

# Pharmacophore

ISSN-2229-5402

Journal home page: <http://www.pharmacophorejournal.com>

## A STUDY OF THE IMPACT OF PREFERRED MUSIC ON THE PAIN INTENSITY AND PHYSIOLOGICAL PARAMETERS OF PATIENTS AFTER CORONARY ARTERY BYPASS SURGERY

Seyedoshohadaee.M<sup>1</sup>, Asgari. Z<sup>2\*</sup>, Ashgali farahani. M<sup>3</sup>, Haghani .H<sup>4</sup>, Bakhshaei.M.H<sup>5</sup>

1. Faculty member, Dept of Medical surgical nursing, Faculty of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran

2. Master degree in Nursing, School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran

3. professor and faculty member, Dept. of Medical surgical nursing, Faculty of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran.

4. Faculty member, Dept. Of statistics, Faculty of management, Iran University of Medical Sciences, Tehran, Iran

5. Cardiovascular Anesthetist Associate professor of Hamedan University of medical sciences, hamedan, Iran.

### ARTICLE INFO

**Received:**03<sup>th</sup> Jun 2017**Accepted:**29<sup>th</sup> Nov 2017**Available online:**14<sup>th</sup> Dec 2017

**Keywords:** music therapy, physiological parameters, pain, open heart surgery

### ABSTRACT

**Introduction and objective:** Cardiac surgery, which is often associated with pain and dysfunctions in multiple systems, creates high levels of stress in patients. Since pain and thereby stress can have impact on physiologic parameters and treatment output of these patients, the present study aimed to study the impact of preferred music on the pain intensity and physiological parameters of patients after coronary artery bypass surgery.

**Materials and method:** the present study was a clinical trial study and it was conducted on 86 patients undergoing open heart surgery. In order to sample, researcher referred to Cardiac Surgery ward of selected hospitals and selected the samples and demographic information questionnaire were filled out by participants. After surgery and entering the patient in the ward, at first, pain intensity and physiologic parameters were measured in both group. Then, in experimental group, in addition to the usual nursing care, the music preferred by the patient was play for him/her for 20 min using headphones and Mp3 player. In control group, pain intensity and physiologic parameters were recorded within 20 min after using the headphones without playing the music. After the end of intervention, pain intensity and physiologic parameters of the both groups were measured again. The obtained data was analyzed by pair and independent t-test.

**Results:** comparing pain intensity and physiologic parameters (systolic and diastolic blood pressure, heart rate, respiration, temperature and blood oxygen saturation level) before and after intervention indicated that in the experimental group, there was a significance difference between pain intensity before and after the intervention (p-value<0.001). The results indicated that after intervention, there were significant differences between the two groups just in diastolic blood pressure (p-value=0.024) and blood oxygen saturation level (p-value=0.14) and no significant difference was observed between them in other physiologic parameters. Also, after intervention, significant decrease in heart rate (p-value=0.036) and significant increase in blood oxygen saturation level (p-value=0.039) were observed.

**Discussion and conclusion:** using the preferred music in patients after coronary artery bypass surgery significantly reduced the pain and diastolic blood pressure and increased the blood oxygen saturation level in the experimental group and no difference was observed in other physiologic parameters after intervention.

Copyright © 2013 - All Rights Reserved - Pharmacophore

**To Cite This Article:** Seyedoshohadaee.M, Asgari. Z<sup>\*</sup>, Ashgali farahani. M, Haghani .H<sup>4</sup>, Bakhshaei.M.H “A study of the impact of preferred music on the pain intensity and physiological parameters of patients after coronary artery bypass surgery”, *Pharmacophore*, 8(6S), e-1173192.

### Introduction

In Iran, the first and the most common cause of death in all ages and in both genders is cardiovascular diseases (1). Of 700-800 deaths occur daily, 317 are due to cardiovascular disease. In Iran, Cardiovascular diseases have significantly increased compared to previous years and deaths due to these diseases fell from 27% to 37% (2). Different methods are used in order to treat cardiovascular diseases, including the use of clot-busting drugs, angioplasty by balloon, laser, stent in coronary artery

