

Literature

Heiderscheit A, Chlan L, Donley K. **Instituting a music listening intervention for critically ill patients receiving mechanical ventilation: Exemplars from two patient cases.** Music Med. 2011 Oct 1;3(4):239-246. doi: 10.1177/1943862111410981. PMID: 22081788; PMCID: PMC3212751.

„The case examples illustrate the importance and necessity of engaging a music therapist in not only assessing the music preferences of patients, but also for implementing a music listening protocol to manage the varied and challenging needs of patients in the critical care setting.“

Laczika K, Graber OP, Tucek G, Lohninger A, Fliri N, Berka-Schmid G, Masel EK, Zielinski CC. **"Il flauto magico" still works: Mozart's secret of ventilation.** Multidiscip Respir Med. 2013 Mar 19;8(1):23. doi: 10.1186/2049-6958-8-23. PMID: 23509946; PMCID: PMC3608996.

Results: It was found that there are two archetypes of ideally typical breathing behaviour in professional musicians that either drive the musical creation, performance and experience or are driven by the musical structure itself. These archetypes also give rise to various states of synchronisation and regulation between performers, audience and the musical structure.

Chiasson AM, Linda Baldwin A, McLaughlin C, Cook P, Sethi G. **The effect of live spontaneous harp music on patients in the intensive care unit.** Evid Based Complement Alternat Med. 2013;2013:428731. doi: 10.1155/2013/428731. Epub 2013 Nov 27. PMID: 24371459; PMCID: PMC3863466.

„Spontaneous harp music significantly decreased patient perception of pain by 27% but did not significantly affect heart rate, respiratory rate, oxygen saturation, blood pressure, or heart rate variability. Trends emerged, although being not statistically significant, that systolic blood pressure increased while heart rate variability decreased.“

Heiderscheit A, Breckenridge SJ, Chlan LL, Savik K. **Music preferences of mechanically ventilated patients participating in a randomized controlled trial.** Music Med. 2014;6(2):29-38. PMID: 25574992; PMCID: PMC4285717.

„Genres preferred include: classical, jazz, rock, country, and oldies. Instrumentation preferred include: piano, voice, guitar, music with nature sounds, and orchestral music.“

Bradt J, Dileo C. **Music interventions for mechanically ventilated patients.** Cochrane Database Syst Rev. 2014;2014(12):CD006902. doi: 10.1002/14651858.CD006902.pub3. Epub 2014 Dec 9. PMID: 25490233; PMCID: PMC6517146.

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

Sun J, Chen W. **Music therapy for coma patients: preliminary results.** Eur Rev Med Pharmacol Sci. 2015 Apr;19(7):1209-18. PMID: 25912580.

Conclusions: Through the quantitative EEG ($\delta+\theta/\alpha+\beta$ value) and the GCS observation score, music therapy in patients with craniocerebral trauma coma has obviously an effect on promoting to regain consciousness. The quantitative EEG ($\delta+\theta/\alpha+\beta$ value) can be used as an objective index to evaluate the state of brain function.

Gullick JG, Kwan XX. **Patient-directed music therapy reduces anxiety and sedation exposure in mechanically-ventilated patients: a research critique.** Aust Crit Care. 2015 May;28(2):103-5. doi: 10.1016/j.aucc.2015.03.003. Epub 2015 Mar 26. PMID: 25818065.

„Patient-directed music therapy allowed a significant reduction in sedation frequency compared to noise-cancelling headphones and usual care participants. Patient-directed music therapy led to significantly lower anxiety and sedation intensity compared to usual care, but not compared to noise-cancelling headphones. This is a robust study with clear aims and a detailed description of research methods and follow-up.“

Hetland B, Lindquist R, Chlan LL. **The influence of music during mechanical ventilation and weaning from mechanical ventilation: A review.** Heart Lung. 2015 Sep-Oct;44(5):416-25. doi: 10.1016/j.hrtlng.2015.06.010. Epub 2015 Jul 27. PMID: 26227333; PMCID: PMC4567402.

„Evidence supports music as an effective intervention that can lesson symptoms related to MV and promote effective weaning. It has potential to reduce costs and increase patient satisfaction.“

Tracy MF, Chlan L, Staugaitis A. **Perceptions of Patients and Families who Received a Music Intervention During Mechanical Ventilation.** Music Med. 2015;7(3):54-58. PMID: 26301046; PMCID: PMC4543301.

