inclusion and exclusion criteria, 72 subjects were selected for the study. Demographic and baseline data was taken on the day subjects were screened. Music group listened to a self-selected music of 60-80 beats per minute for 30 minutes. PMR group practiced relaxation through a pre-recorded audio of instructions of 16 muscle groups. Outcome variables were Spielbergerg's state anxiety inventory (SSAI), Spielbergerg's trait anxiety inventory (STAI), dyspnea, systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse rate (PR) and respiratory rate (RR). There was = 6.024, p = 0.003), trait anxiety (F = 8.222, p = 0.000), dyspnea (F = 10.659, p = 0.000), SBP (F = 12.889, p = 0.000), PR (F = 4.746, p = 0.008) and RR (F = 12.078, p = 0.000). There were greater changes observed after the second session in both groups however statistically significant main effect across the sessions for state anxiety (F = 62.621, p =0.000), trait anxiety (F = 19.528, p = 0.000), dyspnea (F = 122.227, p = 0.000), SBP (F = 63.885, p = 0.000), PR (F = 115.780, p = 0.000) and RR (F = 202.977, p = 0.000). There was statistically significant interaction effect between the two groups for state anxiety (F, change in DBP was not significant in either group. Music and PMR are effective in reducing anxiety and dyspnoea along with physiologic measures such as SBP, PR and RR in two sessions in COPD patients hospitalized with exacerbation. However, reductions in the music group were greater compared to the PMR group.

24. Music Therapy May Reduce Pain and Anxiety in Children Undergoing Medical and Dental Procedures. ¹


¹ Bekhuis, T., Journal of Evidence-Based Dental Practice, Volume 9, Issue 4, December 2009, Pages 213-214

25. A solution on ubiquitous EEG-based biofeedback music therapy. 1

Abstract - Nowadays, many people suffer from negative moods like sadness or anxiety. As an effective tool to relieve such moods, music therapy is widely embraced. Furthermore, researchers try to use newly developed bio-feedback technologies like electroencephalograms (EEG) to measure the effects of music therapy since it can reflect people's emotion sensitively and objectively. In this paper, we design a mobile platform of music therapy based on EEG feedback. The platform can record user's EEG in real time, analyze the emotion state, and choose a suitable music track to play. Users can adjust their emotion at anytime and anywhere. They can examine the therapeutic effects in time by observing EEG feedback on mobile client. In consideration of the hardware and software resources of mobile device limitations, we only collect EEG data from two channels and barely compute beta/alpha power ratio and alpha lateralization as the signal features used to measure test subjects' emotion status. Accordingly, we've committed experiments involving 4 subjects. Preliminary results show that the prototype design of the music therapy is fitful and it can be used in the mobile platform because of its simplicity and accuracy.

26. Divergent effects of joyful and anxiety-provoking music on endothelial vasoreactivity. 2

Abstract - To evaluate the extent to which music may affect endothelial function. In previous research, a link between music and physiologic parameters such as heart rate

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1 Dong, Q., Li, Y., etc., ICPCA10 - 5th International Conference on Pervasive Computing and Applications, 2010, Article number 5704071, Pages 32-37
2 Miller, M., etc., Psychosomatic Medicine, Volume 72, Issue 4, May 2010, Pages 354-356
and blood pressure has been observed. METHODS: Randomized four-phase crossover and counterbalanced trial in ten healthy, nonsmoking volunteers (70% male; mean age, 35.6 years) that included self-selections of music evoking joy or provoking anxiety. Two additional phases included watching video clips to induce laughter and listening to audio tapes to promote relaxation. To minimize emotional desensitization, subjects were asked to refrain from using self-selected tapes and images for at least 2 weeks before the assigned study phase. Endothelial function was assessed by brachial artery flow-mediated dilation (FMD) and measured as percent diameter change after an overnight fast. After baseline FMD measurements, subjects were randomized to a 30-minute phase of the testing stimulus followed by post study FMD; they returned a minimum of 1 week later for the subsequent task. A total of 160 FMD measurements were obtained. RESULTS: Compared with baseline, music that evoked joy was associated with increases in mean upper arm FMD (2.7% absolute increase; p <.001), whereas reductions in FMD were observed after listening to music that elicited anxiety (0.6% absolute decrease; p =.005 difference between joyful and anxiety-provoking music). Self-selected joyful music was associated with increased FMD to a magnitude previously observed with aerobic activity or statin therapy. CONCLUSION: Listening to joyful music may be an adjunctive lifestyle intervention for the promotion of vascular health.

27. Singing teaching as a therapy for chronic respiratory disease - A randomized controlled trial and qualitative evaluation.  

Abstract - Background: Despite optimal pharmacological therapy and pulmonary rehabilitation, patients with COPD continue to be breathless. There is a need to develop additional strategies to alleviate symptoms. Learning to sing requires control of breathing and posture and might have benefits that translate into daily life. Methods: To test this hypothesis we performed a randomized controlled trial, comparing a six-week course of twice weekly singing classes to usual care, in 28 COPD patients. The experience of singing was assessed in a qualitative fashion, through interviews with a psychologist. In addition, we surveyed patients with chronic respiratory conditions who participated in a series of open singing workshops. Results: In the RCT, the physical component score of

1 Lord, V.M., etc., BMC Pulmonary Medicine, Volume 10, 3 August 2010, Article number 41
the SF36 improved in the singers (n = 15) compared to the controls (n = 13); +7.5(14.6) vs. -3.8(8.4) p = 0.02. Singers also had a significant fall in HAD anxiety score; -1.1(2.7) vs. +0.8(1.7) p = 0.03. Singing did not improve single breath counting, breath hold time or shuttle walk distance. In the qualitative element, 8 patients from the singing group were interviewed. Positive effects on physical sensation, general well-being, community/social support and achievement/efficacy emerged as common themes. 150 participants in open workshops completed a questionnaire. 96% rated the workshops as "very enjoyable" and 98% thought the workshop had taught them something about breathing in a different way. 81% of attendees felt a "marked physical difference" after the workshop. Conclusion: Singing classes can improve quality of life measures and anxiety and are viewed as a very positive experience by patients with respiratory disease; no adverse consequences of participation were observed.

28. Study on therapeutic effect of music therapy on patients with dental anxiety of college students. ¹

Abstract - Dental anxiety (DA) is the psychology obstacle of the dental patients in the dental treatment. It has been an important problem that hampers dental care service in common people, especially in College Students of many countries. The serious dental anxiety not only injures oral health and physical and mental health of patients but also affects university students' normal study and life. The intervention treatment was carried out in college students with dental anxiety through music therapy, so as to eliminate their misgiving and fear. Different music is chosen according to different grades and hobbies of college students, then the doctor carried out careful operation when the patient enjoying music. We should measure and record the students' symptoms of diseases and reaction, so as to get score of dental anxiety scale (DAS) about preoperatively and intra-operatively. By using the music therapy and humanized nursing in college students with dental anxiety, we could obviously relieve their symptoms and dreadful emotion.

¹ Pu, C., etc., 2010 International Conference on E-Health Networking, Digital Ecosystems and Technologies, EDT 2010, Volume 1, 2010, Article number 5496628, Pages 12-14
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 support 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 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.

Observations: 29 researches experimented music with invasive and non-invasive medical procedures to register its impact on one or more psycho-physiological

variables like anxiety, pain, depression, heart rate, respiratory rate, blood pressure, procedure time and effectiveness, comfort and satisfaction of the patient, consumption of sedatives, etc.

21 reports said music lowers anxiety, 10 abstracts concluded that it creates a comfortable environment leading to patient satisfaction, 6 registered it reduces pain, 6 agreed that music listening lessens sedative consumption, 4 studies measured a decrease in blood pressure, 3 extracts claim that procedure can be effectively performed by music and takes less time, 2 noticed reduction in depression, pulse rate effectively decreased in 2, 1 administered decreased heart rate and respiratory rate respectively. 3 studies didn't conclude on any significant results and suggested further research, whereas 1 assumed it to be an alternative to sedative and anxiolytics.

Music once again takes the role of a complementary intervention mediating between the medical procedures and emotional well being of the patient during invasive & non-invasive procedures.
1. Music therapy and the effects on laboring women. ¹

Abstract - Wiand's (1997) study supported the use of music therapy to decrease pain and anxiety. The results of this study could be used to support a research utilization project to educate nurses on the potential benefits of music therapy among laboring women. Nurses and physicians could collaborate together to educate clients on music therapy to decrease pain and anxiety. Feasibility issues would include education of the nurses to use music therapy and the cost of developing different types of music. Future research could be done to study a larger sample size. Other research is needed to determine what type of music works best with laboring women.

2. The application of music therapy in maternity nursing. ²

Abstract - Music therapy has been used in the care of patients in a variety of fields, to decrease anxiety and enhance health, and has shown promising results. It is reported that pregnancy and childbirth may result in stressful consequences for some women. This article describes the systematic applications of music therapy to perinatal women and

¹ Robinson, A., Kentucky nurse, Volume 50, Issue 2, April 2002, Page 7
their families. The use of music for the childbearing family is appropriate because it enhances learning, improves the birth experience, and promotes closer relationships. The labor nurses are charged with the tasks of assuring the positive aspects of pregnancy and childbirth and meeting the demands of the women in these stressful situations. In order to create a caring environment, we suggest that music therapy be incorporated into standard maternity care.

3. **Effects of music therapy on women's physiologic measures, anxiety, and satisfaction during cesarean delivery.**

Abstract - The purpose of the study was to investigate the effects of music therapy on women's physiologic measures, level of anxiety, and satisfaction during cesarean delivery. Sixty-four women who were planning to have a cesarean delivery were randomly divided into an experimental and a control group. The experimental group received routine care and music therapy, whereas the control group received routine care only. Our results indicated that compared to the control group the experimental group had significantly lower anxiety and a higher level of satisfaction regarding the cesarean experience. No significant differences were found between the two groups in any of the physiological indexes. This controlled study provides evidence that music therapy can reduce anxiety and create a more satisfying experience for women undergoing cesarean delivery.

4. **The effects of mothers' singing on full-term and preterm infants and maternal emotional responses.**

Abstract - The purpose of this research was to determine the effects of mothers' singing on their adjustment to and bonding with their new infants as well as use of music in the home environment in the first 2 weeks after their infants' birth. Preterm mothers were assessed for coping with their infants' NICU stay, and premature infants' length of hospitalization was evaluated. Fifty-four full-term infants and mothers and 20 premature infants and 16 mothers were randomly assigned to experimental or control conditions.

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1 Chang, S.-C., etc., Research in Nursing and Health, Volume 28, Issue 6, December 2005, Pages 453-461
Mothers in both experimental groups were recorded singing songs of their choice for use at home. Recordings of each preterm mother's voice were played 20 minutes per day, 3 to 5 times per week, at a time when she was not able to visit her infant in the NICU. All full-term and preterm mothers in experimental and control groups completed a posttest survey 2 weeks after infants were discharged. Comparisons revealed that experimental preterm and full-term mothers indicated less adjustment to their baby and lifestyle changes and less bonding compared to control mothers, though this difference was not significant. Preterm and full-term experimental mothers reported the greatest number of postpartum medical complications, which might explain their poor adjustment and bonding scores. There was a significant difference between mothers' value of music, with preterm experimental valuing music more. Preterm and full-term experimental mothers used music with and sang to infants more compared to preterm and full-term control mothers, but not to a significant degree. Preterm mothers reported a mean score of 4.75 (with a 5 indicating that they strongly agreed) for the following Item: knowing my infant listened to my singing helped me to cope with my infant's stay in the NICU. Furthermore, preterm infants who listened to the CD recording of their mothers' singing left the hospital an average of 2 days sooner than those in the control group, though this difference was not significant.

5. Effects of music therapy on psychological health of women during pregnancy.  

Abstract - Aims and objectives. The purpose of this study was to examine the effects of music therapy on stress, anxiety and depression in Taiwanese pregnant women. Background: The value of music therapy is being realized in various clinical areas including obstetrics. Previous studies have demonstrated a high prevalence of psychological stress during pregnancy. Few studies have examined the effects of music therapy on reducing psychological stress during pregnancy. Design: A randomized experimental study design was developed and implemented. Methods: Two hundred and thirty-six pregnant women were randomly assigned to music therapy (n = 116) and control (n = 120) groups. The music therapy group received two weeks of music

intervention. The control group received only general prenatal care. Psychological health was assessed using three self-report measures: Perceived Stress Scale (PSS), State Scale of the State-Trait Anxiety Inventory (S-STAI) and Edinburgh Postnatal Depression Scale (EPDS). Results: In a paired t-test, the music therapy group showed significant decrease in PSS, S-STAI and EPDS after two weeks. The control group only showed a significant decrease in PSS after two weeks. This decrease was not as substantial as in the experimental group. An ancova test with the pretest scores as the control revealed that the changes in PSS, S-STAI and EPDS after two weeks were significantly decreased in the experimental group compared with the control group. Conclusions: This controlled trial provides preliminary evidence that two-week music therapy during pregnancy provides quantifiable psychological benefits. Relevance to clinical practice: The findings can be used to encourage pregnant women to use this cost-effective method of music in their daily life to reduce their stress, anxiety and depression. Further research is needed to test the long-term benefits.

6. To relieve anxiety in pregnant women on bed rest: A randomized Trial, controlled trial.  

Abstract - Abstract Purpose: To explore the effect of music therapy on anxiety alleviation for antepartal women on bed rest in China. Design and Methods: One hundred and twenty patients recruited from one tertiary hospital in Changsha city, China were enrolled in a randomized controlled trial. Women in the experimental group received music therapy for 30 minutes on 3 consecutive days. Usual care participants had a 30-minute rest on 3 consecutive days. Variables included anxiety (State-Trait Anxiety Inventory), and physiological responses (vital signs, fetal heart rate). Descriptive statistics, t tests, \( \chi^2 \) tests, Wilcoxon rank sum tests, and Pearson correlation analyses were used to analyze the data. Results: Anxiety levels decreased and physiological responses improved significantly in the intervention group, which was provided with music therapy while on bed rest. Clinical Implications: Carefully selected music that incorporates a patient's own

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1 Yang, M., etc., MCN The American Journal of Maternal/Child Nursing, Volume 34, Issue 5, September 2009, Pages 316-323
preferences may offer an inexpensive and effective method to reduce anxiety for antepartal women with high risk pregnancies who are on bed rest.

7. **Music during caesarean section under regional anaesthesia for improving maternal and infant outcomes.**

Abstract - Background: Evidence on the benefits of music during caesarean section under regional anaesthesia to improve clinical and psychological outcomes for mothers and infants has not been established. Objectives: To evaluate the effectiveness of music during caesarean section under regional anaesthesia for improving clinical and psychological outcomes for mothers and infants. Search strategy We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (30 September 2008). Selection criteria: We included randomized controlled trials comparing music added to standard care during caesarean section under regional anaesthesia to standard care alone. Data collection and analysis: Two review authors, Malinee Laopaiboon and Ruth Martis, independently assessed eligibility, risk of bias in included trials and extracted data. We analyzed continuous outcomes using a mean difference (MD) with a 95% confidence interval (CI). Main results: One trial involving 76 women who planned to have their babies delivered by caesarean section met the inclusion criteria, but data were available for only 64 women. This trial was of low quality with unclear allocation concealment and only a few main clinical outcomes reported for the women. The trial did not report any infant outcomes. It appears that music added to standard care during caesarean section under regional anaesthesia had some impact on pulse rate at the end of maternal contact with the neonate in the intra-operative period (MD -7.50 fewer beats per minute, 95% CI -14.08 to -0.92) and after completion of skin suture for the caesarean section (MD -7.37 fewer beats per minute, 95% CI -13.37 to -1.37). There was also an improvement in the birth satisfaction score (maximum possible score of 35) (MD of 3.38, 95% CI 1.59 to 5.17). Effects on other outcomes were either not significant or not reported in the one included trial. Authors' conclusions: The findings indicate that music during planned caesarean section under regional anaesthesia may improve pulse rate and birth

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1 Laopaiboon, M., etc., Cochrane Database of Systematic Reviews, Issue 2, 2009, Article number CD006914
satisfaction score. However, the magnitude of these benefits is small and the methodological quality of the one included trial is questionable. Therefore, the clinical significance of music is unclear. More research is needed to investigate the effects of music during caesarean section under regional anaesthesia on both maternal and infant outcomes, in various ethnic pregnant women, and with adequate sample sizes.

8. **Effects of music therapy on labour pain and anxiety in Taiwanese first-time mothers.**¹

Abstract - Aims: The purpose of the study was to investigate the effects of music on pain reaction and anxiety during labour. Background: Music therapy has been used on clinical medicine. Only few scientific studies validate the value on labour women. Design: Randomized controlled trial. Methods: Sixty primiparas expected to have a normal spontaneous delivery were randomly assigned to either the experimental group (n = 30) or the control group (n = 30). The experimental group received routine care and music therapy, whereas the control group received routine care only. A self-report visual analogue scale for pain and a nurse-rated present behavioral intensity were used to measure labour pain. Anxiety was measured with a visual analogue scale for anxiety and finger temperature. Pain and anxiety between groups were compared during the latent phase (2-4 cm cervical dilation) and active phase (5-7 cm) separately. Results: Our results revealed that compared with the control group, the experimental group had significantly lower pain, anxiety and a higher finger temperature during the latent phase of labour. However, no significant differences were found between the two groups on all outcome measures during the active phase. Conclusions: This study provides evidence for the use of music as an empirically based intervention of women for labour pain and anxiety during the latent phase of labour. Relevance to clinical practice: The findings support that music listening is an acceptable and non-medical coping strategy for labouring women. Especially, apply in reducing the pain and anxiety for women who are at the early phase of labour.

¹ Liu, Y.-H., etc., Journal of Clinical Nursing, Volume 19, Issue 7-8, April 2010, Pages 1065-1072
9. Effects of listening to music on postpartum stress and anxiety levels. ¹

Abstract - Aim: This Taiwan study investigated what effect listening to specially selected, relaxing music at home, on a self-regulated basis, had on the perceived stress and state anxiety of postpartum women. Background: Listening to music has been increasingly used in the perinatal period, but few studies have been undertaken to provide evidence of its effectiveness. Design: A randomized clinical trial. Methods: Seventy-seven postpartum women were randomly assigned to an experimental group (n = 37) and a control group (n = 40). The experimental group listened to music at home for at least 30 minutes a day over two weeks and received regular postpartum care. The women in the control group received regular postpartum care only. The Perceived Stress Scale and State Anxiety Inventory were used to measure outcomes. Results: After controlling the pretest scores and educational level of mothers, which was a significant covariate, there were no significant differences in the posttest levels of perceived stress and state anxiety between the two groups. Conclusions: This study does not provide evidence that preselected designer music reduced stress and anxiety levels among postpartum women. Relevance to clinical practice: Despite the absence of significant findings, there are lessons that professionals may find useful. It is recommended that future studies take more account of the stress factors that postpartum women are unable to control when they are listening to music at home.

