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General

Music therapy and psychological-clinical impact in surgery: a systematic review

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Background

Music therapy is a discipline that makes use of music, active or passive, to produce beneficial effects on the psyche of subjects.
The field of use of music therapy has recently been broadened with the introduction of music therapy interventions to treat various problems, such as anxiety and stress, arising from pre- and post-operative psychophysical conditions.
This review aims to examine the use of music therapy and its outcomes in the context of surgery in recent years.

Methods

The main procedure was to search for studies on various scientific platforms such as PubMed, Medline, PsycINFO and CINAHL.Many studies pertaining to the topic in question were examined and from the variety of articles available, thirty-four were selected that fully reflected the focus of this review.

Conclusions

The use of music therapy is still little exploited in hospital conditions such as the one reported in this review, but despite its reduced use compared to other treatments, it has proved to be an effective technique for reducing anxiety and stress prior to surgery and for improving psychophysical conditions following surgery. Above all, the absence of side effects is emphasised since it is a nonpharmacological treatment.
Further research is needed for additional confirmation of the effectiveness of music therapy mainly because this method is still being explored worldwide.

1. INTRODUCTION

The power of music is felt and heard by humans in many circumstances. This evidence has prompted many scholars[1–3] to conduct research with the aim of verifying the potential of music in the field of healing: using music, sound, as therapy.

Therapy refers to an improvement in a subject's status that leads to general well- being. Indeed, music brings about emotional changes, but also physiological changes, so it is suitable for optimising human health.

Music therapy can be described as a systematic process of intervention in which the therapist, through his or her instruments and musical experiences, helps the patient to increase health. A fundamental part of the whole process is the relationship between patient and music therapist: both must share the goals of the treatment, even if this is not always possible (think of coma patients or very young children).

It is important to specify that music therapy does not heal, nevertheless in various pathologies such as handicaps, psychological or physical conditions it produces a beneficial and healthy effect, presenting itself as an essential factor in achieving a state of well-being.[4]

Another role that has emerged is the alleviation of pain, which is very relevant when dealing with major physical and psychological ailments.

Music therapy has been applied in multiple fields, but with specific focus on psychology, it has been used in the

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treatment of dementia such as Alzheimer's disease, in the improvement of symptoms caused by psychosis, such as ego- disruption, and other diseases of psychiatric interest among which anxiety and depressive states are most prominent.

There are numerous studies in the literature demonstrating the effectiveness of music therapy both during coma and in alleviating discomfort caused by diseases of neurological interest such as brain injury and aphasia.

So far, few studies have been carried out to be able to definitively confirm the outcomes of music therapy in the above-mentioned conditions and especially in the use of this form of therapy in the surgical setting, but, despite this, according to the currently available literature, the evidence shown by studies concerning music therapy suggests the excellent qualities of this tool.

Over the last ten years, there has been an increase in studies concerning the application of music therapy before and after various surgical procedures. It is well known that major surgical procedures are associated with considerable levels of pain, anxiety and stress. Therefore, the use of music therapy as an adjuvant therapy to alleviate perioperative anxiety and alter pain perception has been of particular interest.

From these conspicuous studies, which are only a fraction of all those available on the various scientific platforms, it is clear how music therapy can be applied to the reduction of pre and post-operative problems in most major surgical interventions.

There are two main methods : the first is called 'passive music therapy', and the second is known as 'active music therapy'. The receptive one is based on listening to pieces of music with the help of reproducers in which the patient has to perceive, imagine, and process the proposed music; the active intervention, on the other hand, takes place through an interaction between the music therapist and the patient that involves the direct production of sounds using musical instruments, objects, or simply one's own body.

The main objective of this systematic review is to evaluate the effects of musical interventions on the problems resulting from the performance of various surgical procedures, such as anxiety and stress, although, as previously stated, further investigations into this issue are needed.

2. MATERIALS AND METHODS

2.1. SEARCH STRATEGY

Between October 2021 and January 2022, relevant studies were searched on the databases PubMed, Medline, PsycInfo and CINAHL.

