

Effects of Music Therapy on Physical-Psychological Outcomes in Coronary Angiography: A Review Article

Masoumeh Forooghi^{1*}, Elaheh Mottahedian Tabrizi², Morteza Khaghanizade³

Abstract

Introduction: Today, because of the complications and costs reduction, non-pharmacologic approaches such as music therapy have been the focus of researchers in different patients. This study aimed to determine the effects of music therapy on outcomes of patients undergoing coronary angiography (pain, stress, anxiety) as a systematic review.

Materials and methods: This is a review study focused on the question "What are the effects of music therapy on physical-psychological outcomes in angiography?" In this systematic review the Keywords; Music Therapy, angiography, Patient Outcomes, Stress, Anxiety and Pain were searched in PubMed, CINAHL/Nursing Science Direct and Scopus data bases between 2006 to 2014. Then according to the articles relevancy to the research topic and opinion of research group members, related articles and contents were selected and analyzed.

Results: Among 217 articles, 10 totally relevant articles in English were chosen. accordingly, depending on the type, duration, repetition frequency and patient selection the use of music therapy increases the relaxation and reduces stress and anxiety in patients and also reduces the need for sedative in patients undergoing heart invasive procedures.

Conclusion: Music therapy is a safe and effective measure in reducing and improving psychological outcomes and anxiety in patients undergoing coronary angiography. Therefore the use of non-pharmacological approaches can be considered by caregivers in clinical environments.

Keywords: Music Therapy, Angiography, Patient Outcomes, Stress, Anxiety, Pain

1. Nursing faculty, Baqiyatallah University of Medical Sciences, Tehran, Iran

2. Behavioral Sciences Research Center, Baqiyatallah University of Medical Sciences, Teh-ran, Iran

3. Nursing Department, Nursing faculty, Baqiyatallah University of Medical Sciences, Teh-ran, Iran

* Corresponding Author

Masoumeh Forooghi, Nursing faculty, Baqiyatallah University of Medical Sciences, Tehran ,Iran

E-mail: forooghy619@yahoo.com

Submission Date: 11/19/2014

Accepted Date: 12/29/2014

Introduction

Cardiovascular diseases are the leading cause of death in the modern world and also are the cause of deaths of more than 16 million people in the world (1). In Iran the highest rate of mortality is related to cardiovascular disease, so that about 40% of the mortality of the population is related to these diseases (2). The most common cardiovascular disease, coronary artery disease or ischemic heart disease, that becomes apparent with secondary angina pectoris following coronary atherosclerotic stenosis (3). Cardiac catheterization is one of the most reliable and most valuable invasive cardiology tests that provides important information about coronary artery disease, congenital diseases, valvular heart diseases and ventricular function (4). Patients awaiting cardiac catheterization experience high anxiety before doing this method (3). Anxiety in patients with severe heart problems or cardiac interventions is 70-80% and 20-25% in the longer term (5). Given that the patient is conscious, noise caused by equipment needed for surgery and the other hand conversations between the surgical team can inadvertently provide a stressful environment for patient (6). The most common factors involved in anxiety of patients include individual's previous experience, pain, stress, unfamiliar environment, fear of the unknown, the results of interventions, need for surgery, fear of catheterization complications and unclear future (7). In the case of anxiety during a critical procedure, the risk of physical and psychological injuries increases (8). anxiety an emotional state characterized by

feelings of tension, irritability, stress, fear, and increased plasma levels of epinephrine and norepinephrine and increased activity of the autonomic nervous system (9). Increases the heart rate, blood pressure and other changes in patient (10, 11). Severe anxiety increases myocardial oxygen demand and aggravate the workload of the heart, increases heartbeat, blood pressure and cardiac output, increases the need for the use of sedatives before and during the method, and also increases the duration of hospital staying (12). On the other hand, there are the drugs' psychological and physiological side effects associated with affecting the daily activities of individuals. The use of these drugs can lead to tolerance and dependence (13). Today willing to use non-pharmacological methods to relieve anxiety is rising. One of these methods is the use of desirable sound stimulants known as music therapy (14). Music improves the physical, psychological and cognitive disease and is introduced and used in different sectors, especially in general and psychiatric hospitals and rehabilitation centers as an appropriate and effective nursing intervention. More than 5,000 music therapists work In the United States (15). Music therapy is an effective intervention on patients' issues such as reducing stress, irritability, decreased feelings of loneliness, improve mood and facilitate excitements (16). This is a complementary therapy that improves patient comfort and safety by increasing the threshold stress, regulating internal processes, creating a state of relaxation (17, 18),