10. Music therapy on anxiety, stress and maternal-fetal attachment in pregnant women during trans vaginal ultrasound. ²

Abstract - Purpose: The purpose of this study was to examine the effects of music therapy on anxiety, stress and maternal-fetal attachment in pregnant women during a transvaginal ultrasound. Methods: This study was a nonequivalent control group non-synchronized design. Pregnant women (n =232) were assigned to experimental (n= 117) and control (n =116) groups respectively. The data were collected from August 2 to 27, 2010. The experimental group received general prenatal care and single 30-minute session of music therapy, while the control group received only general prenatal care.

¹ Tseng, Y.-F., etc., Journal of Clinical Nursing, Volume 19, Issue 7-8, April 2010, Pages 1049-1055
² Shin, H.S., etc., Asian Nursing Research, Volume 5, Issue 1, March 2011, Pages 19-27
Anxiety, stress, and maternal-fetal attachment was assessed using three self-report measures by State scale of the State-Trait Anxiety Inventory (1976), Pregnant women's stress scale of Ahn (1984) and Cranley's (1981) maternal-fetal attachment scale. Results: The music therapy group showed statistically significant decrease in anxiety compared to control group but no significant difference was identified in stress and maternal-fetal attachment. Conclusions: The finding provides evidence for use of nursing intervention in prenatal care unit to reduce pregnant women's anxiety. Further research is necessary to test the benefits of music therapy with different frequency and duration.

11. Effect of maternal anxiety and music on fetal movements and fetal heart rate patterns. ¹

Abstract – Objective: Aimed to investigate (a) the effect of non-stress test (NST) and music on maternal anxiety (b) the effect of maternal anxiety and music on fetal heart rate (FHR) changes. Material and method: The two hundred and one pregnant women coming for routine prenatal care were randomized to receive either music (n = 96) or no music (n = 105) during NST. Before and after the test, these women were asked to complete the Spielberg State-Trait Anxiety Inventory on two interviews; primary outcome was considered as a maternal state anxiety score before and after NST. Secondary outcome was the baseline FHR, the number of fetal movement, large accelerations, dubious NST, variable decelerations, and the minimum procedure time. Results: Before NST, the mean state anxiety score of the music and control groups was found as 38.1 ± 8.8 and 38.08 ± 8.2, respectively (p > 0.05). On the other hand, after NST, the mean state anxiety score of the music and control groups was found as 35.5 ± 8.2 and 40.2 ± 9.2, respectively (p < 0.001). While in control group, NST brought about a statistically significant increase in a state anxiety score (38.08 ± 8.2 versus 40.2 ± 9.2, p < 0.001), listening to music during NST resulted in decrease in a state anxiety score of the study group but it was not statistically significant (38.1 ± 8.8 versus 35.5 ± 8.2, p > 0.05). The baseline FHR of the music group was significantly higher than that of the control group (134.09 ± 7.2 versus 130.3 ± 5.7, p < 0.001). The number of fetal movement in the music group was

¹ Kafali, H., etc., Journal of Maternal-Fetal and Neonatal Medicine, Volume 24, Issue 3, March 2011, Pages 461-464
significantly higher than that of the control group (8.9 ± 4.7 versus 5.9 ± 3.9, p < 0.001). The number of large accelerations in music group was significantly higher than that of the control group (5.7 ± 2.1 versus 4.5 ± 2.04, p < 0.001). The minimum procedure time in music group was significantly lower than that of control group (13.4 ± 5.2 versus 15.6 ± 6.1, p < 0.05). The number of dubious NST and variable decelerations was found to be similar for both groups (p > 0.05). Conclusion: NST has anxiogenic effects on mothers and listening to music during the test has positive impact on both maternal and fetal parameters but it is an open question whether maternal anxiety during pregnancy may affect fetal accelerations to such an extent that it could influence clinical judgments.

12. Cortisol and anxiety response to a relaxing intervention on pregnant women awaiting amniocentesis.  

Abstract - Background: Stress and anxiety during pregnancy have been associated with premature and low birth weight babies, presumably through fetus over exposition to glucocorticoids. Antenatal stress also seems to have long-term effects upon infant development and adult health. However, medication for stress may carry risks to the expectant mother, therefore the efficacy of non-pharmacological interventions should be investigated. Methods: Pregnant women (n=154) awaiting amniocentesis were randomly assigned in the morning and the afternoon to three groups for 30 min: (1) listening to relaxing music, (2) sitting and reading magazines, and (3) sitting in the waiting-room. Before and after that period, they completed the Spielberger's State and Trait anxiety inventory and provided blood samples for cortisol. The groups were then compared regarding change in cortisol levels and anxiety. Results: Maternal cortisol and state anxiety were correlated (r=0.25, p=0.04) in the afternoon, but not in the morning. The larger decreases in cortisol occurred in the music group (-61.8 nmol/L, ANOVA: p=0.01), followed by magazine, being differences among groups more pronounced in the morning. Women in the music group also exhibited the greater decreases in state anxiety (p<0.001). Younger mothers with less gestational age were on average the most anxious, and also the ones with greater decreases in cortisol and anxiety levels after relaxation. Conclusion: A relaxing intervention as short as 30 min, especially listening to music,

1 Ventura, T., etc., Psychoneuroendocrinology, Volume 37, Issue 1, January 2012, Pages 148-156
decreases plasma cortisol and self-reported state anxiety score. Pregnant women might benefit from the routine practice of relaxation in the imminence of clinical stressful events.

**Observations:** Potential of music was measured in maternity nursing by analyzing its impact on anxiety, pain, improving birth experience, bonding between mother and infant, etc.

8 out of 12 studies considers music decreases anxiety, 2 cases showed its effectiveness in reducing stress, pain and improving / satisfying birth experience respectively. 1 study says that music helps to cope from depression and 2 reports in positive impact of music listening on maternal and fetal parameters. No significant results were shown in 3 studies and 4 of them suggested further research into this area.

Music Therapy has been used in both ways in maternity nursing. On one hand it is used as a conjunction with the operating procedure during C-section whereas was an independent form of therapy in normal delivery cases.
1. **Musicotherapy in treatment of hyperkinetic and anxiety neuroses in children (Polish).**

Abstract - The authors based this work on the analysis of 20 cases of neurotic children. Half of them were diagnosed as hyperkinetic and half as anxiety neuroses. At the onset of musicotherapy the children on the former group had well expressed guidance, image and inventory of movements, and the problems concerned the secondary coordination and control of movement. The latter group had unsatisfactory developed forms of movement and improper guidance and inventory of movements. Applied musicotherapy was one of the elements of comprehensive treatment. The system of treatment was cohesive, organizationally consistent, directive and subservent to the general line of treatment, its aims and theoretical considerations. The aims were: giving direction to uncontrolled movement; developing concentration; time space orientation; self-regulation of psychomotor functions, forming the visual and audio motoric coordination; damping anxiety attitudes; perfecting the ability for independent decision making in solving life tasks; developing active attitudes towards themselves and the environment; awakening esthetic sensitivity, musical perception; exercising memory, musical imagination and fixing the fondness for music. In the realization of these aims two forms of musicotherapy were used: the receptive form - listening to music; and the active form (image - projection) also known as 'plastic auto-expression of movement'; and 'movement - to - music' classes. The tasks of musicotherapy in both groups of children are discussed. Detailed methods for musicotherapy in hyperkinetic and anxiety neuroses in children are

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1. Gromska, J., etc, Psychiatria Polska, Volume 9, Issue 6, 1975, Pages 605-612
presented. The results of this treatment allowed discontinuing pharmacotherapy, which was initially applied.

2. Music therapy - Possible uses in social psychiatry.  

Abstract - The importance of music therapy as a type of treatment within the framework of psychiatry is examined. Music therapy, as used in the treatment of schizophrenia, is considered to be a communicative therapy with a tendency to regression. A plan for treating psychotics with a non-verbal and a verbal track is outlined. The special approach to patients offered via music therapy is seen as follows. The therapist-patient relationship is established on a preverbal communicative level in a zone, which is free from anxiety. The shelter afforded by a common musical experience enables self-regulation of the balance between symbiosis and separation, and hence the development of a therapist-patient relationship. The feedback provided by establishing structured objects represents an integration aid for the self and the ego of the patient. Therapy practiced as active group music therapy forms part of a social field within the group.

3. Emotional experience of music by psychiatric patients compared with normal subjects.  

Abstract - Psychiatric patients (n = 107) and normal subjects (n = 100) were exposed to seven newly composed pieces of music orchestrated for a small symphony orchestra. The patients were divided into seven subgroups: schizophrenic, depressive and manic psychosis; obsessive, depressive, anxiety and hysterical neurosis. All subjects rated the music on semantic differential scales describing three factors of emotional experience: tension-relaxation, gaiety-gloom and attraction-repulsion. The ratings by patients in the different groups were compared with those by the normal subjects. Expressiveness in music was found to be communicative to patients in the same relative way as to normal. However, in the various diagnostic groups, several marked differences in experience were demonstrated. The main findings were that schizophrenic psychotics experienced the music as more attractive, while depressive and anxiety neurotics experienced it as less

attractive, than normal. Depressive and manic psychotics experienced the music as less gay. Obsessive neurotics seem to be more sensitive to tension in music than normal.

4. **Group music therapy in multiple sclerosis: First report.**

![Diagram of healthy and damaged nerves](http://www.healthandphysicaleducationteacher.com/mental-health/multiple-sclerosis.html/attachment/multiple-sclerosis)

Abstract - Group music therapy is a special kind of psychotherapeutic treatment. Within two years 225 patients with multiple sclerosis (MS) had the opportunity to participate a music therapy group over 4-6 weeks after admission to a MS-clinic. The major topics which were chosen in group sessions were MS associated problems such as disability, uncertainty, anxiety, depression, loss of self-esteem etc. The data suggest that group music therapy is a useful adjunct not only in actual psychological support but also in the individual coping strategies.

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1 Lengdobler, H., etc., PmP Psychotherapie Psychosomatik Medizinische Psychologie, Volume 39, Issue 9-10, 1989, Pages 369-373
5. Music therapy: A rating by schizophrenic patients.  

Abstract - Music therapy is presented as an integral part of the therapeutic program of an open reception ward at a state-funded psychiatric hospital. The target group for music therapy comprises schizophrenic patients whose primary psychopathological symptoms are characterized by basic disorders, autistic withdrawal, anergia and limited means of verbal communication. A sample of 30 schizophrenic patients selected for music therapy is described. The subjective evaluation and rating of the music therapy was registered using a specially developed questionnaire. The primary results are: 1. Music therapy has a high level of subjective acceptance among patients. 2. No negative effects are recorded despite the therapy being introduced in the post-acute phase. 3. The positive therapeutic effects quoted are relaxation, activation, reduced anxiety, easier contact-making, and improved opportunities for emotional expression. The duration of the effects is limited. 4. The training-related concept and the clearly structuring behavior of the group leader are given a positive rating by the patients.

Image Source: www.healthlob.com

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1 Reker, T., Psychiatrische Praxis, Volume 18, Issue 6, 1991, Pages 216-221
6. **Using music therapy to help a client with Alzheimer's disease adapt to long-term care.**

Abstract - The purpose of this case study is to illustrate how music therapy can be used to help the elderly successfully adjust to living in a long-term care (LTC) facility. LTC residents, particularly those with Alzheimer's disease or related dementia, may exhibit behaviors such as depression, withdrawal, anxiety, emotional liability, confusion, and memory difficulties, frequently related to the disorder, but often exacerbated by difficulty in adjustment to the change in lifestyle. The subject of this case study demonstrated these symptoms. Music therapy helped him adjust to life in a LTC setting by improving his quality of life and enhancing his relationships with those around him. As chronicled in this study, music therapy may facilitate a resident's adjustment to life in a LTC facility. N.B. Names and identifying information have been changed to protect privacy.

7. **Using music as a therapy tool to motivate troubled adolescents.**

Abstract - Children and adolescents with emotional disorders may often be characterized by having problems in peer and adult relations and in display of inappropriate behaviors. These include suicide attempts, anger, withdrawal from family, social isolation from peers, aggression, school failure, running away, and alcohol and/or drug abuse. A lack of self-concept and self-esteem is often central to these difficulties. Traditional treatment methods with young people usually includes cognitive-behavioral approaches with psychotherapy. Unfortunately these children often lack a solid communication base, creating a block to successful treatment. In my private clinical practice, I have endeavored to break through these communication barriers by using music as a therapy tool. This paper describes and discusses my use of music as a therapy tool with troubled adolescents. Pre- and post-testing of the effectiveness of this intervention technique by using the Psychosocial Functioning Inventory for Primary School Children (PFI-PSC) has yielded positive initial results, lending support to its continued use. Music has often been successful in helping these adolescents engage in the therapeutic process with

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1 Kydd, P., American Journal of Alzheimer's Disease and other Dementias, Volume 16, Issue 2, 2001, Pages 103-108
minimized resistance as they relate to the music and the therapist becomes a safe and trusted adult. Various techniques such as song discussion, listening, writing lyrics, composing music, and performing music have proven to be useful in reaching the child, facilitating self-expression, projecting personal thoughts and feelings into a discussion, enhancing self-awareness, stimulating verbalization, providing a pleasurable, non-threatening environment, facilitating relaxation, and reducing tension and anxiety. I have found that by using music in this way, the distrustful adolescent has come to regard me as a positive adult. Music has thus provided a safe, non-confrontative means of expression. This has helped in creating more socially acceptable ways of venting anger and fears, increasing self-awareness, self-confidence, and self-esteem.

8. Psychophysiological responsivity to Indian instrumental music

Abstract - The effects of rāga Desi-Todi played on a flute by a renowned Indian musician, Hari Prasad Chaurasia, were examined on three physiological (alpha EEG frequency, systolic and diastolic blood pressure and heart rate) and three psychological (depression, state and trait anxiety, and four components of anxiety: somatic, cognitive, behavioral and affective) assessments. The postgraduate male university students served as subjects. The subjects listened to instrumental music (without lyrics) for 30 minutes a day for 20 days. A pre- and post-treatment procedure was adopted for recording physiological and psychological assessments. The results showed that the instrumental music led to a significant increase in the alpha EEG frequency and a significant decrease in the scores on depression, state and trait anxiety, and the four components of anxiety; the systolic and diastolic blood pressure and heart rate, however, remained unaffected.


Abstract - Introduction: Neuro-degenerative diseases are, and will remain, an enormous public health problem. Interventions that could delay disease onset even modestly will have a major public health impact. The aim of this study is to see which components of

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2 Aldridge, D., etc., Complementary Therapies in Medicine, Volume 13, Issue 1, March 2005, Pages 25-33
the illness are responsive to change when treated with music therapy in contrast to a group of patients receiving standard medical treatment alone. Material and methods: Twenty multiple sclerosis patients (14 female, 6 male) were involved in the study, their ages ranging from 29 to 47 years. Ten participants formed the therapy group, and 10 the matched control group matched by age, gender and the standard neurological classification scheme Expanded Disability Status Scale (EDSS). Exclusion criteria were pregnancy and mental disorders requiring medication. Patients in the therapy group received three blocks of music therapy in single sessions over the course of the one-year project (8-10 sessions, respectively). Measurements were taken before therapy began (U1), and subsequently every three months (U2-U4) and within a 6-month follow-up without music therapy (U5) after the last consultation. Test battery included indicators of clinical depression and anxiety (Beck Depression Inventory and Hospital Anxiety and Depression Scale), a self-acceptance scale (SESA) and a life quality assessment (Hamburg Quality of Life Questionnaire in Multiple Sclerosis). In addition, data were collected on cognitive (MSFC) and functional (EDSS) parameters. Results: There was no significant difference between the music-therapy treatment group and the control group. However, the effect size statistics comparing both groups show a medium effect size on the scales measuring self-esteem (d, 0.5423), depression HAD-D (d, 0.63) and anxiety HAD-A (d, 0.63). Significant improvements were found for the therapy group over time (U1-U4) in the scale values of self-esteem, depression and anxiety. In the follow-up, scale values for fatigue, anxiety and self-esteem worsen within the group treated with music therapy. Discussion: A therapeutic concept for multiple sclerosis, which includes music therapy, brings an improvement in mood, fatigue and self-acceptance. When music therapy is removed, then scale scores worsen and this appears to intimate that music therapy has an influence.

10. Music therapy and childcare. 1

Abstract - Music therapy was shown many years ago to have positive effects in various age groups of patients in the Western world. Music can produce physiological and psychological effects, including changes in the vital signs, reductions in anxiety,

1 Chang, S.M., etc., The journal of nursing., Volume 52, Issue 6, December 2005, Pages 71-75
improvements in the immune system, decreases in cortisol levels, the reduction of stress and the promotion of well being. Music therapy is an inexpensive and effective intervention for nurses to apply to patients. The application of such therapy to children, however, is different from that to adults due to their limited cognitive and language development. In Taiwan, nurses' knowledge of music therapy is limited, and it is rarely used in childcare. This article introduces music therapy and its effects in childcare, such as in premature infants, children in emergency care, handicapped children, and children receiving surgery. Music therapy is often used as an assisted intervention for patient care in clinical settings. Health care professionals can perform some of the music therapy activities for patients appropriately even if they have not been trained in music. This article aims to improve nurses' knowledge of music therapy and to provide a useful reference for those involved in childcare.

11. The effect of music on cognitive performance: Insight from neurobiological and animal studies.¹

Abstract - The past 50 years have seen numerous claims that music exposure enhances human cognitive performance. Critical evaluation of studies across a variety of contexts, however, reveals important methodological weaknesses. The current article argues that an interdisciplinary approach is required to advance this research. A case is made for the use of appropriate animal models to avoid many confounds associated with human music research. Although such research has validity limitations for humans, reductionist methodology enables a more controlled exploration of music's elementary effects. This article also explores candidate mechanisms for this putative effect. A review of neurobiological evidence from human and comparative animal studies confirms that musical stimuli modify autonomic and neurochemical arousal indices, and may also modify synaptic plasticity. It is proposed that understanding how music affects animals provides a valuable conjunct to human research and may be vital in uncovering how music might be used to enhance cognitive performance.