„Music listening is one integrative intervention that has been shown to reduce anxiety as well as other symptoms that contribute to distress in MV patients.“

Warth M, Keßler J, Hillecke TK, Bardenheuer HJ. **Music Therapy in Palliative Care.** Dtsch Arztebl Int. 2015 Nov 13;112(46):788-94. doi: 10.3238/arztebl.2015.0788. PMID: 26806566; PMCID: PMC4671329.

Conclusion: Music therapy is an effective treatment with a low dropout rate for the promotion of relaxation and well-being in terminally ill persons undergoing palliative care.

Galińska E. **Music therapy in neurological rehabilitation settings.** Psychiatr Pol. 2015;49(4):835-46. English, Polish. doi: 10.12740/PP/25557. PMID: 26488358.

„Clinical outcome studies provide evidence of the significant superiority of rehabilitation with music over the one without music.“

Yaman Aktaş Y, Karabulut N. **The effects of music therapy in endotracheal suctioning of mechanically ventilated patients.** Nurs Crit Care. 2016 Jan;21(1):44-52. doi: 10.1111/nicc.12159. Epub 2015 Feb 26. PMID: 25721305.

Relevance to clinical practice: It is recommended that music therapy should be added to the routine nursing care for mechanically ventilated patients.

Yoo BK, Kim M, Sasaki T, Melnikow J, Marcin JP. **Economic Evaluation of Telemedicine for Patients in ICUs.** Crit Care Med. 2016 Feb;44(2):265-74. doi: 10.1097/CCM.0000000000001426. PMID: 26540398.

Conclusions: Our analyses suggest that telemedicine in the ICU is cost-effective in most cases and cost saving in some cases. The thresholds of cost and effectiveness, estimated by break-even analyses, help hospitals determine the impact of telemedicine in the ICU and potential cost saving.

Mofredj A, Alaya S, Tassaïoust K, Bahloul H, Mrabet A. **Music therapy, a review of the potential therapeutic benefits for the critically ill.** J Crit Care. 2016 Oct;35:195-9. doi: 10.1016/j.jcrc.2016.05.021. Epub 2016 May 28. PMID: 27481759.

„Music listening, widely used for stress release in all areas of medicine, tends to be a reliable and efficacious treatment for those critically ill patients. It can abate the stress response, decrease anxiety during mechanical ventilation, and induce an overall relaxation response without the use of medication. This relaxation response can lower cardiac workload and oxygen consumption resulting in more effective ventilation. Music may also improve sleep quality and reduce patient's pain with a subsequent decrease in sedative exposure leading to an accelerated ventilator weaning process and a speedier recovery.“

Lee CH, Lai CL, Sung YH, Lai MY, Lin CY, Lin LY. **Comparing effects between music intervention and aromatherapy on anxiety of patients undergoing mechanical ventilation in the intensive care unit: a**

randomized controlled trial. Qual Life Res. 2017 Jul;26(7):1819-1829. doi: 10.1007/s11136-017-1525-5. Epub 2017 Feb 24. PMID: 28236262.

Conclusions: Music and aromatherapy interventions were both effective for ICU patients. The effects of music intervention were greater than that of aromatherapy; both interventions maintained the effects for at least 30 min.

McConnell T, Porter S. **Music therapy for palliative care: A realist review.** Palliat Support Care. 2017 Aug;15(4):454-464. doi: 10.1017/S1478951516000663. Epub 2016 Oct 24. PMID: 27772537.

Results: A total of 51 articles were included in the review. Music therapy was found to have a therapeutic effect on the physical, psychological, emotional, and spiritual suffering of palliative care patients. We also identified program mechanisms that help explain music therapy's therapeutic effects, along with facilitating contexts for implementation.

Khan SH, Wang S, Harrawood A, Martinez S, Heiderscheid A, Chlan L, Perkins AJ, Tu W, Boustani M, Khan B. **Decreasing Delirium through Music (DDM) in critically ill, mechanically ventilated patients in the intensive care unit: study protocol for a pilot randomized controlled trial.** Trials. 2017 Nov 29;18(1):574. doi: 10.1186/s13063-017-2324-6. PMID: 29187230; PMCID: PMC5708104.