and increases the secretion of various hormones such as endorphins, the endorphins that can ease the pain. It also strengthens the immune system and its functions (19). Vandrbom believes that invasive interventions can lead to anxiety. Using non-pharmacological methods such as music therapy and other methods can be effective in reducing blood pressure and the amount of needed drugs (20). Lenzen, in 2002, in his study as anxiety and feeling of well-being in patients undergoing coronary angioplasty, for the first time, compared to the next times according to the theory of self-regulation showed that sensory information is an important factor to do the invasive procedures. Sensory information impacts invasive procedures and leads to form a mental image related to the procedure which has three effects: Person's affection will change, his cognition will be influenced and his habits will change. He believes that the anxiety and negative feelings are the two influencing factors in this regard that must be controlled (21). On the other hand music by diversion of attention and reducing patient anxiety triggers reduces pain and anxiety (22). The pain and stress reduction effect of music is probably due to its ability to interact with cognitive and emotional processes Created by: prevention of hearing and understanding the sounds of the operating room, reducing the sources of stress and occurrence of pleasant feeling that impacts unpleasant pain of surgery (23). Due to the risks, complications and prognosis of invasive cardiac procedures anxiety occurs on a broader level and sometimes even beats patient and causes disturbances in the heart rhythm (12). Anxiety is a normal emotional state that can lead to depression, post-operative pain, increased demand for analgesic, length of hospital stay and delayed discharging from hospital. High levels of anxiety before surgery can increase proteins break down, delay wound healing and increase risk of infection (24). Music therapy is an inexpensive and non-invasive nursing intervention with no side effects that can be used as a complementary method to reduce patient anxiety. (25) Many scientists and researchers have investigated about the music and its ability to reduce anxiety in patients and healthcare environments. In addition, some reports are obtained about the effects of music in intensive care, the elderly, nervous or depressed patients and in rehabilitation. Studies have shown that music has beneficial effects on various physiological parameters and is an important option in the treatment of these diseases (26). On the other hand, in some cases the use of complementary therapies such as music in the health care system is still controversial (27). The existence of such uncertainties among the medical community is one of the main challenges for entering these actions to the set of medical performance. Fortunately systematic review in this regard is very helpful and in cases where the views of the authors are different, can help solve the problem. On the other hand, systematic review is an important "vital link" between research studies and clinical decisions (28). Therefore, this study was conducted as a systematic review with the aim of determining the effect of music therapy on coronary Angiography physical-psychological outcomes.

Materials and methods: This is review study focused on the question "What are the effects of music therapy on physical-psychological outcomes in coronary angiography?"

Literature Search: In this review study all relevant information between 2004 and 2014 were studied. Search for resources was done electronically in the specified time interval (in April 2014) and in PubMed, Science Direct, Scopus, CINAHL, Google Scholar electronic databases. In the first stage keywords were selected using MESH browser, and include the following statements:

Music Therapy, angiography, Patient Outcomes (Stress, Anxiety, Pain)

Study Selection Criteria: Articles entered into the study, include review articles, clinical trials, abstracts, etc. Due to the limitation of conducted studies all articles with focus on adult sample population in the English language between 2006 and 2014 were entered the study. Studies were evaluated based on the rate of appropriateness with criteria, title of study review and summary table of articles. After removal of non-related articles (review, repetitive and conference proceedings), the number of 10 articles were included to examine the full text and structured review. Proceedings removal took place due to lack of access to the detailed results of the study.