In addition, the book 'Introduction to Music Therapy' by Ezzu et al. was consulted; in particular, the section on clinical applications was considered.

In addition to the included studies and reviews, articles were consulted concerning the application of music therapy and its power in fields where it brings proven benefits.

The systematic review was conducted according to the PRISMA 2020 guidelines for systematic reviews.

The PICO (Participants, Intervention, Comparison, Outcomes) framework was used to clearly answer the review question. The following search terms were used to search the previously mentioned scientific platforms in order to identify the best articles concerning the use of music therapy in surgery: "music therapy and surgery", "anxiety and surgery", "stress and surgery". In addition, filters were set up to select articles published within the last ten years and to focus mainly on systematic reviews, meta-analyses and clinical studies.

2.3. ELIGIBILITY CRITERIA

Articles were included in various languages, mainly in English pertaining to research carried out in the last ten years that met the following criteria:

1. Participants: patients undergoing surgery, both paediatric and adult.
2. Intervention: intervention models of both active and passive music therapy.
3. Comparison: patients who received standard care or received music therapy interventions instead.
4. Results: assessments of psychological parameters, such as anxiety and stress, and assessment of pain and physiological parameters.
5. Study design: clinical studies, systematic reviews, meta-analysis.

2.4. RISK OF BIAS ASSESSMENT

The risk of bias assessment for the included studies was carried out with the Cochrane risk-of-bias tool for randomised trials, version 2 (RoB 2) by Sterne et al. (2019).

3. RESULTS

3.1. CHARACTERISTICS OF THE INCLUDED STUDIES

The database search identified a total of 628 articles. After removing duplicates and excluding studies not relevant to the research question, 47 articles related to the objective of the systematic review were selected.

These 47 articles were assessed for suitability and, upon completion, 34 met the inclusion criteria and were included in the systematic review, 13 articles were excluded as not perfectly suited to the aims of the review (flow chart, Figure 1). The included studies are summarised in Table 1, while Table 2 shows the risk of bias assessment for the included studies.

3.2. PRIMARY OUTCOMES

3.2.1. ANXIETY

Patients awaiting surgical procedures often experience significant anxiety in anticipation of unpleasant, uncertain events that may include a major health risk. High levels of anxiety lead to negative physiological manifestations such as high blood cortisol levels and increased blood pressure

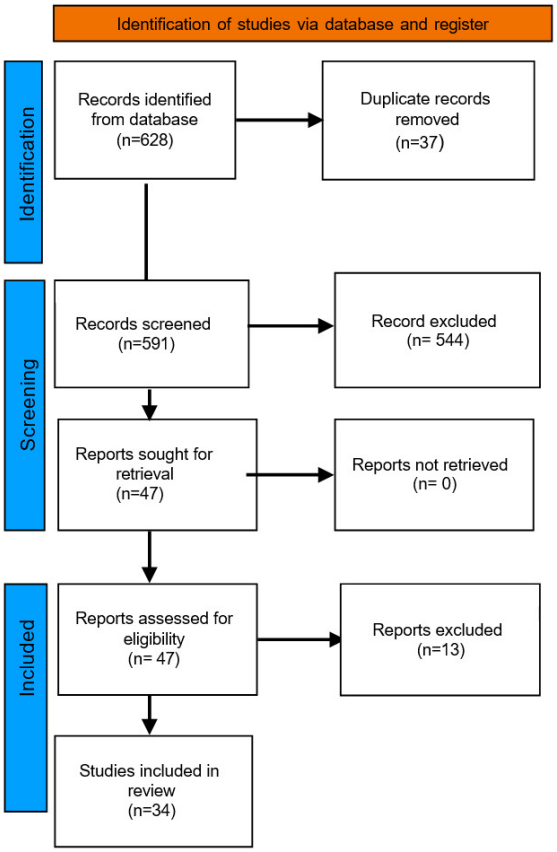

Figure 1.

and heart rate, leading to slower wound healing, reduced immune response and increased risk of infection.