„DDM is a feasibility trial to provide personalized and non-personalized music interventions for critically ill, mechanically ventilated patients.“

Porter S, McConnell T, Clarke M, Kirkwood J, Hughes N, Graham-Wisener L, Regan J, McKeown M, McGrillen K, Reid J. **A critical realist evaluation of a music therapy intervention in palliative care.** BMC Palliat Care. 2017 Dec 8;16(1):70. doi: 10.1186/s12904-017-0253-5. PMID: 29221475; PMCID: PMC5723094.

Conclusions: There is a synergy between the therapeutic aims of music therapy and those of palliative care, which appealed to a significant proportion of participants, who perceived it as effective.

Schmid W, Rosland JH, von Hofacker S, Hunskaar I, Bruvik F. **Patient's and health care provider's perspectives on music therapy in palliative care - an integrative review.** BMC Palliat Care. 2018 Feb 20;17(1):32. doi: 10.1186/s12904-018-0286-4. PMID: 29463240; PMCID: PMC5819707.

Results: Twelve articles, reporting on nine quantitative and three qualitative research studies were included. Seven out of the nine quantitative studies investigated pain as an outcome. All of the included quantitative studies reported positive effects of the music therapy. Patients themselves associated MT with the expression of positive as well as challenging emotions and increased well-being. An overarching theme in both types of research is a psycho-physiological change through music therapy.

Chlan LL, Heiderscheid A, Skaar DJ, Neidecker MV. **Economic Evaluation of a Patient-Directed Music Intervention for ICU Patients Receiving Mechanical Ventilatory Support.** Crit Care Med. 2018 Sep;46(9):1430-1435. doi: 10.1097/CCM.0000000000003199. PMID: 29727366; PMCID: PMC6095811.

Measurements and main results: The base case cost-effectiveness analysis estimated patient-directed music intervention reduced anxiety by 19 points on the Visual Analogue Scale-Anxiety with a reduction in cost of \$2,322/patient compared with usual ICU care, resulting in patient-directed music dominance. The probabilistic cost-effectiveness analysis found that average patient-directed music intervention costs were \$2,155 less than usual ICU care and projected that cost saving is achieved in 70% of 1,000 iterations. Based on break-even analyses, cost saving is achieved if the per-patient cost of patient-directed music intervention remains below \$2,651, a value eight times the base case of \$329.

Conclusions: Patient-directed music intervention is cost-effective for reducing anxiety in mechanically ventilated ICU patients.

Khan SH, Kitsis M, Golovyan D, Wang S, Chlan LL, Boustani M, Khan BA. **Effects of music intervention on inflammatory markers in critically ill and post-operative patients: A systematic review of the literature.** Heart Lung. 2018 Sep-Oct;47(5):489-496. doi: 10.1016/j.hrtlng.2018.05.015. Epub 2018 Jul 9. PMID: 30001799; PMCID: PMC6380515.

Conclusions: Music intervention may decrease cortisol levels, but other biomarkers remain unchanged. Given the low level of evidence, further research on music effects on inflammatory biomarkers is needed.

Mateu-Capell M, Arnau A, Juvinyà D, Montesinos J, Fernandez R. **Sound isolation and music on the comfort of mechanically ventilated critical patients.** Nurs Crit Care. 2019 Sep;24(5):290-298. doi: 10.1111/nicc.12407. Epub 2018 Dec 27. PMID: 30592127.

Relevance to clinical practice: Music and sound isolation are potential strategies that could be used in nursing care to provide comfort to critical patients. Further studies should be undertaken to define the role of these new approaches and determine which groups of patients can benefit most from music or sound isolation.

Park JY, Park, S. **Effects of Two Music Therapy Methods on Agitation and Anxiety among Patients Weaning off Mechanical Ventilation: A Pilot Study.** Journal of Korean Academy of Fundamentals of Nursing, (2019), 26(2), 136-143.

Conclusion: Music interventions which centered on either patients' preferences or classical relaxation music to enhance relaxation, helped reduce agitation and anxiety during the mechanical ventilation weaning process.