**Corresponding Author:** Asgari. Z, Master degree in Nursing, School of Nursing and Midwifery, Iran University of Medical Sciences, Tehran, Iran Email: Zahra asgari 20012@gmail.com

and removing the plaque of atherosclerosis (3). Today, open heart surgery has become a common and successful intervention in the care and treatment of heart disease and it is carried out to increase survival and improve the quality of life of heart patients (4) so that it is annually done on thousands of people in the world. In Iran, over thirty thousand open-heart surgeries are annually done in different health care centers (5) and %60 of them were coronary artery bypass surgeries (6). Pain is one of the essential aspects and subcategories of human somatosensory that can have protective, stimulating or destructive aspects, and/or it can alert us to a clear or hidden damage to the body (7,8). Pain is a defense mechanism for the body and also it is a complex mix of physiological, psychological, social and cultural variables, when a tissue is injured, reactions created causes pain (8). All the pain in patients after cardiac surgery, can lead to decreased mobility, general stress, tension during recovery, increased demand for painkillers, increased oxygen demand of the heart muscle due to increased activity of the heart, rupture or leakage of blood from the stitches, increased bleeding after surgery, graft anastomosis rupture due to hypertension after surgery, respiratory insufficiency due to shallow breathing due to the pain of sternal incision and chest tube, prolongation of hospital stay, delayed discharge of patients, etc. Parameter is an important element in assessing or understanding of an event or situation. In other words, it is a variable index and measurement of it indicates the quantity or performance which cannot be determined directly and comprehensively. In the medical science, a category of measurable factors including temperature, pulse, blood pressure, respiratory rate and pulse oximetry are indices of physiological function (systolic and diastolic blood pressure, heart rate, respiration, temperature and blood oxygen saturation) (9). In recent years, one of the ways paid attention is the use of complementary therapies after heart surgery, including massage therapy, music therapy and guided imagery techniques. In the meantime, one of the most popular form of complementary medicine is music therapy used to increase the comfort of patients (10,11) Music therapy is defined as the therapeutic use of music to influence the patient's health and comfort. This controlled form of listening to music has been shown to be effective in influencing the patient's physiology, psychology and emotion during treatment of his/her injury (12). The use of music for pain relief is one of the most common and easiest ways of thinking deviation and it is an available and inexpensive, non-invasive method with no side effects and it can be successfully use as safety nursing intervention in the hospitals and in addition to creating vitality and strengthening the sympathy, it can lead to decreased heart rate, deeper breathing, reduced depression and anxiety and pain relief (13,14,15). Music entices individual's senses to itself, and the individual can reduce the pain with intentional focus on music according to the mechanism mentioned .Listening to music is capable of enhancing an individual's comfort in the status of being patient. In nursing practices, music as an effective intervention can be a part of a patient's care program and used to relieve pain, enhance the sense of relaxation and a feeling of safety (14). The type of music must suit the mood of people. Accordingly, the first step in music therapy is to assess the patient's needs and mood and selection of familiar and desired music which suits to the culture is a key point in the intervention (15). Music leads to the secretion of endorphins and reduction in pain by influencing the brain and stimulating alpha brain waves. Also, secretion of endorphins leads to reduction in physiological responses, including reductions in blood pressure, respiration and heart rate (16,17). In 2010, a quasi-experimental study entitled "the impact of music therapy on physiological parameters and pain after surgery in patients undergoing open heart surgery" was conducted by ÖZER et al(18). This study aimed to determine the impact of patient's preferred music on his/her physiological parameters and pain intensity and it was conducted for 6 months in cardiac surgical intensive care unit of one of the hospitals affiliated to the Turkey University of Medical Sciences. 90 patients were selected by simple sampling method. The results showed significant increase in arterial oxygen saturation ( $p=0.001$ ) and significant reduction in pain intensity ( $p=0.001$ ) in the experimental group. No significant difference was observed between the two groups in other physiological parameters. Sendelbach et al(19). have studied the impact of music therapy on pain intensity, anxiety, physiological parameters and opioid consumption after cardiac surgery. The results showed that anxiety and pain were significantly reduced in the experimental group compared to the control group but in both groups, no significant differences were observed before and after intervention in diastolic blood pressure, systolic blood pressure and heart rate. Also, no significant difference was observed between two groups in opioid consumption. This study showed that music therapy can be useful for patients undergoing cardiac surgery. In this study, no impact was observed on physiologic parameters. Given that no study has been done with this purpose in Iran, the present study aimed to the impact of preferred music on the pain and physiological parameters of patients after coronary artery bypass surgery.