¹ Rickard, N.S., etc., Behavioral and Cognitive Neuroscience Reviews, Volume 4, Issue 4, December 2005, Pages 235-261
12. Music therapy in the treatment of multiple sclerosis: A comprehensive literature review.¹

Abstract - Coping with multiple sclerosis symptoms still remains a challenge for each patient suffering from this chronic inflammatory disease. Therefore, patients often turn to using complementary and alternative medicine (CAM). In this review, the authors aimed to investigate the current state of literature of music therapy in the treatment of multiple sclerosis (MS). Medline, PubMed, Embase, AMED, CAMbase and the Music Therapy World Journal Index were searched for the terms MS and 'music therapy'. In addition, an Internet search using Google Scholar was performed. The authors found seven case-reports/series and seven studies on music therapy for MS-patients. Both the case reports and studies presented here are pioneer work. Most of the studies are naturally predominated by the use of qualitative and uncontrolled research designs. Nevertheless, the results of the studies as well as the case reports demonstrate patients' improvement in the domains of self-acceptance, anxiety and depression. The results of the studies as well

¹ Ostermann, T., etc., Expert Review of Neurotherapeutics, Volume 6, Issue 4, April 2006, Pages 469-477
as the case reports define a sufficient basis for further music therapeutical work as they show a variety of psychosocial and emotional benefits for MS patients.

13. **Investigating the enhancing effect of music on autobiographical memory in mild Alzheimer's disease.**


Abstract - The enhancing effect of music on autobiographical memory recall in mild Alzheimer's disease individuals (n = 10; Mini-Mental State Examination score >17/30) and healthy elderly matched individuals (n = 10; Mini-Mental State Examination score 25-30) was investigated. Using a repeated-measures design, each participant was seen on

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1 Irish, M., etc., Dementia and Geriatric Cognitive Disorders, Volume 22, Issue 1, June 2006, Pages 108-120
two occasions: once in music condition (Vivaldi's 'Spring' movement from 'The Four Seasons') and once in silence condition, with order counter-balanced. Considerable improvement was found for Alzheimer individuals' recall on the Autobiographical Memory Interview in the music condition, with an interaction for condition by group (p < 0.005). There were no differences in terms of overall arousal using galvanic skin response recordings or attentional errors during the Sustained Attention to Response Task. A significant reduction in state anxiety was found on the State Trait Anxiety Inventory in the music condition (p < 0.001), suggesting anxiety reduction as a potential mechanism underlying the enhancing effect of music on autobiographical memory recall.

14. **Neurophysiology and neurobiology of the musical experience.**

Abstract - Music, a universal art form that exists in every culture around the world, is integral to a number of social and courtship activities, and is closely associated with other creative behaviors such as dancing. Recently, neuroimaging studies have allowed researchers to investigate the neural correlates of music processing and perception in the brain. Notably, musical stimuli have been shown to activate specific pathways in several brain areas associated with emotional behaviors, such as the insular and cingulate cortex, hypothalamus, hippocampus, amygdala, and prefrontal cortex. In addition, neurochemical studies have suggested that several biochemical mediators, such as endorphins, endocannabinoids, dopamine and nitric oxide, may play a role in the musical experience. A growing body of evidence also indicates that music therapy could be useful in the clinical management of numerous neurological and psychiatric disorders. Indeed, music therapy could be effective in patients with neurodegenerative disorders, such as Alzheimer's dementia and Parkinson's disease, as well as in psychiatric illnesses, such as schizophrenia, depression, anxiety and autism spectrum disorders. Unfortunately, there is still a shortage of rigorous scientific data supporting the clinical application of music therapy, and there is thus a need to confirm and expand the preliminary findings regarding the potential and actual effectiveness of music therapy. This need should be addressed through prospective, randomized, controlled, single-blinded investigations of the short- and long-term effects of music therapy in diverse clinical conditions.

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1 Boso, M., etc., Functional Neurology, Volume 21, Issue 4, October 2006, Pages 187-191
15. **Music therapy in moderate and severe dementia of Alzheimer's type: A case-control study.**

Abstract - Music therapy is a potential non-pharmacological treatment for the behavioral and psychological symptoms of dementia, but although some studies have found it to be helpful, most are small and uncontrolled. Methods: Qualified music therapists in two nursing homes and two psychogeriatric wards carried out this case-control study. The participants were 38 patients with moderate or severe Alzheimer's disease (AD) assigned randomly to a music therapy group and a control group. Results: The study showed a significant reduction in activity disturbances in the music therapy group during a 6-week period measured with the Behavior Pathology in Alzheimer's disease Rating Scale (BEHAVE-AD). There was also a significant reduction in the sum of scores of activity disturbances, aggressiveness and anxiety. Other symptoms rated by subscales of the BEHAVE-AD did not decrease significantly. Four weeks later the effects had mostly disappeared. Conclusions: Music therapy is a safe and effective method for treating agitation and anxiety in moderately severe and severe AD. This is in line with the results of some non-controlled studies on music therapy in dementia.

16. **The effect of music therapy on patients' perception and manifestation of pain, anxiety, and patient satisfaction.**

Abstract - An extensive review and synthesis of current research was completed to identify the clinical benefit of using music therapy in the hospital setting. It demonstrated that music therapy has the potential to improve the hospital experience of patients.

17. **The effect of background stimulative music on behavior in Alzheimer's patients.**

Abstract - Previous studies have demonstrated the benefits of music therapy in Alzheimer's patients, focusing either on improvement of healthy cognitive and social

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1 Svansdottir, H.B., etc., International Psychogeriatrics, Volume 18, Issue 4, December 2006, Pages 613-621
2 Richards, T., etc., Medsurg nursing: official journal of the Academy of Medical-Surgical Nurses, Volume 16, Issue 1, February 2007, Pages 7-14; quiz 15
skills, or reduction of agitation symptoms. The present study examined the effect of background music on both positive and negative behaviors, during a time in which patients were not occupied with any structured activity. Twenty-eight participants were observed both with and without stimulative, familiar background music. Results showed both a significant increase in positive social behaviors and a significant decrease in negative behaviors related to agitation when music is played. Results demonstrate the contribution of music to enhancing general positive functioning in elderly patients with dementia, and reducing negative behaviors typical of their condition.

18. **Determination of effects of different music on frontal muscle by using EMG signal.**

Abstract - Music has a myriad of health-related benefits, both psychological and physiological. However, because the healthful effects of music have not been fully explored scientifically, many questions about the clinical efficacy of music are yet to be answered. In this study the musical selections used were reed flute sound and hard rock music. The information obtained from the present study adds significantly to what is known about the relaxing properties of music, by investigating how exposure to different styles of music the psychophysiological aspects of anxiety. The physiological measure was frontalis electromyography. EMG data taken from individual before music was listened, during listening to reed flute sound and during listening to hard rock music, were examined to extracted power spectral density by welch method which is use to evaluate unstable sign. Power spectral densities of during listening to reed flute and hard rock music were determined differently compared with psd of without music situation. As reed flute sound triggered off the decreased psd value, hard rock music triggered off the increased psd value. There is a reverse ratio between PSD on muscle and relief amount. In conclusion, listening to reed flute music has relaxing property according to hard rock music on frontal muscle.

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1 Kara, S., etc., Proceedings of the Frontiers in the Convergence of Bioscience and Information Technologies, 2007, Article number 4524147, Pages 449-452
19. **Emotional valence contributes to music-induced analgesia.**

Abstract - The capacity of music to soothe pain has been used in many traditional forms of medicine. Yet, the mechanisms underlying these effects have not been demonstrated. Here, we examine the possibility that the modulatory effect of music on pain is mediated by the valence (pleasant-unpleasant dimension) of the emotions induced. We report the effects of listening to pleasant and unpleasant music on thermal pain in healthy human volunteers. Eighteen participants evaluated the warmth or pain induced by 40.0, 45.5, 47.0 and 48.5 °C thermal stimulations applied to the skin of their forearm while listening to pleasant and unpleasant musical excerpts matched for their high level of arousal (relaxing-stimulating dimension). Compared to a silent control condition, only the pleasant excerpts produced highly significant reductions in both pain intensity and unpleasantness, demonstrating the effect of positive emotions induced by music on pain (Pairwise contrasts with silence: p's < 0.001). Correlation analyses in the pleasant music condition further indicated that pain decreased significantly (p's < 0.05) with increases in self-reports of music pleasantness. In contrast, the unpleasant excerpts did not modulate pain significantly, and warmth perception was not affected by the presence of pleasant or unpleasant music. Those results support the hypothesis that positive emotional valence contributes to music-induced analgesia. These findings call for the integration of music to current methods of pain control.

20. **Efficacy of music therapy in the treatment of behavioral and psychiatric symptoms of dementia.**

Abstract - Background: Music therapy (MT) has been proposed as valid approach for behavioral and psychological symptoms (BPSD) of dementia. However, studies demonstrating the effectiveness of this approach are lacking. Objective: To assess MT effectiveness in reducing BPSD in subjects with dementia. Method: Fifty-nine persons with dementia were enrolled in this study. All of them underwent a multidimensional assessment including Mini Mental State Examination, Barthel Index and Neuropsychiatry

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1 Roy, M., etc., Pain, Volume 134, Issue 1-2, January 2008, Pages 140-147
2 Raglio, A., etc., Alzheimer Disease and Associated Disorders, Volume 22, Issue 2, April 2008, Pages 158-162
Inventory at enrolment and after 8, 16, and 20 weeks. Subjects were randomly assigned to experimental (n = 30) or control (n = 29) group. The MT sessions were evaluated with standardized criteria. The experimental group received 30 MT sessions (16wk of treatment), whereas the control group received educational support or entertainment activities. Results: NPI total score significantly decreased in the experimental group at 8th, 16th, and 20th weeks (interaction time × group: F3 165 = 5.06, P = 0.002). Specific BPSD (ie, delusions, agitation, anxiety, apathy, irritability, aberrant motor activity, and night-time disturbances) significantly improved. The empathetic relationship and the patients' active participation in the MT approach, also improved in the experimental group. Conclusions: The study shows that MT is effective to reduce BPSD in patients with moderate-severe dementia.


Abstract - Background: Individuals with severe mental illness (SMI) may be at increased risk of HIV infection. Prevention programs designed specifically for SMI have relied primarily on principles of cognitive-behavior change theories delivered in a small group format and in venues and services utilized by SMI. Most intervention effects have not been shown to be sustainable over time. We report on our findings relating to the importance of music to Puerto Rican women with SMI and the implications for HIV prevention interventions with this population. Methods: We interviewed and shadowed over a 2-year period 53 women of Puerto Rican ethnicity between the ages of 18 and 50, residing in northeastern Ohio, who had been diagnosed with schizophrenia, bipolar disorder, or major depression. Results: Nearly one-half of the participants listened to music regularly. Some reported that music was essential to their lives. Participants reported that music improved their mental and social well-being by facilitating expression and reflection of their emotions and increasing their energy levels. Discussion: Music may affect the core negative symptoms and compensate for neuropsychological deficits in women with schizophrenia and related conditions by facilitating the articulation of emotion and allowing individuals to better attend to and potentially

1 Loue, S., etc., Journal of Immigrant and Minority Health, Volume 10, Issue 6, 2008, Pages 489-495
incorporate external activities into their lives. The use of music in HIV prevention efforts with SMI Latinas may facilitate their emotional expression and assist them in integrating the educative efforts into their life style choices.

22. Effects of group music intervention on depression, anxiety, and relationships in psychiatric patients: A pilot study. ¹

Image Source: http://news.concordia.ca/images/photos/MusicTherapy02.jpg

Abstract - Objective: To test whether group music therapy is effective for improving depression, anxiety, and relationships in psychiatric patients. Methods: Twenty-six patients were non-randomly allocated to either a music intervention group or a routine care group. The music intervention group received 60 minutes of music intervention for 15 sessions (1 or 2 times weekly). The outcomes were measured with Beck's Depression Inventory, the State and Trait Anxiety Inventory, and the Relationship Change Scale. Results: After 15 sessions, the music intervention group showed significant improvements in depression, anxiety, and relationships compared with the control group. Conclusions: These findings suggest that music can improve depression, anxiety, and relationships in psychiatric patients. However, we cannot elucidate the nonspecific

¹ Choi, A.-N., etc., Journal of Alternative and Complementary Medicine, Volume 14, Issue 5, 1 June 2008, Pages 567-570
effects. Furthermore, objective and replicable measures are required from a randomized controlled trial with a larger sample size and an active comparable control.

23. The effect of personality type and musical task on self-perceived arousal.  

Abstract - This study was designed to measure the level of arousal influenced by 4 different musical experiences classified by task difficulty and to examine the relationship between music-induced arousal level and personality type. Participants included 32 university students who were neither musicians nor music majors. The Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975) was used to identify participants as either extravert or introvert. Participants were randomly assigned to 1 of 4 types of musical tasks: listening, singing, rhythm tapping, or keyboard playing. Arousal level was measured using the Activation-Deactivation Adjective Check List (ADACL) (Thayer, 1978) before and after the musical task. The ADACL is a self-report scale consisting of a list of 20 adjectives, which describe various transitory arousals, states, including energy, tiredness, tension, and calmness. Results showed no significant difference between personality types and the changes in arousal level. Result indicated a significant effect of listening on decreased tension arousal. Singing and rhythm tapping, which are regarded as having a relatively moderate task difficulty, increased energy arousal significantly and decreased tiredness arousal significantly. Participants' tiredness arousal levels also decreased significantly after keyboard playing. These findings suggest that engaging in musical experience that has a moderate level of task difficulty makes individuals more energetic and less tired.


Abstract - Introduction: A previous study (carried out in 2003-2004) had included 34 patients with traumatic brain injury in order to study the feasibility and usefulness of music therapy in patients with this type of injury. Objective: To evaluate the effect of music therapy on mood, anxiety and depression in institutionalized patients with

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2 Guétin, S., etc., Annals of Physical and Rehabilitation Medicine, Volume 52, Issue 1, February 2009, Pages 30-40
traumatic brain injury. Study methodology: A prospective, observational study. Materials and methods: Thirteen patients with traumatic brain injury were included in the present study and took part in individual, weekly, 1-hour music therapy sessions over a period of 20 weeks. Each session was divided into two 30-minute periods - one devoted to listening to music (receptive music therapy) and the other to playing an instrument (active music therapy). The assessment criteria (measured at weeks 1, 5, 10, 15 and 20) were mood (on the face scale) and anxiety-depression (on the Hospital Anxiety and Depression [HAD] Scale). Mood was assessed immediately before and after the first music therapy session and every fifth session. Results: Music therapy enabled a significant improvement in mood, from the first session onwards. This short-term effect was confirmed by the immediate changes in the scores after music therapy sessions (from 4.6 ± 3.2 to 2.6 ± 2; p < 0.01). Music therapy also led to a significant reduction in anxiety-depression (p < 0.05) from week 10 onwards and up until the end of the study (week 20). Conclusion: These results confirm the usefulness of music therapy in the treatment of anxiety-depression and mood in patients with traumatic brain injury. Music therapy could usefully form an integral part of the management programme for these patients.

25. Impact of music therapy on anxiety and depression for patients with Alzheimer's disease and on the burden felt by the main caregiver (feasibility study).

Abstract - Introduction: The impact of music therapy on dementia care for patients with Alzheimer's disease (AD) is well recognized. Music alters the different components of the disease through sensory, cognitive, emotional, behavioral and social impacts. The academic aspect of music therapy in this area was based on the fact that music can alter the various components of the overall evolution of this disease. We found around 10 case studies presenting various results from receptive music therapy sessions on patients with Alzheimer's disease. The results of these studies point out the interest of music therapy in the multidisciplinary care of Alzheimer's disease and its related syndromes. It has been deemed useful for significantly reducing the medication given to AD patients. A music therapy protocol, specifically tailored to the patient's needs has been shown to

1 Guetin, S., etc., Encephale, Volume 35, Issue 1, February 2009, Pages 57-65
significantly reduce anxiety, depression and aggressiveness in patients suffering from Alzheimer's disease. This technique has also demonstrated its impact on helping AD patients recall their previous life experience. Objective: To demonstrate the feasibility and to evaluate the impact of music therapy on anxiety and depression at the early to moderate stage of Alzheimer's disease and on the main caregiver burden. Method: Five outpatients suffering from early stage of Alzheimer's disease (MMS: 18-26) were prospectively included. They were living in Montpellier with a reliable caregiver. A weekly receptive music therapy session was delivered to patients over a 10-week period, according to the U method standardized protocol. This technique was based on the recommendations made by Gardner and Good relating to the importance given to an individualized choice of music. Instrumental tracks were selected from various music styles (classic, jazz, world music...) and were tailored to the patient's requirements. This individual session was always followed by an interview with the music therapist in order to allow the patient to express the emotions felt during the session and to stimulate the patient's cognitive functions by recalling memories and images from his past life experience. The main evaluation criterion was regular session attendance at the hospital. Secondary criteria were: anxiety score (Hamilton scale), depression score (Cornell scale) and the burden score felt by the main caregiver (Zarit scale). Evaluations took place at W1, W4 and W10. The score evolution on the Hamilton, Cornell and Zarit scales were tested using the Wilcoxon test on paired data. The significance threshold has conventionally been set at 5% for all tests used. The statistical analysis was done using the SAS software (8th version) (SAS Institute, Cary, N.C.; proc npar1way, proc univariate, proc freq). Alzheimer's disease is a recognized indication for music therapy. A simple oral consent was collected prior to the study inclusion. Results: Five patients were included for a total of 44 sessions. The patients' regular attendance at the music therapy sessions showed its feasibility. Thanks to oral feedback, we were able to see that music therapy was very well accepted both by patients and caregivers. After the sessions, all patients expressed a sensation of well-being and pleasure, such as: "Music made me feel better, I feel more relaxed", "I feel better", "I didn't know that music could have such an impact on me"... Other verbal comments were collected regarding the patients' previous life experience: "This music reminds me of my childhood", "I imagined myself dancing
just like I used to in the old days", "This reminds me of my trip to Italy with my children"... The level of anxiety (Hamilton scale) dropped significantly from 9.4 (± 2.2) to 3.4 (± 2.6) between the first session and the fourth session (P < 0.004). The differences observed between W4-W10 and W1-W10 were close to the threshold of significance due to a major drop in the anxiety level starting at W4 (P = NS). On the Cornell scale, the depression level dropped significantly from 10.8 (± 5.3) to 2.2 (± 1.9) between the first session and the fourth session (P < 0.01). The differences observed between W4-W10 and W1-W10 were not significant (P = NS). The weight of the physical and emotional burden experienced by the main caregiver (Zarit scale) fell significantly from 30.2 (± 11.7) to 15.6 (± 10.4) between W1-W4 (P < 0.002). The differences observed between W4-W10 and W1-W10 were not significant (P = NS). Discussion/conclusion: This preliminary study demonstrates the feasibility as well as the initial efficacy of music therapy in terms of its impact on the overall care for patients suffering from Alzheimer's disease. This easily applicable technique can be useful in treating anxiety and depression in a patient with Alzheimer's disease and also in relieving the emotional and physical burden experienced by the main caregiver.