To reduce patient anxiety, sedatives or anti-anxiety drugs are routinely administered shortly before surgery. However, sedatives often have negative side effects, such as drowsiness and respiratory depression, and can prolong the patient's recovery time and discharge. Therefore, increasing attention is being paid to multiple non-pharmacological interventions, such as the music therapy in question, for the reduction of preoperative anxiety.

A theory shared by many authors on the anxiety-reducing effects of music therapy concerns how it can help patients shift the focus of their attention from stressful events to something pleasant and relaxing.[18]

As anxiety is a problem that decreases the pain threshold and increases the heart rate, blood pressure, body temperature and respiratory rate of individuals, it can lead to a greater possibility of complications that could be avoided, or at least reduced, with timely music-therapy interventions, as several researchers have reported how music can positively influence vital signs by reducing anxiety and, consequently, pain.

3.2.2. STRESS

The feeling one experiences in a stressful situation is that of being under great mental and emotional pressure.

Such distress contains several key components including a perceived inability to cope effectively with a change in emotional state, discomfort, communication of that discomfort and partial harm to the person. Psychological distress can be conceived as a relational construct, which includes the continuous interchange between factors of the environment and factors of the person. In such a transactional model of stress, there are many stimulus-, context- and person- related factors that combine to create stress and the resulting outcomes.

Since stress is an inevitable part of existence, how one is able to cope with it becomes the area of greatest adaptive significance.

Music therapy promotes active musical engagement that can lead to an increase in positive feelings and can promote a positive cognitive reappraisal of stressors.

Increasing these factors leads to an overall decrease in psychological distress. Activities centred sometimes on listening and sometimes on improvisation increase endorphins and induce the release of dopamine, a pleasure neurotransmitter, affect the level of certain hormones, particularly stress hormone, with a clear effect on improving mood.

3.2.3. PAIN

Pain is often accompanied by anxiety and stress, so that this triad plays an essential role in critically ill patients.

According to a meta-analysis performed by Kühlmann et al.[19] to evaluate music therapy interventions aimed at improving anxiety and pain in surgery, pre- and postoperative music activities were more likely to reduce pain. Furthermore, as preoperative anxiety is associated with postoperative pain, the observed reduction in pain after preoperative musical interventions could also be the result of decreased anxiety. This meta-analysis offers relevant evidence for the implementation of musical interventions before, during and after surgery. Preoperative anxiety and postoperative pain are clinically relevant issues that may determine morbidity, length of hospital stay and even mortality. Alleviating these factors may improve clinical outcomes and quality of life, may also lead to earlier discharge from hospital, and, thus, may even help reduce healthcare costs.

The postoperative pain of general surgery is unavoidable, given its complexity and great trauma. Music can prompt the brainstem's reticuloendothelial system to slow down the painful stimulation input, produce inhibitory nerve impulses and close the conduction valve of painful nerve impulses, ultimately leading to pain relief.[20]

3.3. SECONDARY OUTCOMES

3.3.1. PHYSIOLOGICAL PARAMETERS

Although music can be interpreted as a subjective sensation, studies have shown that objective parameters such as heart rate, blood pressure and other physiological parameters are clearly influenced by music in a variety of circumstances. Music activates many parts of our brain to a greater extent than any other stimulus and has very powerful and helpful effects on the human body. The use of music im-

Table 1.