## Method

In the present study, the samples were selected by convenience sampling method. After obtaining approval from the ethics committee and offering it to the relevant centers and gaining approval of the relevant authorities in order to attend in the research environment, the samples were selected among the patients, who were in the list of surgery and eligible to participate in the present study. Firstly, the patients were selected by convenience sampling method according to the inclusion criteria, then they were randomly divided into two experimental and control groups. This study is a quasi-experimental study. The samples include the patients undergoing coronary artery bypass surgery and hospitalized in ICU of open heart surgery at Farshchian Heart Hospital. Inclusion criteria were: 1- Having no history of previous surgery; 2- Having non-emergency open heart surgery; 3- Surgical procedure has been routinely completed in the operating room; 4- There is stable hemodynamic conditions (systolic blood pressure is greater than 90 mm Hg, absence of dangerous dysrhythmias and heart rate is between 60 to 100 according to the monitors connected to the patient and hospital protocol); 5- Being awake; 6-

Having ability to understand content in Persian; 6- Having no history of known mental diseases; 8- Having no addiction to drugs and alcohol; 9- Liking music and wanting to hear it through the headphone; and 10- Having no hearing impairment preventing the use of headphones. Exclusion criteria were: 1- The patient suffers acute complications associated with surgery (bleeding more than 200 cc/h of the chest tube, cardiac tamponade, a life-threatening dysrhythmia or any emergency situation that requires immediate intervention); 2- The patient doesn't consent to continue participating in the study; and 3- The patient dies during performing the study. In order to select samples, the day before heart surgery, researcher referred to cardiac surgery ward of Farshchian Heart hospital and selected the samples from the surgery list of the patients hospitalized in the heart surgery and according to the inclusion criteria. Then, after explaining the objectives and obtaining informed consent, the questionnaire on demographic information were filled out by the participants. Also on the same day, a list of music was offered to the samples and the experimental group selected their preferred music and in order to ensure their selections, the preferred music were played for them several times. After surgery and entering the patient in the ward, between 12:00 p.m. and 8:00 p.m. and after extubation and when the patient awaked and his/her physiological conditions became stable completely (according to the hospital protocol), in order to achieve a fundamental criteria of the patients of both groups, measurement tools were used to record the physiologic parameters (systolic and diastolic blood pressure, heart rate, respiratoin, temperature and blood oxygen saturation). Then, in the experimental group, in addition to routine nursing care, the music preferred by the patient was play for him/her for 20 min using headphones and Mp3 player (20). In the control group, in addition to routine care, in the same way where intervention was performed, physiologic parameters and pain intensity were recorded within 20 min after using the headphones without playing the music. After intervention, pain intensity and physiologic parameters of both groups were measured again. Pain intensity was measured according to the criterion of Visual Analogue Scale (VAS) and pain intensity was divided into 5 levels: without pain (zero), mild pain (1-3 scores), moderate pain (3-6 scores), severe pain (6-9 scores) and unbearable pain (10). The data on pain intensity was collected by interviewing. Since the patients didn't have ability to answer with audible and understandable voice, researcher asked them to show the level of pain intensity by their fingers and then the answer was marked and recorded by the researcher. The physiological parameters questionnaire included measurement and record of systolic and diastolic blood pressure, heart rate, respiration, temperature and blood oxygen saturation. Physiologic parameters were recorded according to the monitors connected to the patients. In order to determine the reliability and validity of the demographic information questionnaire and physiological parameters, content validity was used. Firstly, the questionnaires were designed according to the references and books related to the research topic and then they were corrected according to the viewpoints of 10 faculty members of Midwifery and nursing school, the difference between the two experimental and control group must be equal to at least 1 ( $d=1$ ) in terms of the impact of preferred music on the pain intensity so that this difference is considered significant statistically. Sample size of each group was 43. It should be noted that according to the similar studies, standard deviation of pain was estimated 1.65. After data collection and entering it in SPSS V.22 Software, descriptive statistical methods such as average, variance, standard deviation and inferential statistical method such as chi-square test, pair t-test and t-test were used to analyze the data.

## Results

The present study aimed to investigate the impact of preferred music on the pain and physiological parameters of patients after coronary artery bypass surgery. The results of independent t-test showed that no significant difference was observed between the two groups in age distribution ( $p$ -value=0.418). In the control group, average age was 62.8 years with standard deviation of 10.02 and in experimental group, it was 61.04 years old with the standard deviation of 9.94. Also the results showed that no significant differences were observed between the two groups in marital status ( $p$ -value=0.139), gender ( $p$ -value=0.068), job ( $p$ -value=0.065), education ( $p$ -value=0.135) and history of surgery ( $p$ -value=0.910).