26. Music, trauma and silence: The state of the art.  

Abstract - This joint-authored article explores the ways in which music can speak directly to the traumatic, and how music therapy offers a unique means of coming to an

1 Sutton, J., etc., Arts in Psychotherapy, Volume 36, Issue 2, April 2009, Pages 75-83
understanding of the traumatized patient. We take a musical and psychoanalytical theoretical stance. Drawing on case material from work with a young boy and an adult attending a psychiatric outpatient department, we show how a form of musical listening and thinking about what is emerging in the clinical room can help us to understand something about the patient, about the treatment of those traumatized, and also about the art of music itself. Our aim is to place the music and the therapeutic relationship as the central focus in the work.

27. Dose-response relationship in music therapy for people with serious mental disorders: Systematic review and meta-analysis. 1

Abstract - Serious mental disorders have considerable individual and societal impact, and traditional treatments may show limited effects. Music therapy may be beneficial in psychosis and depression, including treatment-resistant cases. The aim of this review was to examine the benefits of music therapy for people with serious mental disorders. All existing prospective studies were combined using mixed-effects meta-analysis models, allowing to examine the influence of study design (RCT vs. CCT vs. pre-post study), type of disorder (psychotic vs. non-psychotic), and number of sessions. Results showed that music therapy, when added to standard care, has strong and significant effects on global state, general symptoms, negative symptoms, depression, anxiety, functioning, and musical engagement. Significant dose-effect relationships were identified for general, negative, and depressive symptoms, as well as functioning, with explained variance ranging from 73% to 78%. Small effect sizes for these outcomes are achieved after 3 to 10, large effects after 16 to 51 sessions. The findings suggest that music therapy is an effective treatment, which helps people with psychotic and non-psychotic severe mental disorders to improve global state, symptoms, and functioning. Slight improvements can be seen with a few therapy sessions, but longer courses or more frequent sessions are needed to achieve more substantial benefits.

1 Gold, C., etc., Clinical Psychology Review, Volume 29, Issue 3, April 2009, Pages 193-207
28. **The effect of group music therapy on quality of life for participants living with a severe and enduring mental illness.**

Abstract - A 10-week group music therapy project was designed to determine whether music therapy influenced quality of life and social anxiety for people with a severe and enduring mental illness living in the community. Ten one-hour weekly sessions including song singing, song writing and improvisation, culminated in each group recording original song/s in a professional studio. The principal outcome measure was the WHOQOLBREF Quality of Life (QoL) Scale; other instruments used were the Social Interaction Anxiety Scale (SIAS) and the Brief Symptom Inventory (BSI). Qualitative data were gathered through focus group interviews and an analysis of lyric themes. Statistically significant improvement was found on five items of the QoL Scale. There were no changes on the BSI indicating that QoL improvement was not mediated by symptomatic change. Themes from the focus groups were: music therapy gave joy and pleasure, working as a team was beneficial, participants were pleasantly surprised at their creativity, and they took pride in their song. An analysis of song lyrics resulted in 6 themes: a concern for the world, peace and the environment; living with mental illness is difficult; coping with mental illness requires strength; religion and spirituality are sources of support; living in the present is healing; and working as a team is enjoyable.

29. **The effect of expressive and instrumental touch on the behavior states of older adults with late-stage dementia of the Alzheimer's type and on music therapist's perceived rapport.**

Abstract - The purpose of this study was to examine the effect of music therapy interventions utilizing two types of touch, expressive touch and instrumental touch, on the behavior states of older adults who have late-stage dementia of the Alzheimer's type. A secondary purpose of this study was to examine the perceived effectiveness of the music therapist when expressive and instrumental touch was employed during music therapy sessions. A within-subject design was used with 9 participants receiving 3 sessions in each of the experimental conditions: no touch, expressive touch, and

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1 Grocke, D., etc., Journal of Music Therapy, Volume 46, Issue 2, June 2009, Pages 90-104
instrumental touch. Results of a one-way ANOVA revealed that expressive touch was significantly more effective during the initial session in eliciting and maintaining alert behavior states than the instrumental and control conditions; however, there were no significant differences between the experimental and control conditions during the first and second session repetitions. Rapport ratings revealed that the therapist's client rapport was perceived to be significantly higher during both the expressive touch and instrumental touch conditions than during the control condition. These findings have important implications for music therapy practice and the effective use of nonverbal communication.

30. **Neurologic music therapy improves executive function and emotional adjustment in traumatic brain injury rehabilitation.**

Abstract - This study examined the immediate effects of neurologic music therapy (NMT) on cognitive functioning and emotional adjustment with brain-injured persons. Four treatment sessions were held, during which participants were given a pre-test, participated in 30 min of NMT that focused on one aspect of rehabilitation (attention, memory, executive function, or emotional adjustment), which was followed by post-testing. Control participants engaged in a pre-test, 30 min of rest, and then a post-test. Treatment participants showed improvement in executive function and overall emotional adjustment, and lessening of depression, sensation seeking, and anxiety. Control participants improved in emotional adjustment and lessening of hostility, but showed decreases in measures of memory, positive affect, and sensation seeking.

31. **A neuroscientific perspective on music therapy.**

Abstract - During the last years, a number of studies demonstrated that music listening (and even more so music production) activates a multitude of brain structures involved in cognitive, sensorimotor, and emotional processing. For example, music engages sensory processes, attention, memory-related processes, perception-action mediation ("mirror neuron system" activity), multisensory integration, activity changes in core areas of

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1 Thaut, M.H., etc., Annals of the New York Academy of Sciences, Volume 1169, July 2009, Pages 406-416
emotional processing, processing of musical syntax and musical meaning, and social cognition. It is likely that the engagement of these processes by music can have beneficial effects on the psychological and physiological health of individuals, although the mechanisms underlying such effects are currently not well understood. This article gives a brief overview of factors contributing to the effects of music-therapeutic work. Then, neuro-scientific studies using music to investigate emotion, perception-action mediation ("mirror function"), and social cognition are reviewed, including illustrations of the relevance of these domains for music therapy.

32. Effect of music therapy on anxiety and depression in patients with Alzheimer's type dementia: Randomized, controlled study. ¹

Abstract - Background/Aims: Numerous studies have indicated the value of music therapy in the management of patients with Alzheimer's disease. A recent pilot study demonstrated the feasibility and usefulness of a new music therapy technique. The aim of this controlled, randomized study was to assess the effects of this new music therapy technique on anxiety and depression in patients with mild to moderate Alzheimer-type dementia. Methods: This was a single-center, comparative, controlled, and randomized study, with blinded assessment of its results. The duration of follow-up was 24 weeks. The treated group (n = 15) participated in weekly sessions of individual, receptive music therapy. The musical style of the session was chosen by the patient. The validated 'U' technique was employed. The control group (n = 15) participated under the same conditions in reading sessions. The principal endpoint, measured at weeks 1, 4, 8, 16 and 24, was the level of anxiety (Hamilton Scale). Changes in the depression score (Geriatric Depression Scale) were also analyzed as a secondary endpoint. Results: Significant improvements in anxiety (p < 0.01) and depression (p < 0.01) were observed in the music therapy group as from week 4 and until week 16. The effect of music therapy was sustained for up to 8 weeks after the discontinuation of sessions between weeks 16 and 24 (p < 0.01). Conclusion: These results confirm the valuable effect of music therapy on anxiety and depression in patients with mild to moderate Alzheimer's disease. This new

¹ Guétin, S., etc., Dementia and Geriatric Cognitive Disorders, Volume 28, Issue 1, August 2009, Pages 36-46
music therapy technique is simple to implement and can easily be integrated in a multidisciplinary programme for the management of Alzheimer's disease.

33. **Effects of music on anxiety and pain in children with cerebral palsy receiving acupuncture: A randomized controlled trial.**

Abstract - Objectives: To study the effects of music on anxiety and pain in children with cerebral palsy receiving acupuncture daily in a clinical setting. Design: A randomized controlled trial. Setting: Acupuncture Unit at Shenzhen Hospital of Traditional Chinese Medicine in Shenzhen City of China. Participants: Sixty children with cerebral palsy undergoing acupuncture. Methods: Intervention: Children listened to their favorite music or a blank disc for 30 min. Measurements: (1) the modified Yale preoperative anxiety scale for children's anxiety (mYPAS); (2) children's hospital of eastern Ontario pain scale (CHEOPS) and Wong-Baker faces pain rating scale (FACES) for pain intensity; (3) vital signs including mean arterial blood pressure (MAP), heart rate (HR) and respiratory rate (RR). Results: An independent sample t-test showed significantly lower mYPAS scores in the music group 30 min after the intervention compared with the control group ($t = 4.72$, $P = 0.00$). Significant differences between groups were found in mYPAS scores ($F = 4.270$, d.f. = 1, $P = 0.043$, Partial $\eta^2 = 0.069$) and over treatment duration ($F = 143.421$, d.f. = 1.521, $P = 0.000$, Partial $\eta^2 = 0.712$). A significant interaction was also found ($F = 4.298$, d.f. = 1.521, $P = 0.025$, Partial $\eta^2 = 0.069$). LSD's post hoc testing confirmed that the mYPAS scores significantly increased from the baseline to 1 min ($P = 0.000$, 95% CI 14.913, 20.257) and then gradually decreased from 1 to 30 min ($P = 0.000$, 95% CI -18.952, -13.714). For pain intensity scores, a highly significant time effect was found in both the CHEOPS ($F = 87.347$, d.f. = 2, $P = 0.000$, Partial $\eta^2 = 0.601$) and FACES ($F = 225.871$, d.f. = 1.822, $P = 0.000$, Partial $\eta^2 = 0.796$), and a significant interaction effect was found as well ($F = 4.369$, d.f. = 2, $P = 0.015$, Partial $\eta^2 = 0.070$; $F = 5.859$, d.f. = 1.822, $P = 0.005$, Partial $\eta^2 = 0.092$). However, no significant difference between groups was present ($F = 2.343$, d.f. = 1, $P = 0.131$, Partial $\eta^2 = 0.039$; $F = 3.738$, d.f. = 1, $P =

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1 Yu, H., etc., International Journal of Nursing Studies, Volume 46, Issue 11, November 2009, Pages 1423-1430
0.058, Partial $\eta^2 = 0.061$). Significant differences between groups were found in MAP and HR ($P < 0.05$) and over time ($P < 0.05$), but no significant effects in RR were apparent ($P > 0.05$). A significant interaction effect was found in HR ($P < 0.05$), but not in MAP or RR ($P > 0.05$). Conclusions: This study demonstrates that listening to music while receiving acupuncture can relieve anxiety among children with cerebral palsy; however, no effect was observed in terms of pain reduction. Further research is needed to explore the types of music which best impact an individual's treatment. Whether music results in fewer accidents and side effects of acupuncture should be investigated. Music can be considered as adjunctive therapy in clinical situations that may be anxiety provoking for children.

34. **Music therapy in the treatment of patients with neurobehavioral disorders stemming from acquired brain injury.**

Abstract - People with neurobehavioral disorders following brain damage present careers with many challenges, particularly in cases where receptive language may be compromised. Music therapy can reduce behaviors such as anxiety and agitation, and promote positive behaviors in this population. However, empirical and descriptive investigations are lacking. Two single cases illustrate music therapy as part of an interdisciplinary treatment for adults with acquired complex neurobehavioral disorders. We describe the inclusion of music therapy interventions delivered in graded programs with two patients with challenging neurobehavioral disorders. Improved functional abilities included participation and task completion in personal care tasks; acquisition and consistency of spoken language; increased independence; and decreased episodes of challenging behavior during functional tasks. The findings suggest that music therapy may be effective in decreasing agitation and anxiety, overcoming initiation difficulties, and promoting positive behaviors in populations with neurobehavioral disorders. Further investigation into the effects of music therapy with adults with neurobehavioral disorders would assist with providing additional interventions to verbal de-escalation techniques.

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1 Hitchen, H., etc., Nordic Journal of Music Therapy, Volume 19, Issue 1, March 2010, Pages 63-78
The effect of pitch, rhythm, and familiarity on working memory and anxiety as measured by digit recall performance.  

Abstract - The purpose of this study was to isolate and quantitatively evaluate the effects of pitch and rhythm of unfamiliar and familiar melodies on working memory and anxiety as measured by sequential digit recall performance. Participants (N = 60) listened to 6 treatment conditions each consisting of 9 randomized monosyllabic digits. The digits were paired with (a) a familiar melody and pitch only, (b) a familiar melody and rhythm only, (c) a familiar melody with both pitch and rhythm, (d) an unfamiliar melody with pitch only, (e) an unfamiliar melody with rhythm only, and (f) an unfamiliar melody with both pitch and rhythm. The 6 different treatments were counterbalanced using a Latin square design in an attempt to control for order effects. Participants rated their state anxiety on a Likert-type scale before, midway through, and after the digits test. No statistically significant order, learning, or practice effects were found. A 3-way repeated-measures ANOVA indicated a statistically significant difference in digit recall performance across musical element conditions and groups. Results indicated that music majors outperformed non-music majors on the digit recall task. Participants were able to recall digits from the rhythm condition most accurately while recalling digits from pitch only and both pitch and rhythm conditions the least accurately. Graphic analysis of treatment as a function of sequential position indicated digit recall was best during conditions of primacy and recency. No main effects were found for the familiarity condition. Additionally, no main effects or interactions were found for the anxiety variable. The results of this study are congruent with existing working memory and music literature suggesting that pairing in formation with rhythm can facilitate recall, music majors outperform non-music majors, and recall accuracy is best in positions of primacy and recency. Implications for practice in therapy and education are made as well as suggestions for future research.

1 Silverman, M.J., Journal of Music Therapy, Volume 47, Issue 1, March 2010, Pages 70-83
A preferred music listening intervention to reduce anxiety in older adults with dementia in nursing homes.¹

Abstract - Aim: This article reports the results of a study evaluating a preferred music listening intervention for reducing anxiety in older adults with dementia in nursing homes. Background: Anxiety can have a significant negative impact on older adults' functional status, quality of life and health care resources. However, anxiety is often under-diagnosed and inappropriately treated in those with dementia. Little is known about the use of a preferred music listening intervention for managing anxiety in those with dementia. Design: A quasi-experimental pretest and posttest design was used. Methods: This study aimed to evaluate the effectiveness of a preferred music listening intervention on anxiety in older adults with dementia in nursing home. Twenty-nine participants in the experimental group received a 30-minute music listening intervention based on personal preferences delivered by trained nursing staff in mid-afternoon, twice a week for six weeks. Meanwhile, 23 participants in the control group only received usual standard care with no music. Anxiety was measured by Rating Anxiety in Dementia at baseline and week six. Analysis of covariance (ancova) was used to determine the effectiveness of a preferred music listening intervention on anxiety at six weeks while controlling for pretest anxiety, age and marital status. Results: ancova results indicated that older adults who received the preferred music listening had a significantly lower anxiety score at six weeks compared with those who received the usual standard care with no music ($F = 12.15$, $p = 0.001$). Conclusions: Preferred music listening had a positive impact by reducing the level of anxiety in older adults with dementia. Relevance to clinical practice: Nursing staff can learn how to implement preferred music intervention to provide appropriate care tailored to the individual needs of older adults with dementia. Preferred music listening is an inexpensive and viable intervention to promote mental health of those with dementia.

¹ Sung, H.-C., etc., Journal of Clinical Nursing, Volume 19, Issue 7-8, April 2010, Pages 1056-1064
37. **Music as a Therapeutic Intervention on an Inpatient Neuroscience Unit.**

Abstract - The purpose of this study was to determine the effect of a music intervention (MI) on physiological parameters, pain and mood states in the neuroscience patient. This study enrolled and randomized subjects to 1 of 2 groups, usual care (UC) group (n= 29) or UC plus MI (n= 24). Data collected were physiologic parameters, pain and mood states pre and post a 30 min MI with UC compared to UC. The sample was 16 males/37 females, mean age of 55.8 years, with similar baseline characteristics. There were significant reductions in heart rate (t= -2.1, p< 0.04), respirations (t= -3.4, p< 0.001), perceived anxiety (t= -4.1, p< 0.000), depression (t= -4.3, p< 0.000), and total mood score (t= -4.1, p< 0.000) in subjects who received UC plus MI compared to UC. The inclusion of MI as a therapeutic intervention for neuroscience patients appears to decrease the emotional burden of hospitalization.

38. **Comparative study on elderly and disabled subjects with various degrees of dementia.**

Abstract - This study aims at showing the positive effects of arts therapies in individual and group sessions, with an aging, valid or dependent population, presenting symptoms of dementia or not. The improvement of cognition (including memory), well-being, as well as of certain medical problems (pain, tension...) was underlined in several studies on arts therapies, including especially the use of music therapeutic techniques. Indeed, music stimulates the emotional memory, causing the emergence of ancient memories, thus restoring narcissism. The well-being of participants is increased. Our population consists of elderly people, most of them suffering from dementia. They come to the workshops by themselves or led by their families. Music but also pictorial arts are used as a therapeutic mediation for one session per week during the time of hospitalization. This period varies depending on the condition of the subject. The scales used in T1 and T2 with patients suffering from dementia are the Echelle d'appréciation clinique en gériatrie by Bouvard & Cottraux and the Fragebogen zur Beurteilung der Behandlung durch den Therapeuten.

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1 Phipps, M.A., etc., Complementary Therapies in Clinical Practice, Volume 16, Issue 3, August 2010, Pages 138-142
(FBB-T) by Mattejat and Remschmidt. Regarding the criteria for external validation, a semi-structured interview is proposed to the nurses in T2. The scales used with valid people are the Index of Well-being by Campbell et al, the Hospital Anxiety and Depression Scale (HADS) by Zigmond and Snaith, the Rosenberg Self-esteem Scale (RSES), validated by Vallières and Vallerand in 1990, and the Stressverarbeitungsfragebogen (SVF 78) by Janke et al. CDC: There was a positive effect for most seniors who attended the sessions: an increased well-being and a temporary appropriation of memories. However, given the small size and the heterogeneity of samples, the irregularity of attendance, the results cannot be generalized. More regular sessions of arts therapies would be favorable for a consolidation of results.