Title	Authors, Year, Country	Study design	Surgical procedure	Music therapy intervention	Main results
"Comparing Active and Passive Distraction-Based Music Therapy Interventions on Preoperative Anxiety in Pediatric Patients and Their Caregivers"	Christopher R. Millett. 2017[5] Florida	Randomised clinical trial	Outpatient surgery, including urology, ophthalmology, otorhinolaryngology, paediatric surgery and dentistry.	Active and passive music therapy intervention	The results indicated a significant reduction in preoperative anxiety for both patients and their caregivers, regardless of the type of surgery.
"Music Therapy for Surgical Patients Approach for Managing Pain and Anxiety "	Genesis R. Bojorquez, Kimmeth E. Jackson, Amy K. Andrews 2020[3] California	Experimental study	Not specified	Active and passive music therapy intervention	The results of this pilot support the use of music therapy to improve the management of pain and anxiety in hospitalised patients.
"The effect of music listening on older adults undergoing cardiovascular surgery"	Elizabeth Twiss, Jean Seaver, Ruth McCaffrey 2006[6] Florida	Experimental randomised clinical trial	Cardiovascular surgery	Passive music therapy intervention	The results show that anxiety is reduced and intubation time is decreased after CABG and valve surgery in older adults who listen to music compared to those who do not.
"Music therapy improves the mood of patients undergoing hematopoietic stem cells transplantation"	Carlos Antonio Dóro, José Zanis Neto, Rosemyriam Cunha, Maribel Pelaez Dóro[7] 2017 Paranà	Randomised controlled trial	Haematopoietic stem cell transplantation	Active music therapy intervention	Musical intervention can have beneficial effects on anxiety, pain, mood and quality of life in people with cancer. In addition, it can have an effect on heart rate, respiratory rate and blood pressure
"Immediate Effects of Single-Session Music Therapy on Affective State in Patients on a Post- Surgical Oncology Unit"	Greta J. Mason, Michael J. Silverman 2015[1] Minnesota	Randomised efficacy study	Oncological surgery	Active music therapy intervention	A single music therapy session can be an effective psychosocial intervention to influence the relaxation and anxiety of patients in a post-surgical oncology unit.
"Active Music Engagement with Emotional-Approach Coping to Improve Well-being in Liver and Kidney Transplant Recipients"	Claire M. Ghetti 2011[8] Kansas	Randomised study	Liver and kidney transplantation	Active music therapy intervention	Interactive music therapy during the days following liver and kidney transplantation can increase the positive effect, decrease the negative effect and reduce pain levels.
"The effects of music therapy on anxiety, pain and the amount of analgesics after coronary artery surgery"	Yeliz Ciğerci, Türkan Özbayır 2011[9] Turkey	Randomised controlled trial	Cardiovascular surgery	Passive music therapy intervention	Music therapy reduces the perception of pain and the amount of analgesics during stays in intensive care and surgery units of patients undergoing coronary surgery.

Title	Authors, Year, Country	Study design	Surgical procedure	Music therapy intervention	Main results
"The effect of music therapy on pain, anxiety and depression in patients after coronary artery bypass grafting"	Wang-Sheng Dai, Shu-Ting Huang, Ning Xu, Qiang Chen, Hua Cao 2020[10] China	Retrospective study	Coronary bypass	Passive music therapy intervention	Music therapy can effectively relieve pain, anxiety and depression in patients undergoing coronary bypass surgery
"Music therapy supported the health-related quality of life for children undergoing haematopoietic stem cell transplants"	L Uggla, LO Bonde, U Hammar, B Wrangsjö,B Gustafsson 2018[11] Sweden	Randomised clinical trial	Haematopoietic stem cell transplantation	Active music therapy intervention	The reduced heart rate values in the music therapy group and the improvement in health-related quality of life suggests that music therapy can be an effective and complementary intervention during and after transplantation.
"The effect of music therapy during colonoscopy on pain, anxiety and patient comfort: A randomized controlled trial"	Dilruba Çelebi, Emel Yılmaz, Semra Tutcu Sahin, Hakan Baydur 2017[12] Turkey	Randomised controlled trial	Colonoscopy	Passive music therapy intervention	Music therapy during colonoscopy reduced pain and anxiety, increased comfort and positively influenced vital signs
"A Randomized Study on the Efficacy of Music Therapy on Pain and Anxiety in Nasal Septal Surgery"	Avinash Gogoularadja, Satvinder Singh Bakshi 2020[13] India	Randomised controlled trial	Nasal septum surgery	Passive music therapy intervention	The present study found a significant reduction in postoperative pain and anxiety in patients undergoing music therapy
"Effect of Music Therapy on Patients' Anxiety and Hemodynamic Parameters During Coronary Angioplasty: A Randomized Controlled Trial	Masoumeh Forooghy, Elaheh Mottahedian Tabrizi, Ebrahim Hajizadeh, Bahram Pishgoo 2015[14] Iran	Randomised controlled trial	Coronary angioplasty	Passive music therapy intervention	Study results revealed that music therapy had significant effects on patients' anxiety
"The effect of music therapy on the level of anxiety in the patients undergoing coronary angiography"	Meltem Vizeli Doğan, Leman Şenturan 2012[15] Turchia	Experimental study	Coronary angiography	Passive music therapy intervention	Music therapy influenced the intraoperative anxiety level of patients who had undergone coronary angiography
"Effect of live oud music on physiological and psychological parameters in patients undergoing cardiac surgery"	Merna Luis, Ramy Doss, Basel Zayed, Magdi Yacoub 2019[16] Egitto	Randomised controlled trial	Cardiac surgery	Passive music therapy intervention	Results suggest a role for music therapy in decreasing the stress response of patients undergoing cardiac surgery, reducing respiratory rate, heart rate, pain, anxiety and cortisol scores
"The effects of music therapy in patients	Erhan Gokcek, Ayhan Kaydu	Prospective, randomised, controlled	Septorhinoplasty	Passive music therapy	Music therapy reduces pain levels and the need for analgesic drugs