**Table1.** Demographic characteristics of the participations in the two experimental and control groups- 2016

Variable		Experimental group		Control group		Statistical test
Age	Younger than 50 years	4	9.3	4	9.5	Independent t-test T=0.814 df=83 p-value=0.418
	50-59	13	30.2	8	19	
	60-69	18	41.9	17	40.5	
	Older than 70	8	18.6	13	31	
Marital status	Single	0	0	1	2.3	Fisher test p-value=0.139

	Married	41	93.2	35	81.4	
	Widow	3	6.8	7	16.3	
Gender	Male	29	65.9	20	46.5	$\chi^2=3.326$ df=1 p-value=0.068
	Female	15	34.1	23	53.5	
Employment	Employed	18	41.9	15	34.9	Fisher test p-value=0.065
	Housewife	11	25.6	22	51.2	
	Unemployed	4	9.3	2	4.7	
	Retired	10	23.3	4	9.3	
Education	Illiterate	14	31.8	23	53.5	Fisher test p-value=0.135
	Primary	17	38.6	10	23.3	
	High school	5	11.4	5	11.4	
	Diploma	5	11.4	5	11.4	
	College	3	6.8	0	0	
History of surgery	Yes	21	47.7	20	46.5	Chi-square test $\chi^2=0.013$ df=1 p-value=0.910
	No	23	52.3	23	53.5	

As shown in Table2, in the control group, no significant difference was observed before and after intervention (p-value=0.057). Immediately after surgery, %53.5 of patients felt no pain and after 20 minutes, %72.1 of them had no pain.

**Table2.** Frequency of pain in the control group before and after intervention-2016

Control group Pain	Before		After	
	Frequency	Percent	Frequency	Percent
Have	23	53.5	31	72.1
Don't have	20	46.5	12	27.9
total	43	100	43	100
Results of McNemar's test	p-value=0.057			

As shown in Table3, in the experimental group, significant different was observed before and after the intervention (p-value<0.001). Before intervention, %50 of patients had pain while after intervention only % 11.4 of them had pain.

**Table3.** Frequency of pain in the experimental group before and after intervention-2016

Experimental group Pain	Before		After	
	Frequency	Percent	Frequency	Percent
Have	22	50	39	88.6
Don't have	22	50	5	11.4
total	44	100	44	100
Results of McNemar's test	p-value<0.001			

As shown in Table4, before intervention, there was significant difference between the two control and experimental groups in systolic blood pressure (p-value=0.019) but no significant differences were observed between them in other physiological parameters.

**Table4.** The values of physiological parameters in the patients after coronary artery bypass surgery before intervention in the two control and experimental groups-2016

Group	Control		Experimental		Independent t-test results
	Average	Standard deviation	Average	Standard deviation	
Systolic blood pressure	117.48	12.22	110.90	13.34	T=2.396 df=85 p-value=0.019
Diastolic blood pressure	74.60	8.17	71.29	8.76	T=1.820 df=85 p-value=0.072
Heart rate	86.74	13.02	87.15	12.17	T=0.153 df=85 p-value=0.878
Respiratory rate	24.18	6.49	23.68	6.28	T=0.368 df=85 p-value=0.714
Temperature	36.88	0.77	36.77	1.50	T=0.432 df=85 p-value=0.667
Blood oxygen saturation	90.62	3.57	92.02	5.19	T=1.456 df=85 p-value=0.149

As shown in Table5, there were significant differences between the two control and experimental groups in diastolic blood pressure (p-value=0.024) and blood oxygen saturation (p-value=0.14) and no significant differences were observed between them in other physiological parameters. After intervention, diastolic blood pressure was higher in the control group and blood oxygen saturation was higher in the experimental group.

**Table5.** The values of physiological parameters in the patients after coronary artery bypass surgery after intervention in the two control and experimental groups-2016

Group	Control		Experimental		Independent t-test results
	Average	Standard deviation	Average	Standard deviation	
Systolic blood pressure	110.90	13.34	108.81	14.38	T=1.634 df=43 p-value=0.110
Diastolic blood pressure	71.29	8.76	69.38	10.33	T=1.950 df=43 p-value=0.058
Heart rate	87.15	12.17	85.43	11.22	T=2.1616 df=43 p-value=0.036
Respiratory rate	23.68	6.28	22.68	5.27	T=1.254 df=43 p-value=0.217
Temperature	36.77	1.50	36.88	0.75	T=0.443 df=43 p-value=0.660
Blood oxygen saturation	92.02	5.19	92.75	3.81	T=2.129 df=43 p-value=0.039

As shown in table6, in the experimental group, after intervention, heart rate significantly reduced (p-value=0.036). Also, in this group, significant difference was observed before and after intervention and it increased (p-value=0.039).