Thrane SE, Hsieh K, Donahue P, Tan A, Exline MC, Balas MC. **Could complementary health approaches improve the symptom experience and outcomes of critically ill adults? A systematic review of randomized controlled trials.** Complement Ther Med. 2019 Dec;47:102166. doi: 10.1016/j.ctim.2019.07.025. Epub 2019 Sep 7. PMID: 31780011.

„There were statistically significant improvements in pain (music, NBSs), anxiety (music, NBSs, aromatherapy, massage, reflexology), agitation (NBSs, reflexology), sleep (music, aromatherapy, reflexology), level of arousal (music, massage), and duration of mechanical ventilation (music, reflexology). **Conclusions:** Evidence suggests CHAs may reduce the symptom burden of critically ill adults.“

Khan SH, Xu C, Purpura R, Durrani S, Lindroth H, Wang S, Gao S, Heiderscheidt A, Chlan L, Boustani M, Khan BA. **Decreasing Delirium Through Music: A Randomized Pilot Trial.** Am J Crit Care. 2020 Mar 1;29(2):e31-e38. doi: 10.4037/ajcc2020175. PMID: 32114612; PMCID: PMC7666845.

Conclusions: Music delivery is acceptable to patients and is feasible in intensive care units.

Browning SG, Watters R, Thomson-Smith C. **Impact of Therapeutic Music Listening on Intensive Care Unit Patients: A Pilot Study.** Nurs Clin North Am. 2020 Dec;55(4):557-569. doi: 10.1016/j.cnur.2020.06.016. Epub 2020 Oct 13. PMID: 33131632.

„This pilot study investigated the association between patient-specific, therapeutic music listening as a nursing intervention for mechanically ventilated patients, and the proportion of time those patients were considered to have intensive care unit delirium. The pilot study used the person-centered nursing framework as its theoretic foundation. Findings from an intimate prospective cohort design encourage an expanded look at potential benefits of therapeutic music listening in large, multisite, randomized clinical trials.“

Chlan LL. **Music therapy as a nursing intervention for patients supported by mechanical ventilation.** AACN Clin Issues. 2000 Feb;11(1):128-38. doi: 10.1097/00044067-200002000-00014. PMID: 11040559.

Jaber S, Bahloul H, Guétin S, Chanques G, Sebbane M, Eledjam JJ. **Effets de la musicothérapie en réanimation hors sédation chez des patients en cours de sevrage ventilatoire versus des patients non ventilés [Effects of music therapy in intensive care unit without sedation in weaning patients versus non-ventilated patients].** Ann Fr Anesth Reanim. 2007 Jan;26(1):30-8. French. doi: 10.1016/j.annfar.2006.09.002. Epub 2006 Nov 3. PMID: 17085009.

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.

Chlan LL, Engeland WC, Anthony A, Guttormson J. **Influence of music on the stress response in patients receiving mechanical ventilatory support: a pilot study.** Am J Crit Care. 2007 Mar;16(2):141-5. PMID: 17322014.

Han L, Li JP, Sit JW, Chung L, Jiao ZY, Ma WG. **Effects of music intervention on physiological stress response and anxiety level of mechanically ventilated patients in China: a randomised controlled trial.** J Clin Nurs. 2010 Apr;19(7-8):978-87. doi: 10.1111/j.1365-2702.2009.02845.x. PMID: 20492042.

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.

Hunter BC, Oliva R, Sahler OJ, Gaisser D, Salipante DM, Arezina CH. **Music therapy as an adjunctive treatment in the management of stress for patients being weaned from mechanical ventilation.** J Music Ther. 2010 Fall;47(3):198-219. doi: 10.1093/jmt/47.3.198. PMID: 21275332.

„Music therapy can be used successfully to treat anxiety associated with weaning from mechanical ventilation.“

Kim DS, Park YG, Choi JH, Im SH, Jung KJ, Cha YA, Jung CO, Yoon YH. **Effects of music therapy on mood in stroke patients.** Yonsei Med J. 2011 Nov;52(6):977-81. doi: 10.3349/ymj.2011.52.6.977. PMID: 22028163; PMCID: PMC3220261.