39. A randomized controlled trial exploring the effect of music on agitated behaviors and anxiety in older people with dementia.¹

Abstract - Objectives: This study, as part of a larger program of research, sought to investigate the effect that participation in a 40-min live group music program, involving facilitated engagement with song-singing and listening, three times a week for eight weeks, had on agitation and anxiety in older people with dementia. Methods: A randomized crossover design, with music and reading control groups, was employed. Forty-seven participants with mild-moderate dementia, from two aged care facilities in Queensland, Australia, were recruited. Participants were assessed three times on the Cohen-Mansfield Agitation Inventory-Short Form (CMAI-SF) and the Rating Anxiety in Dementia Scale (RAID). Results: A sub-analysis of 24 participants attending ≥50% of music sessions found a significant increase in the frequency of verbal aggression over time, regardless of group (F (2,46) = 3.534, p <0.05). A series of multiple regressions found cognitive impairment, length of time living in the facility and gender to be predictors of agitation overall and by subtype. Conclusion: Participation in the music program did not significantly affect agitation and anxiety in older people with dementia. Both the music and reading group activities, however, gave some participants a 'voice' and increased their verbalization behavior. Agitation was found predicted by a number of background factors (namely level of cognitive impairment, length of time in the facility

¹ Cooke, M.L., etc., Aging, Volume 14, Issue 8, November 2010, Pages 905-916
and gender). Future studies would benefit more from in-depth participant assessment prior to study commencement, helping to moderate the influence of low scores, and by undertaking interventions at times when assessed symptoms are most prevalent.

40. Mental health implications of music: Insight from neuro-scientific and clinical studies. ¹

Abstract – Neuro-scientific and clinical studies of music over the past two decades have substantially increased our understanding of its use as a means of therapy. The authors briefly review current literature related to music's effect on people with different mental illnesses, and examine several neurobiological theories that may explain its effectiveness or lack thereof in treating psychiatric disorders. Neuro-scientific studies have shown music to be an agent capable of influencing complex neurobiological processes in the brain and suggest that it can potentially play an important role in treatment. Clinical studies provide some evidence that music therapy can be used as an alternative therapy in treating depression, autism, schizophrenia, and dementia, as well as problems of agitation, anxiety, sleeplessness, and substance misuse, though whether it can actually replace other modes of treatment remains undetermined. Future research should include translational studies involving both neuroscience and clinical medicine that investigate the long-term effects of music intervention and that lead to the development of new strategies for music therapy.

Observations: 40 researches studied the psycho-physiological impact of music on either of the psychotic & neurotic illnesses & disorders like Alzheimer’s / dementia, schizophrenia, cerebral palsy, brain injury, bipolar disorder, multiple sclerosis or its efficacy in social psychiatry and neuro-scientific spectrum.

12 out of 40 reports on Alzheimer’s / dementia advocated that music is helpful in improving the autobiographical memory recall of the patient, thus improving his relationships & quality of life. Also agrees that music significantly reduces level of aggression, anxiety & depression thereby increasing positive social behaviors. It also gives pleasure to the patient and promotes well-being. Only 1 study negated the

¹ Lin, S.T, etc., Harvard Review of Psychiatry, Volume 19, Issue 1, January 2011, Pages 34-46
effects of music on agitation and anxiety & suggested future studies for valid conclusions.

11 abstracts talked about the musical impact in social psychiatry and call it a safe, non-confronting means of expression that creates more socially acceptable ways of venting anger and fears and increases self-awareness, self-confidence, and self-esteem. Significant reductions in pain intensity; depression, anxiety, tension, tiredness and unpleasantness have been registered. It is said to enhance cognitive performance, improve relationships and makes the hospital experience of patients comforting. It is noticed to increase energy levels; thus giving joy and pleasure. 2 researches proposed further research.

6 extracts on schizophrenia quoted the positive therapeutic effects of music intervention as relaxation, activation, reduced anxiety, easier contact-making, and improved opportunities for emotional expression further calling it as an attractive experience for schizophrenic patients and as a communicative therapy.

4 investigations traced the music-effects on brain injury and found significant improvement in mood, executive function and overall emotional adjustment. On the other hand its effectiveness in decreasing agitation, anxiety-depression and, sensation seeking was also reported thereby overcoming initiation difficulties, and promoting positive behaviors. 1 study suggested further investigation in the area.

In 3 multiple sclerosis cases music has proved as a useful adjunct in psychological support & in the individual coping strategies by improving the mood, fatigue and promoting self-acceptance and reducing disability, uncertainty, anxiety, depression, loss of self-esteem etc.

Amongst the 3 neurotic disorder abstracts, 1 study even proposed discontinuing pharmacotherapy in the same and all propagated that music improves global state, symptoms, and functioning of the patient.

According to 2 neuro- scientific perspectives - music engages sensory processes like attention, memory-related processes, perception-action mediation and multisensory
integration. Musical activity changes the core areas of emotional processing, processing of musical syntax and musical meaning, and social cognition. Significant reductions in heart rate, respirations, perceived anxiety, depression, and total mood score decrease the emotional burden of hospitalization, on physiological parameters, pain and mood states.

2 cases of Bipolar disorder showed improved mental and social well-being of the patient through music by facilitating expression and emotion, increasing their energy levels.

Though 1 cerebral palsy case also promoted that music relieves anxiety but no effect was observed in terms of pain reduction. So it is suggestive of further research.

Music Therapy plays the role of a communicative and expressive therapy in psychiatric field facilitating the betterment of the patient and adjunct to the conventional system of medicine.
P) MIGRAINE

Image Source: http://www.thecamreport.com/category/g-conditions-to-treat/migraine/

1 A neurophysiological music therapy in migraine. ¹

Music therapy is effective for migraine sufferers according to researchers in Switzerland. Researchers studied the use of Psychofonia, a new form of music therapy for the treatment of migraine. As alternative treatment has gained more widespread acceptance, especially for this common yet often difficult to treat condition, each patient had their own individualized sound pattern created based upon their individual EEG using computer technology. 55 migraine patients treated with EEG-based music therapy were then studies prospectively. The results showed that 56% of patients showed improvement of at least 50% of symptoms following a 12-month treatment period. From this we can say that the findings suggest that this form of music therapy is effective in treating migraine patients and should be studied in a prospective, randomized, controlled trial.

Observations: Limited abstracts were obtained leaving further scope of research in the area.

The study above definitely favors music therapy for its effectiveness in bringing improvement in migraine pain and recommends further research in randomized and controlled trial.

Music Therapy has been applied as an alternative to other medical treatment for migraine.

¹ Meister M et al., Psychofonia – a Schweizerische Rundschau faer Medizin Praxis 88; 21:946-9 20/05/99
1. **Music therapy: meeting the psychosocial needs of hospitalized children.**

Abstract - Music therapy offers a unique approach for reducing the stresses of hospitalization for children. By meeting important psychosocial needs, music therapy lessens anxiety, aids adaptation and contributes to making the hospital experience a more positive one. The use of music therapy is described and illustrated with three patients all of whom underwent painful and prolonged hospitalization with immobilization and severe movement restriction.

2. **The effectiveness of music as an intervention for hospital patients: A systematic review.**

Abstract - Over the past few decades there has been a growing interest in the use of music, which has seen it used to achieve a diverse range of outcomes. While music as an intervention for hospital patients has subject to considerable evaluation, many of these studies are small and findings are therefore often contradictory. This systematic review was conducted to investigate the effectiveness of music as an intervention for hospital patients. Method: A comprehensive search was undertaken involving all major health care databases. For studies to be included in the review they must have investigated the effect of music, involved adult hospital patients and used a randomized controlled trial

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1 McDonnell, L. Children's Health Care, Volume 12, Issue 1, June 1983, Pages 29-33
design. These studies must also have used outcome measures such as anxiety, satisfaction, pain, mood and vital signs. Identified studies were critically appraised, and then categorized according to whether music was evaluated during normal care delivery or during invasive and unpleasant procedures. When appropriate, studies were combined in a meta-analysis. Results: A total of 29 studies were identified that fulfilled the inclusion criteria, of which 10 were subsequently excluded following critical appraisal. Music played via headphones reduces anxiety of patients during normal care delivery, but it has no impact on the anxiety of patients undergoing procedures such as bronchoscopy, sigmoidoscopy or surgery with a spinal anaesthetic. Music produces a small reduction in respiratory rate during normal care delivery, but appears to have little effect on other vital sign parameters. It has no impact on the vital signs of patients undergoing procedures. Although the evidence is limited, music also appears to improve the mood and tolerance of patients. Conclusion: This review demonstrates the effectiveness of music for the reduction of anxiety during normal care delivery. Given the inexpensive nature of this intervention, and the lack of adverse events, it is recommended as an adjunct to normal care practices. This review also highlights the need for further research into many aspects of this intervention.

3. **Music listening as a nursing intervention: a symphony of practice.**

Abstract - This article presents the use of music listening as an effective, noninvasive intervention designed to assist nurses in creating a healing environment to promote health and well-being. Music has demonstrated effectiveness in reducing pain, decreasing anxiety, and increasing relaxation. In addition, music has been used as a process to distract persons from unpleasant sensations and empower them with the ability to heal from within. As nurses develop practice patterns that are evidence based, the use of music listening could become an integral nursing intervention. To develop a guide for using music listening as a nursing intervention, six principles of practice are identified: intent, authentic presence, wholeness, preference, entrainment, and situating the client.

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1 McCaffrey, R., etc., Holistic nursing practice, Volume 16, Issue 3, April 2002, Pages 70-77
4. **The use of music in facilitating emotional expression in the terminally ill.**

Abstract - The expression and discussion of feelings of loss and grief can be very difficult for terminally ill patients. Expressing their emotions can help these patients experience a more relaxed and comfortable state. This paper discusses the role of music therapy in palliative care and the function music plays in accessing emotion. It also describes techniques used in assisting clients to express their thoughts and feelings. Case examples of three in-patient palliative care clients at Baycrest Centre for Geriatric Care are presented. The goals set for these patients were to decrease depressive symptoms and social isolation, increase communication and self-expression, stimulate reminiscence and life review, and enhance relaxation. The clients were all successful in reaching their individual goals.

5. **Harmonic sounds: complementary medicine for the critically ill.**

Abstract - Anxiety is a common phenomenon among hospitalized patients, and over the past few decades there has been a growing interest in using music as an anxiolytic agent on patients in intensive care undergoing ventilation. Critically ill patients experience both anxiety and pain related to their illness and injury, but the implementation of music can help provide a supportive role for relief of symptoms that interfere with the healing process. This article aims to review music therapy as an aid to reducing anxiety and pain levels within an intensive care unit setting. By observing the literature, music therapy as a non-pharmacological intervention will be discussed and the benefit of promoting a healing environment for patients will be addressed.

6. **Hot research and clinical application of music therapy.**

Abstract - Objective: Music therapy is a newly rising frontier branch of science, whose connotation cannot be understood by many doctors. The aim of this paper is to detailed introduce the conception and development of music therapy, and review its latest clinical

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2. Cardozo, M., British journal of nursing, Volume 13, Issue 22, 9 December 2004, Pages 1321-1324
application home and abroad, expecting to help to carry out music therapy in China. Data sources: The relevant articles to music therapy between January 2000 and January 2004 were searched for in Medline by inputting the key words "music therapy" in English into the computer. Meanwhile, the relevant articles also between January 2000 and January 2004 were searched for in the titles of relevant journals by using computer with the key words "music" in Chinese. Study selection: Totally 40 literatures in English and 5 in Chinese were selected. The original literatures about nonrandomized and nonblind studies were included, and the case reports were excluded. Study extraction: A total of 45 literatures about the clinical study of music therapy were collected, of which 11 were excluded because of their resembled contents. Then, the rest 34 literatures were classified and arranged. Data synthesis: Now, music therapy mainly focused on parturition of pregnant woman, nursing for infants, improvement of clinical patients' anxiety, relief of pre- and post-operative pain, amelioration of brain function and other individual studies. Blood pressure, heart rate, oxygen saturation, pain index, anxiety index, and simple clinical symptoms were always used as clinical indexes. The enhancement of therapeutic effect was emphasized on the improvement of mental state, clinical symptoms and simple life indexes. Conclusion: The operative criteria for music therapy should be established as soon as possible so as to enforce the operating of basic experimental research.

7. Music Therapy in Hospice and Palliative Care: a Review of the Empirical Data. ¹

Abstract: Although music therapy is an established allied health profession and is used with increasing frequency in the treatment of those with a terminal illness, there is a real dearth of empirical research literature supporting the use of music therapy in end-of-life care. This article reviews the empirical studies found in the literature and documents the emergence of an evidenced-based approach to the use of music therapy in hospice and palliative care. A total of 11 studies are reviewed; of these, six show significant differences supporting the use of music therapy in this area. Dependent variables positively affected by music therapy include pain, physical comfort, fatigue and energy,

¹ Russell E. Hilliard, Evidence-based Complementary and Alternative Medicine, Vol.: 2, No.: 2, June 2005  [Page 173-178]
anxiety and relaxation, time and duration of treatment, mood, spirituality and quality of life. Guidelines for future research are considered, and variables that need to be controlled are presented. The need to create an evidence-based approach to hospice and palliative care music therapy is articulated, and future researchers are empowered to continue to conduct investigations among this population.


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.

Image Source: http://www.7dvt.com/files/f-harptherapy.jpg

1 Freeman, L., etc., American Journal of Hospice and Palliative Medicine, Volume 23, Issue 2, March 2006, Pages 100-104
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.

9. Characteristics of music intervention. ¹

Abstract - Objective: To introduce the progressive process, physiological and psychological effects as well as practice principle of music intervention, and detailed review its latest clinical application at home and abroad with expectation of helping to carry out music intervention in China. Data sources: An online search of Medline database se was undertaken by using the keyword of "music intervention" to identify the relevant articles of music intervention published in English from January 1999 to August 2005. Meanwhile, Wanfang database and China Academic Journals Database were scanned with computer to search the relevant articles of music intervention published from January 1999 to August 2005, and the keyword was "music intervention" with language limited to Chinese. Study selection: After primary screening, the relevant articles about the basic and clinical study of music intervention were selected, while the obvious non-randomized trials were excluded, and then the full texts of selected articles were searched for randomized controlled study. Inclusive criteria: randomized controlled study with single-blind, double-blind or non-blind method; experiment including parallel control groups. Exclusive criteria: repetitive experimental study. Data extract ion: Totally 38 original articles related to basic and clinical study of music intervention were collected. Of the 38 articles, 27 articles in accordance with the inclusive criteria were reviewed, while other 11 studies were excluded due to repetitive studies. Data synthesis: At present, music intervention mainly focuses on physiological and psychological effects, practice principle and clinical application. It is proved that music is an easy-to-

administer, relatively inexpensive, noninvasive intervention that has been used to reduce heart rate, blood pressure, myocardial oxygen consumption, gastrointestinal function, anxiety, and pain. At the same time, six principles of music intervention have been identified: intent, authentic presence, wholeness, preference, entrainment and situating the client, which can be used as a guide for using music as a nursing intervention and play a important role in promoting the development of holistic nursing care. Conclusion: Some progresses have been achieved in the basic and clinical study of music intervention nowadays. The standard, operating procedure for music intervention should be established as soon as possible so as to strengthen in future study.

10. **Role of the music in the operating theatre.**

Abstract - Purpose: To investigate the effect of music on patients, surgeons and staff in the operating theatre at our Ophthalmology department in Mária street Clinic. Patients and methods: I. 150 patients, 7 staff and 19 surgeons have been asked to fill in a questionnaire. II. 29 patients who were listening music during surgery and as control group 27 patients having surgery without music therapy filled in a different questionnaire dealing with their preference on different kind of music. In order to obtain more complete results, psychophysiology tests (STAI H test, Face-scale), blood pressure and pulse rate parameters were measured as well. Results: Almost all of the patients, and every surgeon and staff person like music. Music does not disturb the staff during their work, but does not help in their concentration. Majority of them considered music useful in recovering of their patients. According to the answers most of the patients think that music has beneficial effect on their treatment compared to those patients who did not hear music. Subjective answers show a mild anxiety during surgery that is supported with the data of the psychophysiological test results. Conclusion: results so far demonstrate that the usage of music therapy at our department during ophthalmic surgery is beneficial. Further examinations are necessary to measure objective effect of music during surgery.

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1 Sármány, J., etc, Orvosi Hetilap, Volume 147, Issue 20, 21 May 2006, Pages 931-936
11. The clinical effects of music therapy in palliative medicine.  

Abstract - Goal: This study was to objectively assess the effect of music therapy on patients with advanced disease. Patients and methods: Two hundred patients with chronic and/or advanced illnesses were prospectively evaluated. The effects of music therapy on these patients are reported. Visual analog scales, the Happy/Sad Faces Assessment Tool, and a behavior scale recorded pre- and post-music therapy scores on standardized data collection forms. A computerized database was used to collect and analyze the data. Results: Utilizing the Wilcoxon signed rank test and a paired t test, music therapy improved anxiety, body movement, facial expression, mood, pain, shortness of breath, and verbalizations. Sessions with family members were also evaluated, and music therapy improved families' facial expressions, mood, and verbalizations. All improvements were statistically significant (P<0.001). Most patients and families had a positive subjective and objective response to music therapy. Objective data were obtained for a large number of patients with advanced disease. Conclusions: This is a significant addition to the quantitative literature on music therapy in this unique patient population. Our results suggest that music therapy is invaluable in palliative medicine.

12. Ambient music in the emergency services: The professionals' perception.  

Abstract - Due to the assistant characteristic of the emergency service, the health professional experiences countless situations that generate anxiety. This study aimed to learn the professionals' perception about the presence of classical music in the working environment. The sample was composed of 49 professionals of the adult emergency department of a medium sized private hospital. The data were collected through a questionnaire to evaluate the professional's perception. The results showed that 78% of the professionals noticed alteration in the atmosphere when the music was present, 41% believed that the music altered their personal performance; 85% believed it altered their performance in a positive way and 15% in a negative way. Regarding the musical repertoire, 61% of the individuals affirmed they enjoyed the selection, 96% believed that

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1 Gallagher, L.M., etc., Supportive Care in Cancer, Volume 14, Issue 8, August 2006, Pages 859-866  
the ambient music should be kept, while 76% of the interviewees suggested other musical genres.