Results

Of the 217 articles that examined the effect of music therapy, 10 totally relevant papers were selected as the primary source. Given that the Articles search was carried out in the period of 2014-2006, shows that in the field of research and publish articles about the effect of music on the outcomes of patients undergoing angioplasty an increasing and special attention to the area of non-pharmacological methods, specifically music therapy is emerging. These articles were about the role and impact of music therapy on pain, anxiety and stress and turmoil of patients. Among the studies in terms of time of intervention, two studies were conducted before the angiography procedure (29, 30). 6 studies during procedure (31- 36), and one study before and during the procedure (37) and one were conducted before and after the procedure (38). Most studies have used headphones for music playback and time for listening to music was 15 to 20 minutes. In the Weeks' study playback was evaluated through loudspeakers and audio pillow (31). Measurement tools to assess outcomes were HADS10, DASS 21 STAI-T, STAI-S., NRS, VAS. Also in most studies, the number of men was more than women. In the Nilsson study, we investigated the effects of music in relation to sex and no difference in results was observed (32). In another study the level music effects on women with high anxiety during the arteriogram were evaluated and became clear that music is effective in reducing anxiety and environment sounds were felt less (33).

Discussion

Interventions to reduce pre-operative anxiety not only include anti-anxiety drugs, but also the ways to distraction such as music (39). Research has shown that music heals and controls mental, physical function and pain and anxiety during the procedure as well. This study review suggests that music can be an effective intervention to reduce patients' anxiety during surgery. In review of 10 studies using music interventions in angiography, seven of them used the

STAI for measuring anxiety, that 8 reported a significant decrease after listening to music. In most studies music has played during surgery and in some studies due to the short time of angiography, music began before surgery and has continued to exit from the operating room (37). Ghetti Clear M. study has reviewed and compared the effects of instrumental music, lyrical music and reciting on vital signs, anxiety and negative and positive effects of emotional adjustment. And the results showed that instrumental music is more effective (30). Music has many beneficial effects on different diseases and one of the most beneficial effects is reducing the anxiety of the patients in the hospital (40). In 2010 Goertz study the effects of choosing Music Genre by patient and choosing Music Genre randomly were compared. He concluded that the most beneficial effect in people who have randomly listened to music was related to classical music and in patients who had chosen the music themselves meditation music had the strongest effect. Also, people who had randomly listened to music had a significant reduction in anxiety. (34). And this is against the study of Nilsson 2009 that says the reason of inefficiency of music is that they are not selected by patients (41). Meditation music has sedative effects. Mellow sounds with a few rhythms, the music have spiritual reflection and are used yoga and tai chi for example. Patients who benefit most from classical music are anxious persons, depressed persons and also people suffering cardiovascular disorders, pain, stress, and sleep disturbance. The most effective musics on quality of life and health and cardiovascular system are (Bach, Mozart and Italian composers) (42).

Also the results of changes in vital signs are different. We found that listening to music made no statistically significant impact on diastolic blood pressure and respiratory rate in 6 studies. In particular, there is significant decrease in PR in three studies (29,34,43), increase in SBP in one study (30). In contrast to this study's findings, music cause significant reduction in hemodynamic variables in Chan Moon

Fai study on patients undergoing a C-clamp procedure (44). Chlan believes that music can decrease heart rate, respiratory rate and blood pressure by creating a sense of peace and tranquility in person that these changes are related to reduce the level of adrenaline in blood (45). Bernadi et al discovered that when patient listens to music increasing respiratory rate, heart rate and blood pressure is proportional to the speed of music (46).