Title	Authors, Year, Country	Study design	Surgical procedure	Music therapy intervention	Main results
undergoing septorhinoplasty surgery under general anesthesia"	2019[17] Turchia	study		intervention	
"Evidence That Music Listening Reduces Preoperative Patients' Anxiety"	Kwo-Chen Lee, Yu-Huei Chao, Jia-Jean Yiin, Hsin-Yi Hsieh, Wen-Jan Dai, Yann-Fen Chao 2012[2] Taiwan	Randomised clinical trial	Various surgeries	Passive music therapy intervention	Listening to music is effective in reducing anxiety in pre-operative patients

Table 2.

Study	Randomization process	Deviations from the intended interventions	Missing outcome data	Measurement of the outcome	Selection of the reported result
Millett (2017)[5]	Low risk	Low risk	Low risk	Low risk	Low risk
Bojorquez et al. (2020)[3]	Some concerns	Low risk	Low risk	Low risk	Low risk
Twiss et al. (2006)[6]	Low risk	Low risk	Low risk	Low risk	Low risk
Dóro et al. (2017)[7]	Low risk	Low risk	Low risk	Low risk	Low risk
Mason et al. (2015)[1]	Low risk	Some concerns	Low risk	Low risk	Low risk
Ghetti (2011)[8]	Low risk	Low risk	Low risk	Low risk	Some concerns
Ciğerci et al. (2011)[9]	Low risk	Low risk	High risk	Some concerns	Some concerns
Dai et al. (2020)[10]	Some concerns	Low risk	Low risk	Low risk	Some concerns
Uggla et. al (2018)[11]	Low risk	Low risk	Low risk	Low risk	High risk
Çelebi et al. (2017)[12]	High risk	Some concerns	Low risk	Low risk	Some concerns
Gogoularadja et al. (2020)[13]	Low risk	Low risk	Low risk	Low risk	Low risk
Forooghy et al. (2015)[14]	Low risk	Low risk	Low risk	Low risk	Some concerns
Doğan et al. (2012)[15]	Low risk	Low risk	Low risk	Some concerns	Some concerns
Luis et al. (2019)[16]	Low risk	Low risk	Low risk	Low risk	Low risk
Gokcek et al. (2019)[17]	Low risk	Low risk	Low risk	Low risk	Low risk
Lee et al. (2012)[2]	Low risk	Some concerns	Low risk	Low risk	Some concerns

proves and helps stabilise physiological and emotional parameters.