13. The effect of music therapy on anxiety in patients who are terminally ill. 1

Abstract - Background: The literature supporting the use of music therapy in palliative care is growing. However, the number of quantitative research studies investigating the use of music therapy in palliative care, and specifically anxiety, is limited. Objective: The aim of this research project was to examine the effectiveness of a single music therapy session in reducing anxiety for terminally ill patients. Design: A randomized-controlled design was implemented and the following hypotheses tested. There will be a significant difference between the experimental and control groups on anxiety levels as demonstrated by the anxiety measurement of the Edmonton Symptom Assessment System (ESAS), and heart rate. The experimental group received a single music therapy intervention and the control group received a volunteer visit. Setting/subjects: Twenty-five participants with end-stage terminal disease receiving inpatient hospice services were recruited. Results: The first hypothesis was supported. Results demonstrated a significant reduction in anxiety for the experimental group on the anxiety measurement of the ESAS (p = 0.005). A post hoc analysis found significant reductions in other measurements on the ESAS in the experimental group, specifically pain (p = 0.019), tiredness (p = 0.024) and drowsiness (p = 0.018). The second hypothesis was not supported. Conclusions: The study supports the use of music therapy to manage anxiety in terminally ill patients. Further studies are required to examine the effect of music therapy over a longer time period, as well as addressing other symptom issues.

14. Bereaved parents' experiences of music therapy with their terminally Ill child. 2

Abstract - The purpose of this study was to investigate bereaved parents' experiences of music therapy with their terminally ill child. In-depth interviews were conducted with 7 bereaved parents who were recruited through a community-based palliative care program.

1 Horne-Thompson, A., etc., Journal of Palliative Medicine, Volume 11, Issue 4, 1 May 2008, Pages 582-590
The parent participants' experiences varied as their children who received music therapy ranged in ages from 5 months to 12 years old. The interview transcripts were analyzed using phenomenological strategies. Five global themes emerged from the analysis. These included (a) music therapy was valued as a means of altering the child's and family's perception of their situation in the midst of adversity, (b) music therapy was a significant component of remembrance, (c) music therapy was a multifaceted experience for the child and family, (d) music therapy enhanced communication and expression, and (e) parents shared perceptions of and recommendations for improving music therapy services. These emergent themes yield knowledge into the relevance of music therapy within pediatric palliative care.

15. A Review of the Evidence for Music Intervention to Manage Anxiety in Critically Ill Patients Receiving Mechanical Ventilatory Support. ¹

Abstract - Critically ill patients receiving mechanical ventilatory support experience profound anxiety with this common treatment modality. Music intervention is one adjunctive therapy that can be implemented to allay anxiety. This article reviews the evidence support music as an adjunctive intervention with mechanically ventilated patients.

16. Music therapy for end-of-life care. ²

Abstract - BACKGROUND: Music therapy in end-of-life care aims to improve a person's quality of life by helping relieve symptoms, addressing psychological needs, offering support, facilitating communication, and meeting spiritual needs. In addition, music therapists assist family and caregivers with coping, communication, and grief/bereavement. OBJECTIVES: To examine effects of music therapy with standard care versus standard care alone or standard care combined with other therapies on psychological, physiological, and social responses in end-of-life care. SEARCH STRATEGY: We searched CENTRAL, MEDLINE, CINAHL, EMBASE, PSYCINFO, LILACS, CancerLit, Science Citation Index, www.musictherapyworld.de, CAIRSS for

¹ Chlan, L., Archives of Psychiatric Nursing, Volume 23, Issue 2, April 2009, Pages 177-179
² Bradt, J., etc., Cochrane database of systematic reviews (Online), Issue 1, 2010, Pages CD007169
Music, Proquest Digital Dissertations, ClinicalTrials.gov, Current Controlled Trials, and the National Research Register to September 2009. We hand searched music therapy journals and reference lists, and contacted experts to identify unpublished manuscripts. There was no language restriction. SELECTION CRITERIA: We included all randomized and quasi-randomized controlled trials that compared music interventions and standard care with standard care alone or combined with other therapies in any care setting with a diagnosis of advanced life-limiting illness being treated with palliative intent and with a life expectancy of less than two years. DATA COLLECTION AND ANALYSIS: Data were extracted, and review authors assessed methodological quality independently. Additional information was sought from study authors when necessary. Results are presented using weighted mean differences for outcomes measured by the same scale and standardized mean differences for outcomes measured by different scales. Posttest scores were used. In cases of statistically significant baseline difference, we used change scores. MAIN RESULTS: Five studies (175 participants) were included. There is insufficient evidence of high quality to support the effect of music therapy on quality of life of people in end-of-life care. Given the limited number of studies and small sample sizes, more research is needed. No strong evidence was found for the effect of music therapy on pain or anxiety. These results were based on two small studies. There were insufficient data to examine the effect of music therapy on other physical, psychological, or social outcomes. AUTHORS' CONCLUSIONS: A limited number of studies suggest there may be a benefit of music therapy on the quality of life of people in end-of-life care. However, the results stem from studies with a high risk of bias. More research is needed.

17. The effect of music and progressive muscle relaxation on anxiety, fatigue, and quality of life in family caregivers of hospice patients.¹

Abstract - The purpose of this study was to examine the effects of music, progressive muscle relaxation (PMR), and music combined with progressive muscle relaxation on the reduction of anxiety, fatigue, and improvement of quality of life in family hospice caregivers. Subjects (N = 32) were divided randomly into 4 groups: control, music only, progressive muscle relaxation only, and music combined with progressive muscle relaxation. No strong evidence was found for the effect of music therapy on anxiety, fatigue, or quality of life. These results were based on two small studies. However, the results stem from studies with a high risk of bias. More research is needed.

¹ Chol, Y.K., Journal of Music Therapy, Volume 47, Issue 1, March 2010, Pages 53-69
relaxation and were tested twice a week for a duration of 2 weeks. A pre and posttest measuring anxiety and fatigue was administered each session. Quality of life was measured only on the first and last session. Results of three-way mixed design ANOVA indicated no significant main effect for group. However, results revealed a significant main effect for pretest and posttest on anxiety $F(1, 28) = 51.82$, $p < .01$ and fatigue, $F(1, 28) = 32.86$, $p < .01$. Significant difference on time effect were found for both anxiety $F(3, 84) = 3.53$, $p < .05$ and fatigue $F(3, 84) = 5.21$, $p < .01$. Follow-up paired t tests used for post hoc testing were conducted to compare pre and posttest difference scores for each group separately. Statistical results indicated a significant difference in quality of life when comparing the subject sample as a whole across the four days of treatment period, $F(1, 28) = 14.21$, $p < .01$. Follow-up paired sample t test indicated that the control and PMR group exhibited a significant difference in pre and posttest quality of life scores. There was a significant correlation between anxiety and quality of life ($r(32) = -.75$, $p < .01$), anxiety and fatigue ($r(32) = .55$, $p < .01$), and fatigue and quality of life ($r(32) = -.53$, $p < .01$).

18. **Music therapy in the context of palliative care in Tanzania.**

Abstract - There has been much written to support music therapy as an adjunct in managing pain and anxiety in palliative care patients in Western societies, but little written on its use in developing countries. In light of increasing numbers of terminally ill patients in Tanzania owing to HIV/AIDS and cancer, limited access to opioids, and a growing interest in palliative care support, this study looks at the application of music in this context. The study reviews the history and principles of therapeutic music and outlines its role in palliative care. A qualitative study was conducted by questionnaire of 17 professionals involved in home-based palliative care in Tanzania. Findings include beliefs about the power of music, how music is being used to bring comfort to the dying patient, and the most important aspects of helpful music to many Tanzanian palliative care patients. Music can powerfully affect body, mind and spirit. It is vocal music, which is an accepted therapeutic music tool used to bring comfort to the palliative care patient.

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and their family members. Finally, music is an active and participatory activity in Tanzanian culture, even for the dying.

Observations: 18 studies revealed how music therapy benefit terminally ill patients / those in palliative care by assessing its impact on various variables like anxiety, stress, pain, relaxation, positive outlook & comfortable environment (for hospital experience) and others.

12 abstracts concluded that music improves health & overall well being of the patient, 11 reported reduction in anxiety values, 7 said music results in positive outlook & makes comfortable environment for all patients, medical staff and relatives. 6 studies noticed significant lowering of pain intensity, 5 are of the belief that music enhances relaxation, 4 talked about its usefulness in self-expression and relieving stress respectively, decreased depression score was administered by 3 researches. 1 showed no significant results whereas 5 recommended further studies in the field.

Music Therapy again is in a complementary role in the palliative care as it ably induces positivity towards life.
1. The effects of music on the selected stress behaviors, weight, caloric and formula intake, and length of hospital stay of premature and low birth weight neonates in a newborn intensive care unit. 1

Abstract - The purpose of this study was to examine the effects of music on selected stress behaviors, weight, caloric and formula intake, and length of hospital stay. Subjects were 52 preterm and low birth weight newborns in a newborn intensive care unit (NBICU) who were in stable condition and restricted to isolettes. Subjects in the experimental and control groups were matched for equivalency based on sex, birth weight, and diagnostic criticality. Eleven males and 15 females were assigned to the control group and received routine auditory stimulation. The experimental group of 11 males and 15 females received music stimulation, which consisted of approximately 60 minutes of tape recorded vocal music, including lullabies and children's music, and routine auditory stimulation. Thirty-minute segments of the recording were played alternatively with 30 minutes of routine auditory stimulation three times daily. Exposure to music stimulation occurred only during the infants' stay in the NBICU. Results suggest

music stimulation may have significantly reduced initial weight loss, increased daily average weight, increased formula and caloric intake, significantly reduced length of the NBICU and total hospital stays, and significantly reduced the daily group mean of stress behaviors for the experimental group. Data analyses suggest the length of hospital stay may be correlated with the amount of stress experienced by the neonate and not with weight gains. Theoretical and practical aspects of these results are discussed.

2. Therapeutic effects of music and mother's voice on premature infants. ¹

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 20 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.

3. The effect of music and multimodal stimulation on responses of premature infants in neonatal intensive care. ²

Abstract - To assess the benefits of lullaby singing and multimodal stimulation on premature infants in neonatal intensive care, 40 infants in a Level III Newborn Intermediate Care Unit were divided into control (n = 20) and experimental (n = 20)

¹ Standley, J.M., etc., Pediatric nursing, Volume 21, Issue 6, November 1995, Pages 509-512, 574
groups by pair matching on the basis of gender, birthweight, gestational age at birth and severity of medical complications. Participants met these project criteria: (a) corrected gestational age > 32 weeks; (b) age since birth > 10 days; and (c) weight > 1700 g. All participants had been referred for developmental stimulation by the medical staff. Experimental infants received reciprocal, multimodal (ATVV) stimulation paired with line singing of Brahms' Lullaby. Stimulation was provided for 15-30 minutes, one or two times per week from referral to discharge. Dependent variables were (a) days to discharge, (b) weight gain/day, and (c) experimental infants' tolerance for stimulation. Results showed that music and multimodal stimulation significantly benefited females' days to discharge and increased weight gain/day for both males and females. Both male and female infants' tolerance for stimulation showed marked and steady increase across the stimulation intervals with females' tolerance increasing more rapidly than males.

4. Pre and perinatal growth and development: Implications of music benefits for premature infants. ¹

Abstract - This article summarizes the current scientific knowledge on fetal and newborn neurological development and related research on beneficial uses of music with the premature infant. As technology and science advance, the survival rate of earlier and earlier premature birth increases with long-term implications for these children having impaired neurological development, delayed growth, and need for special education. Research in the neonatal intensive care unit has focused on uses of music to reduce stress, to promote homeostasis and weight gain, to reinforce non-nutritive sucking, to enhance developmental maturation, and to shorten length of hospitalization. Further, it is theorized that music benefits documented for full term newborns may also apply to the premature infant, i.e., lullabies promote language development; familiar music is recognized, reinforcing, and comforting; and infants orient to and avidly attend to music more so than other auditory stimuli. This burgeoning area of research provides exciting possibilities for the practice of music therapy in the neonatal intensive care unit and for music education in early childhood.

5. Soothing pain-elicited distress in Chinese neonates. ¹

Abstract - OBJECTIVE: To test the effect of nonnutritive sucking (NNS), music therapy (MT), and combined NNS and MT (NNS + MT), versus no intervention, on heart rate, transcutaneous oxygen (TcPaO(2)) levels, and pain behavior of neonates in intensive care units having blood taken by a heel-stick procedure. METHODOLOGY: A within-subjects, counter-balancing, repeated-measures design conducted in a government-funded hospital in Hong Kong, comparing TcPaO(2) levels, heart rate, and pain behavior outcomes in 27 neonates. RESULTS: Repeated-measures multivariate analysis of variance revealed statistically significant differences in outcomes across all interventions (Wilk's lambda =.142; F [3,27] = 31.82; eta2 =.47). One-way analysis of variance revealed that the 3 comfort interventions significantly reduced neonates' heart rate (Wilk's lambda =.647; F [2,27] = 18.93; eta2 =.35), improved their TcPaO(2) levels (Wilk's lambda =.481; F [2,27] = 37.42; eta2 =.51), and reduced their pain behavior (Wilk's lambda =.312; F [2,27] = 76.42; eta2 =.68). Posthoc scheffe tests revealed that NNS + MT had the strongest effect on neonates' TcPaO(2) levels and pain behavior; MT alone had the strongest effect on neonates' heart rate. CONCLUSIONS: Health professionals using NNS + MT when doing heel-sticks can improve the TcPaO(2) levels of neonates and reduce their pain. Using MT alone can improve the heart rate of neonates.

6. The effect of parent training in music and multimodal stimulation on parent-neonate interactions in the neonatal intensive care unit. ²

Abstract - This study examined the effects of parent training in music and multimodal stimulation on the quantity and quality of parent-neonate interactions and the weight gain and length of hospitalization of premature and low birth weight (LBW) infants in a Neonatal Intensive Care Unit (NICU). Twenty sets of parents and premature LBW infants participated in the study. Parents in the experimental group (n = 10) received approximately one hour of instruction in appropriate uses of music, multimodal stimulation including massage techniques, and signs of infant overstimulation and techniques for its avoidance. Parent-neonate interactions, specifically parent actions and

¹ Bo, L.K., etc., Pediatrics, Volume 105, Issue 4, April 2000, Pages E49
responses and infant stress and non-stress behaviors, were observed for subjects in both groups. Infant stress behaviors were significantly fewer and appropriateness of parent actions and responses were significantly greater for experimental infants and parents than for control subjects. Parents in the experimental group also self-reported spending significantly more time visiting in the NICU than did parents of control infants. In addition, length of hospitalization was shorter and average daily weight gain was greater for infants whose parents received training, although these differences were not significant. A one month, post discharge follow-up showed little difference between experimental and control group parent-infant interactions in the home.

7. **Music therapy for the neonate.**

Abstract - Survivors of extreme prematurity (less than 26 weeks gestational age) may have long-term impairment, including developmental disabilities and neurological deficits that become evident as the child matures. Music has been used as an intervention purported to facilitate development in young, at-risk children in infant stimulation and early intervention programs. Over the past decade, music has been introduced into the neonatal intensive care unit as a therapy designed to enhance treatment and facilitate growth and development of premature infants. This report summarizes extant research on music therapy in the neonatal intensive care unit.

8. **A meta-analysis of the efficacy of music therapy for premature infants**

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, birth weight, 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

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1 Standley, J.M., Newborn and Infant Nursing Reviews, Volume 1, Issue 4, 2001, Pages 211-216
from all other sounds are discussed and clinical implications for research-based music therapy procedures cited.

9. Effects of music therapy on oxygen saturation in premature infants receiving endotracheal suctioning. ¹

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 one-group 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.

10. Music Therapy for Prematures: Further Over tension or Necessary Stimulation?²

Abstract - Background: More than ever before the neonatal care besides the medical and nursing work has to been balanced between protecting the child against overextension due to the concept of "minimal handling" and on the other hand the

¹ Chou, L.L., etc., The journal of nursing research: JNR, Volume 11, Issue 3, September 2003, Pages 209-216
² Haus, R., etc., Zeitschrift fur Geburtshilfe und Neonatologie, Volume 207, Issue 6, November 2003, Pages 225-227
necessary fostering of the young patients psychic and sensomotoric development during the long stationary treatment. In addition to known approaches of auditive stimulation as receptive music therapy a concept of active music therapy methods based on the Nordoff/Robbins creative music-therapy (University Witten/Herdecke) is presented in a case-report. Patient and Methods: The report describes in a single case-report the music-therapeutic work with a premature of the 23 + 3th week of pregnancy at the neonatological unit of the Vestische Kinder- und Jugendklinik Datteln, Universität Witten/Herdecke. The main focus was the observation of the prematures reactions on specific synchronization of motoric, sensoric and acoustical stimulation. Results: Positive reactions allow to presume the effectivity of music therapy with early born children as they are already shown in clinical studies about receptive music therapy. On the level of involuntary motional actions in the area of head-, face-and hand movements increased directly reactions of awareness on the coordination of sensomotoric and acoustical stimulation have been observed. Temporary increase of oxygen partial pressure and reduction of heart/pulse rate seem to cause positive physiological effects. Conclusions: Active music therapeutic treatment does not seem to be another risk of over tension for prematures, but offers through the coordination of different levels of perception an adequate development fostering stimulation.

11. Therapeutic effects of music on preterm infants in neonatal intensive care units.\(^1\)

Abstract - The hospital care of premature and low-birth infants requires expensive technology and experienced care. Many studies have looked at the institution of developmental care in the NICU. Significant increases in oxygen saturation as well as decreased levels of agitation and heart rate were found with the use of music. Other studies have shown a doubled daily weight gain when premature babies in the NICU were exposed to music therapy.

\(^1\) Malinova, M., etc., Akusherstvo i ginekologija, Volume 43 Suppl 4, 2004, Pages 29-31
12. Attitudes and expectations about music therapy for premature infants among staff in a Neonatal Intensive Care Unit.  

Abstract - Background: Music appears to reduce stress in premature infants, but little is known about the attitudes and expectations about music among clinicians caring for these infants. The study questions were: a) would staff like to have music played in the Neonatal Intensive Care Unit (NICU), b) would they prefer live to recorded music, and c) how would their attitudes be affected by their profession and experience? Design: Cross sectional survey of NICU staff in the winter of 2003. Methods: Eligible subjects were 37 physicians and 150 nurses and other clinical staff in the NICU. After pilot testing and revision, the self-administered questionnaires contained 57 Likert type or multiple choice items. They were distributed by email and in staff mailboxes with two reminders. Data were analyzed using simple descriptive statistics, Chi-square, and logistic regression. Results: The response rate was 75%. Most were nurses and 27 were MD's. Most (84%) were female and most (70%) reported some previous musical training. The majority (68%) agreed that they would like to have music played in the NICU. Most agreed that music could reduce stress (86%) and crying (79%) and improve sleep (79%) in premature infants. Recorded was preferred to live music by more than 2:1. Attitudes were significantly associated with prior musical training, experience, and profession. Conclusions: NICU staff holds favorable attitudes toward music for premature infants. Music's effects on caregiver attitudes, mood and behavior may contribute to its impact on infants. Evaluation of the effects of music on infants needs to account for caregiver's expectations and behavior as well as direct effects on infants' physiology.