in two studies, music have not been effective on pain (30,32), also the results of study Nilsson 2009 in cardiac surgery as same as this study (41), But In contrast to them, the results of most studies show that music is effective in relieving pain (27,44,47) Perhaps the effect of music with slow beats on vital signs is very low but it could be more in patients' physical and mental experiences such as pain and anxiety. It seems that most important factor for music to have positive results in pain and relaxing is its speed. Slow music with 60 to 80 beats is suggested. From the positive effects of music interventions is controlling pain which is known as (audioanalgesia, audioanxiolytic or audiorelaxation) (39). Based on the results of the Cooke M 2005 study entitled the music and its effect on anxiety in the short time (48) and the Cepeda MS 2006 study entitled the effects of music on pain (42) it seems that the style and duration of music influences effectiveness of music intervention. The most measured issue in studies was patients' anxiety levels that almost all studies have focused on this issue and reported its reduction after music therapy, but the results of changes in vital signs are different and the study of chest pain has conducted less or has not been effective enough, so more researches are needed in this area. Although there are differences between the studies in technique, duration and genre of music, but eventually focus of results on desired outcomes has common views with similar conclusions. (Table 1).

Table 1 A summary of included studies investigating the Music therapy and Patient outcomes (Stress, Anxiety, Pain, Vital sign).

Ref	Author	N	Design	gender & age	Measures	Independ variable	Depend variable	Type Music	Significant results
34	Buffum, M.D., et al. 2006	170	Two group Case group and Control group	M=4 F=166 Age 35-85	(STAI)	15" of music before procedure standard "boom box"-style CD player without earphones	Anx HR, BP, RR	classical, jazz, rock, country western, and easy listening	Sig dec in HR & anx for music group vs. control
35	Argstatter, H., et al. 2006	83	three groups n=28 1-coaching group, 2-exposure group, 3-control group	M=48 F= 35 Age 66±11	(STAI)-S (STAI)-T VAS HADS[10]	Earphones. 50" of MUSIC Group1, day prior angiography Group2, During Group 3, attention-placebo	Anx , HR, SBP, DBP	"Relaxation" by Martin Rummel	Sig dec in anx
38	Moradipannah F., et al. 2009 Study in (2005)	74	Case Group n=37 group Control n=37	M=44 F= 30 Age 50.6±5.8	DASS21	1.5 hours before and after repeated angiography	anx, stress and Depression	3 relaxing "Canon in D" composed, "Love story" & "Dance of the iguana"	Sig dec in anx, stress and Depression
32	Nilsson, Ulrica, et al. 2009 study in (2007)	240	four groups Control group59 male /Control group60 female/ Music group60 female / Music group61 male	M=120 F= 120 Age 66±11	(STAI)-S NRS	During procedure loudspeaker system	Anx, analgesics, angina, pain, degree of relaxation & comfort	music, MusiCure®, Gefion Records, Copenhagen, Denmark was soft, relaxing,	No sig for gender
34	Goertz, W., et al. 2010 study in (2007)	200	allocated group A & self-selected group B A (A1,A2,A3,A4) B (B1, B2, B3, B4) 4Group(25 each)	M=63 F=134 Age 65±10	(STAI)	during procedure Loudspeakers Three compact discs (CD) were used for the ALMUT trial.	Anx HR , ST	Music modern , Classical, smooth jazz	Sig dec in HR & anx for randomized, group B
31	Weeks, B.P, et al. 2011 study in (2005)	98	three groups control group n=34 music groups(LS) n=30, music group (PF) n=30	M=47 F= 51 Age 66±11	NRS	During procedure Loudspeaker audio pillow	Anx Well-being	MusiCure®	Sig dec in anx, Sig in increased well-being
36	Chang, H.K, et al. 2011	54	N=27 Music control	M=32 F=22 Age 47-70	VAS (STAI)	30 minutes	Anx		Sig dec anx, PR Sig inc in ST