Conclusion: Music therapy has a positive effect on mood in post-stroke patients and may be beneficial for mood improvement with stroke. These results are encouraging, but further studies are needed in this field.

Lim KB, Kim YK, Lee HJ, Yoo J, Hwang JY, Kim JA, Kim SK. **The therapeutic effect of neurologic music therapy and speech language therapy in post-stroke aphasic patients.** Ann Rehabil Med. 2013 Aug;37(4):556-62. doi: 10.5535/arm.2013.37.4.556. Epub 2013 Aug 26. PMID: 24020037; PMCID: PMC3764351.

Conclusion: We concluded that the two therapies are effective treatments in the chronic stage of stroke and NMT is effective in subacute post-stroke aphasic patients.

Altenmüller E, Schlaug G. **Apollo's gift: new aspects of neurologic music therapy.** Prog Brain Res. 2015;217:237-52. doi: 10.1016/bs.pbr.2014.11.029. Epub 2015 Feb 11. PMID: 25725918; PMCID: PMC4425943.

„These multimodal effects of music together with music's ability to tap into the emotion and reward system in the brain can be used to facilitate and enhance therapeutic approaches geared toward rehabilitating and restoring neurological dysfunctions and impairments of an acquired or congenital brain disorder.“

Scholz DS, Rohde S, Nikmaram N, Brückner HP, Großbach M, Rollnik JD, Altenmüller EO. **Sonification of Arm Movements in Stroke Rehabilitation - A Novel Approach in Neurologic Music Therapy.** Front Neurol. 2016 Jun 30;7:106. doi: 10.3389/fneur.2016.00106. PMID: 27445970; PMCID: PMC4928599.

„We present an innovative musical sonification therapy, especially designed to retrain patients' gross motor functions.“

Zhang Y, Cai J, Zhang Y, Ren T, Zhao M, Zhao Q. **Improvement in Stroke-induced Motor Dysfunction by Music-supported Therapy: A Systematic Review and Meta-analysis.** Sci Rep. 2016 Dec 5;6:38521. doi: 10.1038/srep38521. PMID: 27917945; PMCID: PMC5137001.

„There was evidence of a positive effect of music-supported therapy, supporting its use for the treatment of stroke-induced motor dysfunction.“

Magee WL, Clark I, Tamplin J, Bradt J. **Music interventions for acquired brain injury.** Cochrane Database Syst Rev. 2017 Jan 20;1(1):CD006787. doi: 10.1002/14651858.CD006787.pub3. PMID: 28103638; PMCID: PMC6464962.

Authors' conclusions: Music interventions may be beneficial for gait, the timing of upper extremity function, communication outcomes, and quality of life after stroke. These results are encouraging, but more high-quality randomised controlled trials are needed on all outcomes before recommendations can be made for clinical practice.

Raglio A, Zaliani A, Baiardi P, Bossi D, Sguazzin C, Capodaglio E, Imbriani C, Gontero G, Imbriani M. **Active music therapy approach for stroke patients in the post-acute rehabilitation.** *Neurol Sci.* 2017 May;38(5):893-897. doi: 10.1007/s10072-017-2827-7. Epub 2017 Jan 30. PMID: 28138867.

„Music therapy assessment showed a significant improvement over time of non-verbal and sonorous-music relationships. Future studies, including a greater number of patients and follow-up evaluations, are needed to confirm promising results of this study.“

Leonardi S, Cacciola A, De Luca R, Aragona B, Andronaco V, Milardi D, Bramanti P, Calabrò RS. **The role of music therapy in rehabilitation: improving aphasia and beyond.** *Int J Neurosci.* 2018 Jan;128(1):90-99. doi: 10.1080/00207454.2017.1353981. Epub 2017 Aug 8. PMID: 28689476.

„In this narrative review, we are going to describe the role of music therapy in improving aphasia and other neurological disorders, underlying the reasons why this tool could be effective in rehabilitative settings, especially in individuals affected by stroke.“

Orantin M, Yelnik A, Jousse M, Guillemette M, Bernard A, Tlili L, Quintaine V. **Give music therapy a chance in post-stroke rehabilitation.** *Ann Phys Rehabil Med.* 2018 Nov;61(6):419-420. doi: 10.1016/j.rehab.2018.01.004. Epub 2018 Feb 10. PMID: 29438827.