13. Effects of the pacifier activated lullaby on weight gain of premature infants.  

Abstract - Within the past 5 years there has been an increase of premature infants surviving in the neonatal intensive care unit as well as an increasing cost for each day the infant is kept there. It is important for the premature infant to acquire the feeding skills necessary for weight gain, which lead to discharge from the hospital, and recent

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1 Kemper, K.J., etc., Alternative Therapies in Health and Medicine, Volume 10, Issue 2, March 2004, Pages 50-54
advancements have indicated the effectiveness in using contingent music to teach sucking skills to premature infants. The purpose of the first analysis in this study was to determine the effects of Pacifier Activated Lullaby (PAL) trials on weight gain of premature infants. During a 2-year time period, 62 infants from a sample of 188 met criteria for analysis. A one-way analysis of variance showed no significance in daily weight gain for the number of PAL trials completed. The mean weight gains for infants with 1 PAL trial - 13.85 grams, 2 trials = 26.67, 3 trials = 29.64, and 4 or more = 22.89. The Pearson product-moment correlation between the mean percent of music earned via nonnutritive sucking (NNS) and mean weight gain of all trials approached significance (p = .077, r = 0.18). In a second analysis, weight gained prior to use of PAL, during use of PAL, and post use of PAL was analyzed. Results indicated no significant difference between weight gain 1 day prior to use of PAL, the day of PAL trial, and 1 day post use of PAL. Mean weight gain for those infants who participated in 1 PAL trial was 8.49 grams for 1 day prior to use of PAL, 18.73 the day of PAL trial, and 24.81 for 1 day post use of PAL. Mean weight gain for 3 days prior to using the PAL was 10.78, 11.30 on the day of PAL trial, and 24.78 grams for 3 days post PAL use. The analyses show definite trends of greater weight gain with PAL use; however, individual variability within groups was greater than group differences leading to no significance in statistical analysis. In the third analysis the effect of proximity between premature infants' feeding schedule and PAL trial on amount of time the infant received contingent music via NNS was examined; the infants' feeding and sleep schedules were divided into 5 blocks of time. Results indicated no statistical significance among the amount of time premature infants sucked/received music according to their schedule, although there were noticeable differences in the average percent of music reinforcement received according to assigned block. Infants who participated in PAL trials 30 minutes prior to feeding scored the highest average at 77.25%, followed by 71% for infants who participated in PAL trials during feeding. Other times, primarily after the infants' feeding, resulted in averages of 59% and 54.5%; these infants often fell asleep after their feeding and did not complete the full 15-minute trial. Based on this research and previous research on NNS, it seems beneficial for premature infants to participate in PAL opportunities 30 minutes prior to feeding.
14. **Does a mother singing to her premature baby affect feeding in the neonatal intensive care unit?**

Abstract - Recent studies suggest that premature neonates exposed to music have reduced symptoms of stress, faster weight gain, and shorter neonatal intensive care unit (NICU) stays. This pilot study attempted to measure contingent effects of mothers' singing during feedings. Mothers sang to their babies during 2 of 4 feedings on 2 consecutive days, logging songs they sang, and subjectively evaluating each feeding. Infants' heart and respiration rates were recorded as well as duration of feeding and volume of fluid taken orally; feeding velocity and percent of feeding goal were calculated. In paired t tests, no significant benefits or deterrents assignable to the singing were observed.

15. **Staff attitudes and expectations about music therapy: Pediatric oncology versus neonatal intensive care unit.**

Abstract - Music is commonly used to reduce stress, but it has not been universally adopted in inpatient and outpatient settings. We compared the attitudes of staff in the neonatal intensive care unit (NICU) and the pediatric outpatient hematology oncology unit (PEDS ONC) toward music therapy. A cross-sectional survey of NICU staff was performed in the winter of 2003 and of PEDS ONC staff in the summer of 2005. Eligible subjects were 187 NICU and 20 PEDS ONC staff members. Surveys were distributed by e-mail, in person, and in staff mailboxes. Data were analyzed using simple descriptive statistics, chi-square test, and logistic regression. t-Tests and chi-square test were used to compare responses in the two units. The response rate was 75% in the NICU and 100% in PEDS ONC unit. Staff in the two locations were similar: the mean age of the staff was 37 years in the NICU and 40 years in the PEDS ONC (p> .1); over 80% of the staff were female in both units, and most (70% in the NICU, 75% in PEDS ONC) reported some previous musical training. Most agreed that music enjoyed by patients could reduce stress (86% in the NICU, 100% in PEDS ONC) and improve sleep (79% in the NICU, 95% in PEDS ONC). Attitudes toward music in both clinical settings were significantly

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1 Blumenfeld, H., etc., Clinical Pediatrics, Volume 45, Issue 1, January 2006, Pages 65-70
2 Bouhairie, A., etc., Journal of the Society for Integrative Oncology, Volume 4, Issue 2, March 2006, Pages 71-74
associated with prior musical training, experience, and profession. Staff in both the NICU and PEDS ONC hold favorable attitudes toward music for patients. Staff attitudes in both inpatient and outpatient settings are not barriers to providing music therapy.

16. Live music is beneficial to preterm infants in the neonatal intensive care unit environment.  

Abstract - 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 post conceptional age ≥ 32 weeks, weight ≥ 1,500 g, hearing confirmed by distortion product otoacoustic emissions (DPOAEs), and no active illness or documentation of hyper responsiveness 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 ± 3.3 beats/min before therapy vs 127 ± 6.5 beats/min after therapy) and improved the behavioral score (3.1 ± 0.8 before therapy vs 1.3 ± 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.

1 Arnon, S., etc., Birth, Volume 33, Issue 2, June 2006, Pages 131-136
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.

17. Theoretical interfaces in the acute pediatric context: A psychotherapeutic understanding of the application of infant-directed singing. ¹

Abstract - Psychotherapy literature provides a theoretical understanding of parent-infant attachment. This article will reflect upon the specific need to give thoughtful consideration to those infants admitted to the acute-care setting, such as neonatal and pediatric intensive care units, and the potential for this environment to affect infant development and the parent-infant relationship. Infant-directed singing, as described in this article, is an improvised form of vocal interaction that is specifically informed by an understanding of the musical parameters of pitch, rhythm, phrasing, timbre, register, dynamic, tempo and silence. This article will detail a theoretical understanding of using infant-directed singing to foster parent-infant interaction within the acute care environment. In particular, the potentially sensitive, reciprocal and engaging nature of infant-directed singing, coupled with its ability to promote and support maternal demonstrations of empathy, will be discussed with a view to the psychological and physical development of the hospitalized infant.

18. The efficacy of non-pharmacological interventions in the management of procedural pain in preterm and term neonates. A systematic literature review ²

Abstract - Background: Neonates in a neonatal intensive care unit are exposed to a high number of painful procedures. Since repeated and sustained pain can have consequences for the neurological and behavior-oriented development of the newborn, the greatest attention needs to be paid to systematic pain management in neonatology. Non-pharmacological treatment methods are being increasingly discussed with regard to pain

¹ O'Gorman, S., American Journal of Psychotherapy, Volume 60, Issue 3, 2006, Pages 271-283
² Cignacco, E., etc., European Journal of Pain, Volume 11, Issue 2, February 2007, Pages 139-152
prevention and relief either alone or in combination with pharmacological treatment. Aims: To identify effective non-pharmacological interventions with regard to procedural pain in neonates. Methods: A literature search was conducted via the Medline, CINAHL, and Cochrane Library databases and complemented by a hand search. The literature search covered the period from 1984 to 2004. Two independent reviewers extracted data according to pre-defined criteria and methodological quality was assessed. Results: 13 randomized controlled studies and two meta-analyses were taken into consideration with regard to the question of current nursing practice of non-pharmacological pain management methods. The selected interventions were "non-nutritive sucking", "music", "swaddling", "positioning", "olfactory and multisensory stimulation", "kangaroo care" and "maternal touch". There is evidence that the methods of "non-nutritive sucking", "swaddling" and "facilitated tucking" do have a pain-alleviating effect on neonates. Conclusions: Some of the non-pharmacological interventions have an evident favorable effect on pulse rate, respiration and oxygen saturation, on the reduction of motor activity, and on the excitation states after invasive measures. However, unambiguous evidence of this still remains to be presented. Further research should emphasize the use of validated pain assessment instruments for the evaluation of the pain-alleviating effect of non-pharmacological interventions.

19. Singing for preterm born infants music therapy in neonatology. ¹

Abstract - The use of music as part of a stress reduction therapy has been applied both to premature infants and their parents in the Neonatal Reanimation Service. This aim of music therapy amounts to an attempt to help the premature infant regaining its physical and neurological balance, so important to its psychological and physical development, mainly by masking the sometimes-excessive noise present in the intensive care unit and/or in the incubator. Studies have demonstrated the positive impact of music therapy on oxygen saturation, heartbeat, and on the general level of relaxation experienced by premature infants. In this project, the palliative technique used was that of live singing, directly to the infant, accompanied by a pentatonic harp. The aim was to improve the

state of health, both physical and psychological, of a group of premature infants, whose gestation period varied between 23 and 36 weeks. The technique used was to apply what amounts to a protective cocoon of sounds to a premature infant in the neonatal unit, which measurably reduced the level of stress as indicated by the babies' increasingly relaxed demeanour and induced a measurable increase on the level of oxygen saturation and a reduction of heart rate.

20. The effects of mothers' singing on full-term and preterm infants and maternal emotional responses. ¹

Abstract - The purpose of this research was to determine the effects of mothers' singing on their adjustment to and bonding with their new infants as well as use of music in the home environment in the first 2 weeks after their infants' birth. Preterm mothers were assessed for coping with their infants' NICU stay, and premature infants' length of hospitalization was evaluated. Fifty-four full-term infants and mothers and 20 premature infants and 16 mothers were randomly assigned to experimental or control conditions. Mothers in both experimental groups were recorded singing songs of their choice for use at home. Recordings of each preterm mother's voice were played 20 minutes per day, 3 to 5 times per week, at a time when she was not able to visit her infant in the NICU. All full-term and preterm mothers in experimental and control groups completed a posttest survey 2 weeks after infants were discharged. Comparisons revealed that experimental preterm and full-term mothers indicated less adjustment to their baby and lifestyle changes and less bonding compared to control mothers, though this difference was not significant. Preterm and full-term experimental mothers reported the greatest number of postpartum medical complications, which might explain their poor adjustment and bonding scores. There was a significant difference between mothers' value of music, with preterm experimental valuing music more. Preterm and full-term experimental mothers used music with and sang to infants more compared to preterm and full-term control mothers, but not to a significant degree. Preterm mothers reported a mean score of 4.75 (with a 5 indicating that they strongly agreed) for the following Item: knowing my infant listened to my singing helped me to cope with my infant's stay in the NICU. Furthermore,

preterm infants who listened to the CD recording of their mothers' singing left the hospital an average of 2 days sooner than those in the control group, though this difference was not significant.

21. Music as a nursing intervention for preterm infants in the NICU. ¹

Abstract - Although there is general agreement that noise in the neonatal intensive care unit should be reduced, there is controversy about the use of music as a developmental care strategy with preterm infants. Much literature supports using music with preterm infants, indicating that it enhances physiologic and neurobehavioral functioning, but some experts’ worry that music is over stimulating. This article presents evidence supporting the use of music with preterm infants as well as criticism of the same. Recommendations for music interventions with preterm infants are discussed, although further research is needed before specific guidelines can be established.

22. The Effects of music listening on inconsolable crying in premature infants. ²

Abstract - 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 developmental 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.

² Keith, D.R., etc., Journal of Music Therapy, Volume 46, Issue 3, September 2009, Pages 191-203
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.

23. Effect of decibel level of music stimuli and gender on head circumference and physiological responses of premature infants in the NICU. ¹

Abstract - The purpose of this study was to examine different protocols with regard to the presentation of music stimuli and compare gender differential reactions to those stimuli. Subjects for this study (N = 63) were premature infants in the Neonatal Intensive Care Unit (NICU) between the gestational ages of 28 and 33 weeks. Half of the experimental infants listened to 20 mins of lullaby music (female voice with orchestral background) on 2 days followed by 20 mins of classical music (Mozart string music) on 2 days. The other half listened to the same music in the reverse order. One quarter of the males and one quarter of the females listened to music presented at an average of 65 dB, one quarter at an average of 70 dB, one quarter at an average of 75 dB, and one quarter did not listen to any music and served as control subjects. Head circumference data were collected four times by the researcher: (a) upon receipt of parental consent, (b) on the first day of music presentation (1 week after consent), (c) on the last day of music presentation, and (d) 1 week after music presentation. Physiological data (heart rate, respiratory rate, oxygen saturation) were recorded by the researcher at 2-minute intervals starting 4 minutes prior to and ending 4 minutes after music presentation. There was a significant difference (p < .0001) in average daily head growth across time, but his seems unrelated to the music condition as the same curvilinear trend (larger gain during days of treatment, smaller gain during baseline before and after treatment) was noted for control infants who did not listen to music. Results indicate a significant (p = .002), but biologically unimportant, decrease in heart rate over the course of data collection. No differences due to gender were noted.

24. **Effect of music by Mozart on energy expenditure in growing preterm infants.**

Abstract - 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 <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."

25. **Exposure to maternal voice in preterm infants: A review.**

Abstract - The mother's voice, along with other developmentally appropriate sensory events (ie, touch, light, smells), stimulates maturation of the sensory systems and helps shape normal fetal development. While vast changes in the neonatal intensive care unit have occurred over the last 2 decades, little research has addressed the loss of exposure to maternal voice for the preterm infant. To address this gap, we compared studies that directly investigated effects of exposure to maternal voice on preterm infants. Studies reviewed were conducted between 1972 and 2007. All presented recordings of maternal voice at sound levels above current recommendations, and few of the findings reached statistical significance. Some potentially positive developmental effects were indicated.

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1 Lubetzky, R., etc., Pediatrics, Volume 125, Issue 1, January 2010, Pages e24-e28
2 Krueger, C., Advances in Neonatal Care, Volume 10, Issue 1, February 2010, Pages 13-18
Future study of the effects of exposure to maternal voice on preterm infants using recommended sound levels is needed.


Abstract - In this randomized, controlled multi-site study, the pacifier-activated-lullaby system (PAL) was used with 68 premature infants. Dependent variables were (a) total number of days prior to nipple feeding, (b) days of nipple feeding, (c) discharge weight, and (d) overall weight gain. Independent variables included contingent music reinforcement for non-nutritive sucking for PAL intervention at 32 vs. 34 vs. 36 weeks adjusted gestational age (AGA), with each age group subdivided into three trial conditions: control consisting of no PAL used vs. one 15-minute PAL trial vs. three 15-minute PAL trials. At 34 weeks, PAL trials significantly shortened gavage-feeding length, and three trials were significantly better than one trial. At 32 weeks, PAL trials lengthened gavage feeding. Female infants learned to nipple feed significantly faster than male infants. It was noted that PAL babies went home sooner after beginning to nipple feed, a trend that was not statistically significant.


Abstract - Medical music therapy, which has developed rapidly in the last 15 years, has been effectively used with preterm infants in neonatal intensive care units. The purpose of this article is to provide an introduction to current music therapy protocols for premature infants, as well as highlight research supporting the use of these procedures to address a variety of medical and developmental objectives. Protocols covered include (a) music combined with kangaroo care, (b) multimodal stimulation, (c) developmentally appropriate music listening and (d) pacifier activated lullabies (PAL). Research suggests that these procedures have been effective in addressing a wide range of medical and developmental needs. Positive outcomes include: (a) reduced length of stay, (b) stabilized

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1 Standley, J.M, etc., Pediatric nursing, Volume 36, Issue 3, May 2010, Pages 138-145
2 Gooding, L.F., Arts in Psychotherapy, Volume 37, Issue 3, July 2010, Pages 211-214
oxygen saturation levels, (c) increased stimulation tolerance, (d) reduced stress-related behaviors, (e) enhanced parent-infant bonding and (f) improved parent-child interactions.

28. **The effect of listening to lullaby music on physiologic response and weight gain of premature infants.**

Abstract - Objectives: The environment plays a key role in survival and brain development for premature infants. Recent interest lends consideration to non-pharmacological interventions as a beneficial alternative. This study seeks to investigate the effect of lullaby music on the physiological response and weight gain of premature infants in Mashhad, Iran. Method: In this study, 44 very low birth weight infants ≤ 34 weeks of gestational age that were admitted to the Neonatal Intensive Care Unit (NICU) of Imamreza Hospital in Mashhad, Iran were enrolled. Infants were randomly assigned to one of two groups: the Music group and the Control group. Lullaby music was played through earphones for the Music group. This continued for 8 days at 20 minutes per day. The Control group received routine auditory stimulation. Neonates in the two groups were in stable condition and kept in their isolelettes. Infants were monitored for 40 minutes; 10 minutes baseline, 20 minutes into the intervention and 10 minutes post intervention. Data measures were heart rate, respiration rate, oxygen saturation and body weight. Result: The two groups differed significantly in the respiratory rate (p= 0.01) and oxygen saturation (p= 0.001). There were no significant differences in the heart rate (p= 0.24) and weight gain (p= 0.093) between the two groups. Conclusion: Preterm infants respond to lullaby music as evidenced by the changes in their respiratory rates and oxygen saturations. Although this study did not demonstrate an improvement in weight gain, further studies are recommended to examine the effect of music on other growth and developmental aspects.

29. **NICU music therapy: Post hoc analysis of an early intervention clinical program.**

Abstract - The incidence of premature births in the United States is increasing, as are medical costs related to this problem. Research has shown benefits for NICU-MT in

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1 Farhat, A., etc., Journal of Neonatal-Perinatal Medicine, Volume 3, Issue 2, 2010, Pages 103-107
2 Standley, J.M., etc., Arts in Psychotherapy, Volume 38, Issue 1, February 2011, Pages 36-40
small sample size, controlled clinical trials. Such benefits have included significantly earlier discharge dates and a consistent pattern of increases in weight gain that has not been statistically significant. As yet, no clinical analyses of the effects of NICU-MT have been conducted. The clinical NICU-MT program at TMH has been in effect for over 7 years and includes referrals for multi-modal stimulation, Pacifier-Activated-Lullaby (PAL) treatment, and parent training in infant stimulation. We analyzed the medical records of all infants born low birth weight (<2499 g) and born prior to 36 gestation weeks who were treated in the NICU in 2006 (N= 208) with differentiation for receipt of NICU-MT or not. We excluded infants not discharged to the home but to another medical site for further treatment. This post hoc analysis of clinical records showed that the smallest, lowest birth-weight infants were more often referred for music therapy. Infants receiving NICU-MT gained more weight/day than did infants not referred for MT. Those born very early (24-28 gestational weeks) were discharged sooner than non-music infants in that age range. Infants born after 30 weeks and receiving MT had longer length of stay than non-music infants but they also were diagnosed with more serious illnesses. In summary, the demographics reveal that MT is primarily referred for premature, low birth-weight infants and those with multiple, serious medical problems.