Table 1: continued

Ref	Author	N	Design	gender & age	Measures	Independ variable	Depend variable	Type Music	Significant results
37	Doğan, M, el al. 2012	200	N=100 intervention control	M=140 F=60	(STAI)	began before of procedure and continued until left of room CD player	Anx	“Hüseyni” “sedative music.”	Sig dec anxiety
30	Ghetti, Claire M, el al. 2012 study in (2011)	37	three groups control(n=10) MusicTherapy : Emotional-Approach Coping group[MT/EAC] (n=13) talk-based Emotional-Approach Coping group(n=14) [MT/EAC](n=13)		PANAS, (VAS)	30 min Prior procedure	coping self-efficacy, and patients atisfaction) Vital sign pain	15 to 50 songs choice of 2–3 songs	Sig dec anx, sig inc SBP No sig in DBP,PR,RR
33	Nilsson, Ulr. 2012 study in (2008)	68	Two group Music group n=34 control group n=34	F=68	(STAI)	During procedure loudspeaker system	Anx Relaxation, environmental sound and discomfort associated	music, MusiCure®, Gefion Records, Copenhagen, Denmark was soft, relaxing	Sig dec in sound environment and less discomfort

F=Female, M= Male, Sig =Significant, dec=Decrease, inc=increase, anx=Anxiety, SBP= Systolic blood pressure, DBP= Diastolic blood pressure, HR= Heart rate, RR= Respiratory rate, ST= skin temperature

Conclusion

Due to the psychological and physiological side effects of drugs music can be used to soothe and alleviate some states such as anxiety, depression and also for relaxation. The best time to carry out is during the procedure, with an emphasis on instrumental relaxing music with 60 to 80 beats per minute, concentrated by headphones or better audio equipment such as sound pillows. Thus music therapy is a safe and effective measure in reducing and improving psychological outcomes and anxiety in patients undergoing angiography. So the use of non-pharmacological approaches can be considered by caregivers in clinical environments.

References

1. Gersh BJ, Sliwa K, Mayosi BM, Yusuf S. Novel therapeutic concepts: The epidemic of cardiovascular disease in the developing world: global implications. *European heart journal*. 2010;31(6):642-8.
2. Farahani M, Mohammadi E, Ahmadi F, Maleki M, Hajizadeh E. Cultural barriers in the education of cardiovascular disease patients in Iran. *International nursing review*. 2008;55(3):360-6.
3. Janice I, h. hk. Brunner & Suddarth's textbook of medical-surgical nursing. Lippincott Williams & Wilkins. 2014. Philadelphia. 13th. [682-751].
4. Aviles RJ. Introductory Guide to cardiac catheterization: Lippincott Williams & Wilkins; 2008.
5. Cullum N, Ciliska D, Marks S, Haynes B. An introduction to evidence-based nursing. *Evidence-Based Nursing: An Introduction*. 2007;16(24):1
6. Rouhi G, Rahmani H, Abdollahi A, Hoseini S, Mahmoodi G, Nasiri H. The effects of listening to music on some physiologic parameters. *Journal of Gorgan Bouyeh Faculty of Nursing & Midwifery*. 2006 (9):17-21. (Persian).
7. Bally K, Campbell D, Chesnick K, Tranmer JE. Effects of patient-controlled music therapy during coronary angiography on procedural pain and anxiety distress syndrome. *Critical Care Nurse*. 2003;23(2):50-7.
8. Uzun S, Vural H, Uzun M, Yokusoglu M. State and trait anxiety levels before coronary angiography. *Journal of Clinical Nursing*. 2008;17(5):602-7.
9. Gagner-Tjellesen D, Yurkovich EE, Gragert M. Use of music therapy and other ITNIs in acute care. *Journal of psychosocial nursing and mental health services*. 2001;39(10):26-37.
10. Lee K-C, Chao Y-H, Yiin J-J, Hsieh H-Y, Dai W-J, Chao Y-F. Evidence That Music Listening Reduces Preoperative Patients' Anxiety. *Biological research for nursing*. 2012;14(1):78-84.
11. Wakim JH, Smith S, Guinn C. The efficacy of music therapy. *Journal of perianesthesia nursing*. 2010;25(4):226-32.
12. Hanser SB, Mandel SE. The effects of music therapy in cardiac healthcare. *Cardiology in review*. 2005;13(1):18-23.
13. DeMartinis NA, Kamath J, Winokur A. New approaches for the treatment of sleep disorders. *Advances in Pharmacology*. 2009;57:187-235.
14. Barker R, Kober A, Hoerauf K, Latzke D, Adel S, Kain ZN, et al. Out-of-hospital auricular acupressure in elder patients with hip fracture: a randomized double-blinded trial. *Acad Emerg Med*. 2006;13(1): 19-23.
15. Allred KD, Byers JF, Sole ML. The Effect of Music on Postoperative Pain and Anxiety. *Pain Management Nursing*. 2010;11(1):15-25.
16. Hasanpour Dehkordi A, Salehi Tali S, Frouzandeh N, Naderipour A, Ganjei F, Kasiry K, et al. The effect of progressive muscle relaxation on anxiety and stress in nursing students at the