„The feasibility of music therapy care in a PRM department deserves much thought because this is a very new kind of therapy implying organizational changes. Yet, the reaction of the caregiver team was excellent, as confirmed by the consistency of their viewpoints. Furthermore, the team had the feeling of a positive effect on improvement. Patient compliance was also excellent. Patients were mainly interested in focusing and expressing their own feelings with music. Although we included only a few patients, our study was a positive experience that led to conclude on the feasibility of music therapy in a PRM department for post-stroke inpatients. Finally, this study suggests that music may have a place in the functional recovery post-stroke care protocol and emotional functions within PRM during the sub-acute stroke period, which in our opinion deserves to be studied.“

Tsoi KKF, Chan JYC, Ng YM, Lee MMY, Kwok TCY, Wong SYS. **Receptive Music Therapy Is More Effective than Interactive Music Therapy to Relieve Behavioral and Psychological Symptoms of Dementia: A Systematic Review and Meta-Analysis.** *J Am Med Dir Assoc.* 2018 Jul;19(7):568-576.e3. doi: 10.1016/j.jamda.2017.12.009. Epub 2018 Feb 1. PMID: 29396186.

Conclusions: This study demonstrated that receptive music therapy could reduce agitation, behavioral problems, and anxiety in older people with dementia, and appears to be more effective than interactive music therapy. It is easy and convenient to implement receptive music therapy; therefore, we recommended the use of receptive music therapy in nursing homes, day care centers, and client homes.

Feng K, Shen CY, Ma XY, Chen GF, Zhang ML, Xu B, Liu XM, Sun JJ, Zhang XQ, Liu PZ, Ju Y. **Effects of music therapy on major depressive disorder: A study of prefrontal hemodynamic functions using fNIRS.** *Psychiatry Res.* 2019 May;275:86-93. doi: 10.1016/j.psychres.2019.03.015. Epub 2019 Mar 10. PMID: 30884335.

„The results indicate that music therapy could improve the brain function of MDD patients.“

Impellizzeri F, Leonardi S, Latella D, Maggio MG, Foti Cuzzola M, Russo M, Sessa E, Bramanti P, De Luca R, Calabrò RS. **An integrative cognitive rehabilitation using neurologic music therapy in multiple sclerosis: A pilot study.** *Medicine (Baltimore).* 2020 Jan;99(4):e18866. doi: 10.1097/MD.00000000000018866. PMID: 31977888; PMCID: PMC7004652.

Results: Both the groups benefit from 8 weeks of CR. In particular, the EG got better results in cognitive function, with regard to selective reminding test long term storage ($P < .000$), long term retrieval ($P = .007$), and delayed recall of the 10/36 spatial recall test ($P = .001$), as compared with the CG. Moreover, the improvement in emotional status, motivation, mood and quality of life (with regard to the mental component; $P < .000$) was more evident in the EG.

Conclusions: NMT could be considered a complementary approach to enhance CCR in patients affected by MS.

Baylan S, Haig C, MacDonald M, Stiles C, Easto J, Thomson M, Cullen B, Quinn TJ, Stott D, Mercer SW, Broomfield NM, Murray H, Evans JJ. **Measuring the effects of listening for leisure on outcome after stroke (MELLO): A pilot randomized controlled trial of mindful music listening.** *Int J Stroke.* 2020 Feb;15(2):149-158. doi: 10.1177/1747493019841250. Epub 2019 Apr 2. PMID: 30940047; PMCID: PMC7045280.

Conclusions: Mindful music listening is feasible and acceptable post-stroke. Music listening interventions appear to be a promising approach to improving recovery from stroke.

Sumakul VDO, Notobroto HB, Widani NL, Aima MH. **Instrumental music therapy reduced depression levels in stroke patients.** *J Public Health Res.* 2020 Jul 3;9(2):1847. doi: 10.4081/jphr.2020.1847. PMID: 32728586; PMCID: PMC7376470.

Conclusions: The study recommended further improvement to include music as treatment options for reducing depression among stroke patients.

Good M, Picot BL, Salem SG, Chin CC, Picot SF, Lane D. **Cultural differences in music chosen for pain relief.** *J Holist Nurs.* 2000 Sep;18(3):245-60. doi: 10.1177/089801010001800306. PMID: 11847812.