30. Combining kangaroo care and live harp music therapy in the neonatal intensive care unit setting.¹

Abstract - Music therapy has been recommended as an adjuvant therapy for both preterm infants and mothers during their stay in the neonatal intensive care unit (NICU), and has been shown to have beneficial effects. To study the usefulness of combining live harp music therapy and kangaroo care (KC) on short-term physiological and behavioral parameters of preterm infants and their mothers in the NICU setting. Included in this study were stable infants born between 32 and 37 weeks of gestation, with normal hearing. Mother-infant dyads were randomly assigned to KC and live harp music therapy or to KC alone. Using repeated measures, neonatal and maternal heart rate, oxygen saturation and respiratory rate were recorded along with neonatal behavioral state and maternal anxiety state. Maternal age, ethnicity, education, and love of music were

¹ Schlez, A., etc., Israel Medical Association Journal, Volume 13, Issue 6, June 2011, Pages 354-358
documented. Fifty-two mother-infant dyads were tested. Compared with KC alone, KC and live harp music therapy had a significantly beneficial effect on maternal anxiety score (46.8 ± 10 vs. 27.7 ± 7.1, respectively, P < 0.01). Infants' physiological responses and behavior did not differ significantly. No correlation was found between mothers' age, ethnicity, years of education and affinity for music, and anxiety scores (P = 0.2 to 0.5 for all four variables). KC combined with live harp music therapy is more beneficial in reducing maternal anxiety than KC alone. This combined therapy had no apparent effect on the tested infants' physiological responses or behavioral state.

31. Nurses' Expectations of Using Music for Premature Infants in Neonatal Intensive Care Unit. ¹

Abstract - This study aimed to describe nurses' expectations of using music for premature infants in the neonatal intensive care unit (NICU) and to find out about the related background factors. The subjects consisted of 210 Finnish nurses who were recruited from the country's five university hospitals providing premature infant care in NICU. The data were collected by validated questionnaire, and the response rate was 82%. Most nurses preferred recorded music to live music in the NICU. They expected that music would have positive effects on premature infants, parents, and staff. Few demographic and many background factors of the respondents' music-related experiences correlated significantly with the expectations concerning their preference. In conclusion, the nurses' expectations were positive regarding the use of music in the NICU, which supports evidence regarding the efficacy of music therapy for premature infants.

Observations: 31 research studies viewed the impact of music on preterm & full term infants in NICU. Efficacy of music was judged by analyzing the fluctuations in physiological parameters like heart rate, weight gain, suckling frequency of the infant and period of stay in hospital and others.

7 studies noted reduction in stress levels, 7 reported weight gain in pre & full term infants, music led to higher oxygen saturation levels in 6 cases and decreased heart rate in 5, music enhanced development maturation of infants in 4 researches and

¹ Pölkki, T., etc., article in press
likely improved sleep in 3. Few other effects noticed are shortening of hospital stay in 3 researches, 3 suggested music improves caregiver’s attitudes, mood and behavior, 2 said it enhances relaxation and tolerance for stimulation. 3 reports emphasized on combined use of MT and other non-pharmacological intervention and brought out amazing outcomes. 6 studies did not show any significant results and 4 recommended further research in the field.

Music is used as an adjuvant therapy to calm the pre & full term infants and likely sync with the heart rate to bring positive physiological changes and development.
1. Effects of music treatment on salivary cortisol in patients exposed to presurgical stress.¹

Abstract - The response of the adrenal cortex to the stress of receiving information about a surgery to be performed the following day was studied in thirty-four patients by monitoring changes in their salivary cortisol levels. Eighteen of those patients were subjected to an individually selected one-hour music program, applied immediately following receipt of the information, and the remaining sixteen patients formed a reference group. Another ten patients, not awaiting surgery, served as controls. Saliva was sampled before the stress and five more samples were collected at fifteen-minute intervals. The stress produced a 50% rise in salivary cortisol within fifteen minutes. Whilst the cortisol levels of those patients not exposed to music gradually decreased, after one hour they were still markedly higher than the initial level. However, those patients in the music group showed a marked reduction in salivary cortisol level and after one hour the relative decrease was similar to that observed in control (non-surgical) patients.

¹ Miluk-Kolasa B, etc., Exp Clin Endocrinol (GERMANY) 1994, 102 (2) p118-20
patients. The results therefore show that music therapy can have a significant beneficial effect on alleviating stress levels for patients who are given distressing information about imminent required surgery. The study suggests that, those in authority should consider introducing relaxing music into the cold, silent corridors and waiting rooms of hospitals and health clinics.

2. **Coping with stress: The effectiveness of different types of music.**

Abstract - Listening to classical and self-selected relaxing music after exposure to a stressor should result in significant reductions in anxiety, anger, and sympathetic nervous system arousal, and increased relaxation compared to those who sit in silence or listen to heavy metal music. Fifty-six college students, 15 males and 41 females, were exposed to different types of music genres after experiencing a stressful test. Several 4 x 2 mixed design analyses of variance were conducted to determine the effects of music and silence conditions (heavy metal, classical, or self-selected music and silence) and time (pre-post music) on emotional state and physiological arousal. Results indicate listening to self-select or classical music, after exposure to a stressor, significantly reduces negative emotional states and physiological arousal compared to listening to heavy metal music or sitting in silence.

3. **The effect of preferred music listening on stress levels of air traffic controllers.**

Abstract - The effect of preferred music listening on stress levels of 33 air traffic controllers (31 males, mean age = 34) was examined. A stratified random sample was employed to evenly represent Extraversion-Introversion and Low-High-Trait Anxiety in the experimental conditions. The control condition was sitting in silence, while the experimental condition was preferred music listening. Dependent variables included heart rate, mean arterial pressure, state anxiety, and perceived air traffic activity. Results indicated that in both the control and experimental conditions state anxiety levels significantly decreased over time (p < .05), with no difference in decrease between the

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1 Labbé, E., etc., Applied Psychophysiology Biofeedback, Volume 32, Issue 3-4, December 2007, Pages 163-168
2 Lesiuk, T., Arts in Psychotherapy, Volume 35, Issue 1, 2008, Pages 1-10
conditions. There were no significant differences in physiological measures found between or within groups. However, a significant interaction effect revealed that the group with High-Trait Anxiety and Introversion experienced no decrease in state anxiety over time. This same personality combination also perceived significantly higher air traffic activity than the three other personality combination types. Self-reports of degree of liking the music and effectiveness in stress reduction indicate a positive report of music in reducing work stress for air traffic controllers. This study contributes to the development of a model that aspires to elucidate music and workplace interactions; as well, it has implications for music therapy practice in organizations.

4. **Music therapy as an adjunctive treatment in the management of stress for patients being weaned from mechanical ventilation.**

Abstract - This project investigated music therapy (MT) in managing anxiety associated with weaning from mechanical ventilation. The use of sedation to treat anxiety during weaning is problematic because side effects (e.g., respiratory depression) are precisely the symptoms that cause the weaning process to be interrupted and consequently prolonged. Study goals were to determine the feasibility of incorporating MT into the weaning process and to evaluate the efficacy of the intervention, based on levels of anxiety, Days to Wean (DTW), and patient/nurse satisfaction. Adult patients received multiple MT sessions per week while undergoing weaning trials from mechanical ventilation. Feasibility was determined by successful enrollment in the study and nurse survey. Efficacy was evaluated through anxiety, as measured by heart rate, respiratory rate, and patient/nurse survey; DTW; and patient/nurse satisfaction. Nurse surveys reported that MT was successfully incorporated into the milieu and 61 subjects were enrolled. Significant differences in heart rate and respiratory rate were found from the beginning to the end of MT sessions (p < .05 and p < .0007, respectively), indicating a more relaxed state. No significant difference in mean DTW was found between study and control subjects. Patient/nurse satisfaction was high. Music therapy can be used successfully to treat anxiety associated with weaning from mechanical ventilation. Limitations and suggestions for further research are discussed.

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1 Hunter, B.C., etc., Journal of Music Therapy, Volume 47, Issue 3, September 2010, Pages 198-219
Observations: 4 studies recorded the impact of music on stress and supported its effectiveness in their conclusions.

Music Therapy has been used as an alternative remedy as well as adjunctive therapy to non-medical and medical procedures respectively to reduce stress levels.
T) TUMOR

1. Clinical observation of music therapy combined with anti-tumor drugs in treating 116 cases of tumor patients. ¹

Abstract - OBJECTIVE: To observe the clinical effect of music therapy in treating tumor patients. METHODS: Music therapy combined with anti-tumor drugs, including chemotherapy and Chinese drugs, was given to 162 tumor patients according to syndrome differentiation to observe the change of self-rating depression scale (SDS), self-rating anxiety scale (SAS), minnesota multiphasic personality inventory (MMPI), Hamilton rating scale for depression (HAMD) and T lymphocyte subsets (immuno-histochemical assay), NK cell anti-tumor activity (NAG method), etc. while 46 cases didn't receive music therapy were taken as the control group. RESULTS: The scale marks of SDS and SAS of the treated group after treatment was obviously lower than that of the

¹ Cai, G.R., etc., Oncology, Volume 21, Issue 12, December 2001, Pages 891-894
control group significantly (P < 0.05, P < 0.01). After treatment, the average values of MMPI on falseness (F), hypochondriasis (HS), depression (D) and psychosthenia (Pt) in the treated group were all improved (P < 0.01 or P < 0.05); but in the control group, significant difference only showed in MMPI on HS (P < 0.05). HAMD in the treated group revealed some improvement in insomnia, early awakening, daily work and interest, systemic symptoms and hypochondriasis (P < 0.05), and significant improvement in depression, difficulty in falling asleep, psychiatric anxiety and somatic anxiety (P < 0.01); while in the control group, only work interest and HS had some improvement (P < 0.05). CD8 percent was reduced in both groups after treatment (P < 0.01), but in the treated group CD3, CD4 and CD4/CD8 ratio were not significantly changed after treatment (P > 0.05); while in the control group they lowered obviously (P < 0.05). As for NK cell anti-tumor activity in the treated group before and after treatment, it was not significantly lowered (P > 0.05); while in the control group the lowering after treatment was significant (P < 0.05). CONCLUSION: Music therapy could regulate the emotion of tumor patient, optimize the emotional effect, improve the somatic symptoms, enhance the immune function, motivate the active principle and raise the self-regulating power in the body.

2. Impact of music on pediatric oncology outpatients. ¹

Abstract - Music is widely used to enhance well-being. We wished to assess music's effect on pediatric oncology outpatients. Patients who had leukemia and were in maintenance or consolidation outpatient treatment served as their own control at two visits. At visit 1, children rested for 20 min; at visit 2, for 20 min they listened to music designed to increase vitality and improve heart rate variability (HRV). At both visits, parents completed before and after treatment visual analog scales (VAS) of their child's relaxation, well-being, vitality, anxiety, stress, and depression; patients' heart rates were monitored during treatments to calculate HRV. The 47 patients with complete VAS data and 34 patients with usable HRV data were similar. At baseline, VAS scores for negative states were low (average <2.5 of 10) and positive states were high (average 7> of 10). Relaxation improved more with music than rest (p < 0.01). The HRV parasympathetic

¹ Kemper, K.J., etc., Pediatric Research, Volume 64, Issue 1, July 2008, Pages 105-109
parameter was significantly lower with music than rest. No other differences were significant. Further studies are needed to better delineate the relationship between subjective and objective measures of well-being among patients who are not in severe distress.

3. **The role of the creative arts therapies in the treatment of pediatric hematology and oncology patients.**

Abstract - The positive effects of art and music therapies for distraction during medical visits and procedures have been well studied. These interventions can reduce anxiety, promote relaxation, and minimize the perception of pain. This article describes combined art and music therapy interventions in the pediatric oncology/hematology environment and discusses various goals addressed during outpatient visits. Patient experiences are described as they relate to engagement in procedural accompaniments, creative arts therapy groups, individual therapy sessions, and group music therapy sessions. Interventions discussed include art making, active music listening, progressive muscle relaxation, music technology, active participation in music making, songwriting, and lyric analysis. The patients' social, emotional, cognitive, and physical outcomes are discussed as they relate to treatment. In addition, the significance of the interventions for creative arts therapy practiced and researched is explored.

4. **Effects of live music therapy sessions on quality of life indicators, medications administered and hospital length of stay for patients undergoing elective surgical procedures for brain.**

Abstract - The physiological and psychological stress that brain tumor patients undergo during the entire surgical experience can considerably affect several aspects of their hospitalization. The purpose of this study was to examine the effects of live music therapy on quality of life indicators, amount of medications administered and length of stay for persons receiving elective surgical procedures of the brain. Subjects \( N = 27 \) were patients admitted for some type of surgical procedure of the brain. Subjects were

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1 Nesbitt, L.L., etc., Primary Psychiatry Volume 15, Issue 7, July 2008, Pages 56-58+61-62
randomly assigned to either the control group receiving no music intervention (n = 13) or the experimental group receiving pre and postoperative live music therapy sessions (n = 14). Anxiety, mood, pain, perception of hospitalization or procedure, relaxation, and stress were measured using a self-report Visual Analog Scale (VAS) for each of the variables. The documented administration of postoperative pain medications; the frequency, dosage, type, and how it was given was also compared between groups. Experimental subjects live and interactive music therapy sessions, including a preoperative session and continuing with daily sessions until the patient was discharged home. Control subjects received routine hospital care without any music therapy intervention. Differences in experimental pretest and posttest scores were analyzed using a Wilcoxon Matched-Pairs Signed-Rank test. Results indicated statistically significant differences for 4 of the 6 quality of life measures: anxiety (p = .03), perception of hospitalization (p = .03), relaxation (p = .001), and stress (p = .001). No statistically significant differences were found for mood (p > .05) or pain (p > .05) levels. Administration amounts of nausea and pain medications were compared with a Two-way ANOVA with One Repeated Measure resulting in no significant differences between groups and medications, F(1, 51) = 0.03; p > .05. Results indicate no significant differences between groups for length of stay (t = .97, df = 25, p > .05). This research study indicates that live music therapy using patient-preferred music can be beneficial in improving quality of life indicators such as anxiety, perception of the hospitalization or procedure, relaxation, and stress in patients undergoing surgical procedures of the brain.

5. Role of interactive music in oncological pediatric patients undergoing painful procedure.  

Abstract – Aim: The present study has examined whether interactive music may be considered an effective treatment for the attenuation of anxiety in oncological pediatric patients undergoing painful procedures (lumbar injection, bone marrow aspiration, osteomedullary biopsy and arterial catheter). Methods. Thirty-nine tumor patients aged between 2 and 12 were randomized into 2 groups: Music (M) (N. 20) and Controls (N. 19) and were treated by M: conscious sedation and intervention of interactive music and

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1 Bufalini, A., Minerva Pediatrica, Volume 61, Issue 4, August 2009, Pages 379-389
C: sedation. The following factors were assessed: temperament on the Emotivity, Activity, Sociability scale, anxiety on the Yale preoperative anxiety scale (mYPAS), the induction compliance checklist (ICC), parent anxiety by cataloguing the trait-state anxiety inventory, and the degree of satisfaction of children, parents and staff using the Barrera questionnaires. Data significance was accepted with values of P<0.05. Results. There was a fall in mYPAS values in M compared to C in the four phases of the process: Phase 1 (P<0.05); Phase 2, 3 and 4 (P<0.01). For the ICC children with a score of ≤1, "collaborated", those with a score of >1 were "non collaborators"; in the music group the trend was for an increase in the number of collaborating children (P<0.07). Conclusion. The M group presents a significant effect of attenuation of anticipatory anxiety and a tendency to great induction compliance compared to group C. The parents do not show any significant anxiety attenuation effect. The degree of satisfaction of children, parents and staff points to a positive and beneficially effective role of interactive music on painful procedures.

Observations: Above 5 studies tested the effects of music intervention on one or more factors like anxiety, pain, relaxation, depression, stress, patient satisfaction, comfortable environment and quality of life in patients undergoing tumor treatments.

All 5 studies concluded that music therapy is a therapeutic intervention which results in positive emotional, social and cognitive functioning by reducing anxiety scores, promoting relaxation, reducing pain and stress, makes the environment comfortable thereby leading to patient satisfaction and quality of life. 1 study recommended further research.

Music Therapy is a supportive intervention to the tumor treatment.
Data Synthesis and Researcher’s Inference: -

Total 266 published abstracts taken from music therapy journals have been placed under 20 themes. Each and every research under a specific theme holds a different perspective of carrying out the study so each research is distinct and cannot be compared qualitatively with the other. Every abstract has assessed the impact of music on either one or more variables under controlled and uncontrolled conditions. A research may or may not be always 100% positive but its effectiveness is always evaluated by the ratio of positive is to negative. However the negated results always leaves a scope of further research in that area.

The efficacy of music in the clinical setting is evident in the observations given at the end of each theme. The noticeable psycho-physiological parameters that strongly got influenced by music are observed as anxiety, pain, stress, depression, relaxation, mood disturbances, memory, sleep, social-cognitive-emotional functioning, overall wellbeing, consumption of sedatives, blood pressure, heart rate, respiratory rate and oxygen saturation level. Needless to say that Music therapy has been able to make a mark as a clinical intervention.

Music Therapy has been noticed coming up as an Alternative Therapy i.e. a therapy that can replace or is a substitute to the medical call especially in academic discipline by aiding the memory, in animals by reducing anxiety, in asthmatic patients by taking up singing as a breathing exercise, in depressive subjects by inducing positivity, in insomnia by lulling soothing music to sleep, in maternity nursing by distracting the laboring women.

A therapy, which is supportive, adjunct or interdependent to the medical procedure and cannot replace the need of a medical treatment, is referred to as a “Complementary”. Music therapy is complementary to majority of the disciplines like perioperative practices, developmental disabilities, psychotic & neurotic disorders, cancer, tumor, cardiovascular problems, chronic pain, depression, ICU, NICU, Cesarean section, invasive & noninvasive medical procedures and palliative
care. Here the Music alone cannot be of much help rather it acts as a distractor and the ‘feel good’ factor comforts the patient and makes the treatment smoother.

So there is sufficient evidence that brings out the complementary aspect of Music intervention than its potential of being an alternative therapy.