- beginning of the internship program. *Journal of Shahrekord University of Medical Sciences*. 2009;11(1):71-7.
17. Chang MY, Chen CH, Huang KF. Effects of music therapy on psychological health of women during pregnancy. *Journal of Clinical Nursing*. 2008;17(19):2580-7.
18. Chang SC, Chen CH. Effects of music therapy on women's physiologic measures, anxiety, and satisfaction during cesarean delivery. *Research in Nursing & Health*. 2005;28(6):453-61.
19. Almerud S, Petersson K. Music therapy--a complementary treatment for mechanically ventilated intensive care patients. *Intensive & critical care nursing : the official journal of the British Association of Critical Care Nurses*. 2003 Feb;19(1):21-30. PubMed PMID: 12590891. Epub 2003/02/20. eng.
20. Vanderboom T. Does music reduce anxiety during invasive procedures with procedural sedation? An integrative research review. *J Radiol Nurs*. 2007;26(1):15-22.
21. Lenzen MJ, Gamel CJ, Immink AW. Anxiety and well-being in first-time coronary angioplasty patients and repeaters. *European Journal of Cardiovascular Nursing*. 2002;1(3):195-201.
22. Nakahara H, Furuya S, Masuko T, Francis PR, Kinoshita H. Performing music can induce greater modulation of emotion-related psychophysiological responses than listening to music. *International journal of psychophysiology*. 2011;81(3):152-8.
23. Tabrizi EM, Rad SM, Lak M, Hajizadeh E. The Effect of Music Therapy on Anxiety and physiological variables in Patients under Spinal Anesthesia. *J Appl Environ Biol Sci*. 2014;4(4):240-6.
24. Motahedian E, Movahedirad S, Hajizadeh E, Lak M. The effect of music therapy on postoperative pain intensity in patients under spinal anesthesia. *Journal of Critical Care Nursing*. 2012;5(3):139-44.
25. 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. *Journal of clinical nursing*. 2010;19(7-8):978-87.
26. Trappe H-J. The effects of music on the cardiovascular system and cardiovascular health *Heart*. 2010;96:1868-71.
27. Sendelbach SE, Halm MA, Doran KA, Miller EH, Gaillard P. Effects of music therapy on physiological and psychological outcomes for patients undergoing cardiac surgery. *Journal of Cardiovascular Nursing*. 2006;21(3):194-200.
28. Cook DJ, Mulrow CD, Haynes RB. Systematic reviews: synthesis of best evidence for clinical decisions. *Annals of internal medicine*. 1997;126(5):376-80.
29. Buffum MD, Sasso C, Sands LP, Lanier E, Yellen M, Hayes A. A music intervention to reduce anxiety before vascular angiography procedures. *J Vasc Nurs*. 2006 Sep;24(3):68-73; quiz 4. PubMed PMID: 16952777. Epub 2006/09/06. eng.
30. Ghetti CM. Effect of music therapy with emotional-approach coping on preprocedural anxiety in cardiac catheterization: a randomized controlled trial. *Journal of music therapy*. 2012;50(2):93-122.
31. Weeks BP, Nilsson U. Music interventions in patients during coronary angiographic procedures: A randomized controlled study of the effect on patients' anxiety and well-being. *European Journal of Cardiovascular Nursing*. 2011;10(2):88-93.
32. Nilsson U, Lindell L, Eriksson A, Kellerth T. The effect of music intervention in relation to gender during coronary angiographic procedures: a randomized clinical trial. *European Journal of Cardiovascular Nursing*. 2009;8(3):200-6.
33. Nilsson U. Effectiveness of music interventions for women with high anxiety during coronary angiographic procedures: a randomized controlled. *Eur J Cardiovasc Nurs*. 2012 Jun;11(2):150-3. PubMed PMID: 21095634. Epub 2010/11/26. eng.
34. Goertz W, Dominick K, Heussen N, vom Dahl J. Music in the cath lab: who should select it? *Clinical Research in Cardiology*. 2011;100(5):395-402.