„Although the majority in each group chose among the other types of music, Caucasians most frequently chose orchestra music, African Americans chose jazz, and Taiwanese chose harp music.“

Lee JH. **The Effects of Music on Pain: A Meta-Analysis.** *J Music Ther.* 2016 Winter;53(4):430-477. doi: 10.1093/jmt/thw012. Epub 2016 Oct 19. PMID: 27760797.

Conclusions: Considering all the possible benefits, music interventions may provide an effective complementary approach for the relief of acute, procedural, and cancer/chronic pain in the medical setting.

Kühlmann AYR, de Rooij A, Kroese LF, van Dijk M, Hunink MGM, Jeekel J. **Meta-analysis evaluating music interventions for anxiety and pain in surgery.** *Br J Surg.* 2018 Jun;105(7):773-783. doi: 10.1002/bjs.10853. Epub 2018 Apr 17. PMID: 29665028; PMCID: PMC6175460.

Conclusion: Music interventions significantly reduce anxiety and pain in adult surgical patients.

Rodgers-Melnick SN, Matthie N, Jenerette C, Griest Pell TJ, Lane D, Fu P, Margevicius S, Little JA. **The Effects of a Single Electronic Music Improvisation Session on the Pain of Adults with Sickle Cell Disease: A Mixed Methods Pilot Study.** *J Music Ther.* 2018 Jun 7;55(2):156-185. doi: 10.1093/jmt/thy004. PMID: 29796596.

Conclusions: Preliminary findings were promising and support the need for additional studies evaluating improvisational music therapy interventions for acute pain management in adults with SCD.

Finn S, Fancourt D. **The biological impact of listening to music in clinical and nonclinical settings: A systematic review.** *Prog Brain Res.* 2018;237:173-200. doi: 10.1016/bs.pbr.2018.03.007. Epub 2018 May 1. PMID: 29779734.

„Effects were shown irrespective of genre, self-selection of the music, or duration of listening, although a majority did use classical music. The evidence base for understanding biological responses to music is still developing, but there is support for the application of listening to music, especially within clinical settings for stress reduction.“

Palazzi A, Nunes CC, Piccinini CA. **Music therapy and musical stimulation in the context of prematurity: A narrative literature review from 2010-2015.** *J Clin Nurs.* 2018 Jan;27(1-2):e1-e20. doi: 10.1111/jocn.13893. Epub 2017 Dec 5. PMID: 28544065.

Relevance to clinical practice: Our review showed that music therapy interventions may provide individualised, effective and family-centred care. There is a significant need for these types of interventions in the neonatal intensive care unit (NICU).

Bashiri M, Akçalı D, Coşkun D, Cindoruk M, Dikmen A, Çifdalöz BU. **Evaluation of pain and patient satisfaction by music therapy in patients with endoscopy/colonoscopy.** Turk J Gastroenterol. 2018 Sep;29(5):574-579. doi: 10.5152/tjg.2018.18200. PMID: 30260780; PMCID: PMC6284616.

Results: Music therapy added to deep sedation administered by anesthesiologists provided decreased anxiety score and propofol consumption. Patient satisfaction was increased, and patients reported a desire for the same protocol for recurrent procedures.

Lu X, Thompson WF, Zhang L, Hu L. **Music Reduces Pain Unpleasantness: Evidence from an EEG Study.** J Pain Res. 2019 Dec 13;12:3331-3342. doi: 10.2147/JPR.S212080. PMID: 31853196; PMCID: PMC6916681.

Conclusion: Music may serve as a real-time regulator to modulate pain unpleasantness. Results are discussed in view of current understandings of music-induced analgesia.

Gelatti F, Viganò C, Borsani S, Conistabile L, Bonetti L. **Efficacy of Live Versus Recorded Harp Music in Reducing Preoperative Stress and Fear Related to Minor Surgery: A Pilot Study.** Altern Ther Health Med. 2020 May;26(3):10-15. PMID: 32088668.

„The live harp music was more effective in reducing HR ($P = .001$) and diastolic BP ($P = .007$), than was recorded harp music, with $P = .151$ and $P = .164$, respectively.“