Luis et al.[16], directed to explore the effects of music therapy interventions on the perception of anxiety, stress and pain, and especially on physiological parameters, in-

cluded twelve patients in their study, of which six underwent music therapy interventions and six were part of the control group. In the intervention group, a statistically significant reduction in respiratory rate and heart rate was observed, demonstrating the effectiveness of music therapy practices.

The results obtained from the analysis of the studies and the various systematic reviews are conflicting. The reason for this could lie in the difference in the samples examined in the various studies, the methodologies implemented, the duration and frequency of the music-therapeutic interventions, and the heterogeneity of the surgeries the patients underwent.

4. DISCUSSION

Negative emotions, tension and anxiety in general surgery can lead to abnormal sleep, heart rate and blood pressure, thus compromising the surgical effect. In addition, a high level of preoperative anxiety increases the incidence of high postoperative pain and the demand for painkillers and anaesthetics, leading to delays in recovery and discharge.

The analysis of the selected articles revealed that different music therapy techniques lead to excellent results in both the psychological and physical domains. The conducted review found a statistically significant decrease in both anxiety and pain in adults, and in some studies also in children, who receive musical interventions before, during or after surgery, be it visceral surgery, cardiac surgery, orthopaedics or gynaecology, to name but a few.

The effect on anxiety seems to be greatest when the musical intervention is provided before surgery; however, musical interventions provided during and after surgery also significantly reduced anxiety. With regard to pain levels, considerable reductions are most noticeable in the postoperative period, with an important contribution from the earlier decline in anxiety levels.

The most significant impact of music administered to surgical patients is associated with a positive influence on their psychological aspects, with the main result being a decrease in anxiety and a significant improvement in mood.

A key parameter to be taken into account is the individual variability inherent in the type of music used during music therapy interventions. Indeed, given the strong presence of subjectivity, it becomes complex to establish cause-effect correlations, as is the case with the administration of a drug, for example. Each subject's culture, experience and musical history make him or her a unique individual, just as each person's response to music is unique.

In order to get a broader and more complete picture, studies that considered different types of surgical practices were included in the collection of articles. This was done to verify the effectiveness of music-therapy interventions, regardless of the type of invasive operation the patients underwent. Furthermore, articles analysing the effects of music therapy in various age groups were included, thus also considering children and the elderly.

6. CONCLUSIONS

According to the present review resulting from the analysis of the available reports and studies published in the last decade, a positive effect of music therapy was found in the improvement of the parameters taken into consideration. Positive outcomes on stress, anxiety and pain parameters and, as secondary effects, on physiological parameters in critically ill patients were demonstrated for those who underwent music therapy practices throughout the perioperative period, i.e. from admission to discharge. Complications related to anxiety, stress and pain at high levels can lead to devastating outcomes on both the physical and psychic side, which is why music therapy, which does not require the use of drugs, may be one of the most suitable methods.

Despite the existence of many studies, many questions remain unanswered in clinical practice also due to the limited use of music therapy practices in surgical conditions. It would therefore be desirable for research, both in basic subjects and at the clinical level, to take up the topic and fill in the knowledge gaps.

REFERENCES

1. Mason GJ, Silverman MJ. Immediate effects of single-session music therapy on affective state in patients on a post-surgical oncology unit: A randomized effectiveness study. *The Arts in Psychotherapy*. 2015;44:57-61. doi:10.1016/j.aip.2014.11.002

2. Lee KC, Chao YH, Yiin JJ, Hsieh HY, Dai WJ, Chao YF. Evidence That Music Listening Reduces Preoperative Patients' Anxiety. *Biological Research For Nursing*. 2012;14(1):78-84. doi:10.1177/1099800410396704

3. Bojorquez GR, Jackson KE, Andrews AK. Music Therapy forSurgical Patients Approach for Managing Pain and Anxiety. *Crit Care Nurs Q* . 2020;43(1):81-85. doi:10.1097/cnq.0000000000000294