35. Argstatter H, Haberbosch W, Bolay HV. Study of the effectiveness of musical stimulation during intracardiac catheterization. *Clin Res Cardiol.* 2006 Oct;95(10):514-22. PubMed PMID: 16897144. Epub 2006/08/10. eng.
36. Chang H-K, Peng T-C, Wang J-H, Lai H-L. Psychophysiological Responses to Sedative Music in Patients Awaiting Cardiac Catheterization Examination: A Randomized Controlled Trial. *Journal of Cardiovascular Nursing.* 2011;26(5):E11-E8 0.1097/JCN.0b013e3181fb711b.
37. Doğan MV, Şenturan L. The effect of music therapy on the level of anxiety in the patients undergoing coronary angiography. *Open Journal of Nursing.* 2012;2:165.
38. Moradipannah F, Mohammadi E, Mohammadil AZ. Effect of music on anxiety, stress, and depression level in patients undergoing coronary angiography. *East Mediterr Health J.* 2009;15(3):639-47.
39. Nilsson U. The anxiety-and pain-reducing effects of music interventions: a systematic review. *AORN journal.* 2008;87(4):780-807
40. Bulfone T, Quattrin R, Zanotti R, Regattin L, Brusaferrero S. Effectiveness of music therapy for anxiety reduction in women with breast cancer in chemotherapy treatment. *Holistic nursing practice.* 2009;23(4):238-42.
41. Nilsson U. The effect of music intervention in stress response to cardiac surgery in a randomized clinical trial. *Heart & Lung: The Journal of Acute and Critical Care.* 2009;38(3):201-7.
42. Cepeda MS, Carr DB, Lau J, Alvarez H. Music for pain relief. *Cochrane Database Syst Rev.* 2006;2(2).
43. Chang H-K, Peng T-C, Wang J-H, Lai H-L. Psychophysiological Responses to Sedative Music in Patients Awaiting Cardiac Catheterization Examination: A Randomized Controlled Trial. *Journal of Cardiovascular Nursing.* 2011;26(5):E11-E8 0.1097/JCN.0b013e3181fb711b.
44. Chan MF. Effects of music on patients undergoing a C-clamp procedure after percutaneous coronary interventions: A randomized controlled trial. *Heart & Lung: The Journal of Acute and Critical Care.* 2007 11//;36(6):431-9.
45. Chlan L. Effectiveness of a music therapy intervention on relaxation and anxiety for patients receiving ventilatory assistance. *Heart & Lung: The Journal of Acute and Critical Care.* 1998;27(3):169-76.
46. Bernardi L, Porta C, Sleight P. Cardiovascular, cerebrovascular, and respiratory changes induced by different types of music in musicians and non-musicians: the importance of silence. *Heart.* 2006;92(4):445-52.
47. Voss JA, Good M, Yates B, Baun MM, Thompson A, Hertzog M. Sedative music reduces anxiety and pain during chair rest after open-heart surgery. *Pain.* 2004;112(1-2):197-203.
48. Cooke M, Chaboyer W, Hiratos MA. Music and its effect on anxiety in short waiting periods: a critical appraisal. *Journal of clinical nursing.* 2005;14(2):145-55.