4. Ezzu A, Messaglia R. *Introduzione Alla Musicoterapia*. Didattica Attiva; 2017.

5. Millett CR, Gooding LF. Comparing Active and Passive Distraction- Based Music Therapy Interventions on Preoperative Anxiety in Pediatric Patients and Their Caregivers. *Journal of Music Therapy*. 2017;00(00):1-19. doi:10.1093/jmt/thx014

6. Twiss E, Seaver J, McCaffrey R. The effect of music listening on older adults undergoing cardiovascular surgery. *Nurs Crit Care*. 2007;11(5):224-231. doi:10.1111/j.1478-5153.2006.00174.x

7. Dóro CA, Neto JZ, Cunha R, Dóro MP. Music therapy improves the mood of patients undergoing hematopoietic stem cells transplantation. *Support Care Cancer*. 2017;25(3):1013-1018. doi:10.1007/s00520-016-3529-z

8. Ghetti CM. Active Music Engagement with Emotional-Approach Coping to Improve Well-being in Liver and Kidney Transplant Recipients. *Journal of Music Therapy*. 2011;48(4):463-485. doi:10.1093/jmt/48.4.463

9. Ciğerci Y, Özbayır T. The effects of music therapy on anxiety, pain and the amount of analgesics following coronary artery surgery. *Turk Gogus Kalp Dama*. 2016;24(1):44-50. doi:10.5606/tgkdc.dergisi.2016.12136

10. Dai WS, Huang ST, Xu N, Chen Q, Cao H. The effect of music therapy on pain, anxiety and depression in patients after coronary artery bypass grafting. *J Cardiothorac Surg*. 2020;15(1):81. doi:10.1186/s13019-020-01141-y

11. Uggla L, Bonde LO, Hammar U, Wrangsjö B, Gustafsson B. Music therapy supported the health-related quality of life for children undergoing haematopoietic stem cell transplants. *Acta Paediatr*. 2018;107(11):1986-1994. doi:10.1111/apa.14515

12. Çelebi D, Yılmaz E, Şahin ST, Baydur H. The effect of music therapy during colonoscopy on pain, anxiety and patient comfort: A randomized controlled trial. *Complementary Therapies in Clinical Practice*. 2020;38:101084. doi:10.1016/j.ctcp.2019.101084

13. Gogoularadja A, Bakshi SS. A Randomized Study on the Efficacy of Music Therapy on Pain and Anxiety in Nasal Septal Surgery. *InternationalArchives of Otorhinolaryngology*. 2020;24(02):e232-e236. doi:10.1055/s-0039-3402438

14. Forooghy M, Mottahedian Tabrizi E, Hajizadeh E, Pishgoo B. Effect of Music Therapy on Patients' Anxiety and Hemodynamic Parameters During Coronary Angioplasty: A Randomized Controlled Trial. *Nurs Midwifery Stud*. 2015;4(2):44-50. doi:10.17795/nmsjournal25800

15. Doğan MV, Şenturan L. The effect of music therapy on the level of anxiety in the patients undergoing coronary angiography. *OJN*. 2012;02(03):165-169. doi:10.4236/ojn.2012.23025

16. Luis M, Doss R, Zayed B, Yacoub M. Effect of live oud music on physiological and psychological parameters in patients undergoing cardiac surgery. *Global Cardiology Science & Practice*. 2019;2019(2). doi:10.21542/gcsp.2019.17

17. Gökçek E, Kaydu A. The effects of music therapy in patients undergoing septorhinoplasty surgery under general anesthesia. *Brazilian Journal of Otorhinolaryngology*. 2019;754:1-8. doi:10.1016/j.bjorl.2019.01.008

18. Nilsson U. The Anxiety- and Pain-Reducing Effects of Music Interventions: A Systematic Review. *AORN Journal*. 2008;87(4):780-807. doi:10.1016/j.aorn.2007.09.013

19. 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. *British Journal of Surgery*. 2018;105(7):773-783. doi:10.1002/bjs.10853

20. Liang J, Tian X, Yang W. Application of Music Therapy in General Surgical Treatment. *BioMed Research International*. 2021;2021:1-4. doi:10.1155/2021/6169183