**Table6.** The values of physiological parameters in the patients after coronary artery bypass surgery before and after intervention in the experimental groups-2016

Experimental Group	Before		After		Pair t-test results
Physiologic parameters	Average	Standard deviation	Average	Standard deviation	
Systolic blood pressure	117.48	12.22	110.90	13.34	T=2.396 df=85 p-value=0.019
Diastolic blood pressure	74.60	8.17	71.29	8.76	T=1.820 df=85 p-value=0.072
Heart rate	86.74	13.02	87.15	12.17	T=0.153 df=85 p-value=0.878
Respiratory rate	24.18	6.49	23.68	6.28	T=0.368 df=85 p-value=0.714
Temperature	36.88	0.77	36.77	1.50	T=0.432 df=85 p-value=0.667
Blood oxygen saturation	90.62	3.57	92.02	5.19	T=1.456 df=85 p-value=0.149

### Discussion and conclusion

As shown in table1, there were statistically no significant differences between the experimental and control group in demographic characteristics such as age, marital status, gender, job, education and history of previous surgery. About pain intensity of the patients after coronary artery bypass surgery before the intervention, the results of the present showed that before the intervention, no significant difference was observed between the two groups (p-value=0.745). These results are consistent with the results of a study entitled "The impact of music on pain after surgery in patients with open heart surgery" by Ajorpaz et al. (21). They have studied on 60 patients in two experimental and control groups and the results showed that before the intervention, no significant difference was observed between the two groups in average pain intensity (p=0.21). The results of the present study showed that after coronary artery bypass surgery, no significant difference was observed between the two groups in terms of pain and more than three-quarters of patients in both groups had no pain (p-value=0.052). In a study entitled "The impact of music on patients' perception of pain after a surgery in a surgery center in North Carolina" by Betty Ister et al(22), the results showed that after surgery, %79.5 of patients of experimental group and %75 of the patients of control group had pain after surgery and so there was no significant different between the two groups (22). Ulrika Nilsson has performed a study to evaluate the effect of music on anxiety in patients after coronary artery bypass surgery and showed that there were statistically significant difference between the two experimental and control group in terms of pain intensity before and after intervention (23). The results of the present study on the pain intensity after coronary artery bypass surgery, before and after intervention showed that in control group, no significant different between the pain intensity before and after intervention (p=0.057). According to the results, immediately after surgery, %53.5of patients of control group had no pain and this increased to %72.1 after 20 min. But, in the experimental group, there was significant different between the pain intensity before and after intervention (p<0.001). Before intervention, %50 of patients had pain but after intervention only %11.4 of them had pain. The results of a study entitled "the impact of music on the patients' anxiety after coronary artery bypass surgery" by Ulrika Nilsson, showed that although no significant difference was observed between the two experimental and control group in terms pain intensity before and after 1-hour bed rest and both groups experienced reduced pain but the reduction in the experimental group undergoing music therapy was clearly more and statistically significant (23). The results of the present study showed that there was significant difference between the two experimental and control group before intervention in systolic blood pressure (p-value=0.019). But, in other physiological parameters, the differences were not significant. In this regard, Alord et al(24). have conducted a study on the impact of music on the pain and anxiety after surgery in 56 patients, the results of their study showed no significant difference in the values of physiological parameters (heart rate and blood oxygen saturation) before invention (24). Zanjan et al(17). have conducted a study on the impact of music therapy on pain and anxiety in the patients undergoing port catheter

placement procedures (pcpp) and the results showed that physiologic parameters (systolic and diastolic blood pressure, heart rate and respiration) of the experimental and control groups were similar (17). The results of present study showed that after intervention, there were significant differences between the experimental and control groups just in diastolic blood pressure (p-value=0.024) and blood oxygen saturation (p-value=0.14) and no significant differences were observed in other physiologic parameters. In this regard, Alord et al.(17) have reported no significant differences in the values of physiologic parameters (heart rate, respiration and blood oxygen saturation) after invention (17). Based on the results of a study conducted by Betty Ister et al(22), after intervention, no significant differences were observed in the values of physiologic parameters (heart rate, respiration and blood oxygen saturation) (22). Wang et al. have conducted a study in order to examine the impact of music on the ventilator-associated patients' anxiety and conducted that after intervention, the change in the physiological parameters (blood pressure and respiration) in the experimental group was significant but the difference between the two groups was not significant (p<0.05) (12). The results of the present study showed that in the control group, no significant differences were observed in the physiological parameters before and after intervention, but in the experimental group, heart rate significantly reduced (p-value=0.036). Also, in experimental group, blood oxygen saturation significantly increased after intervention (p-value=0.039). On the other hand, comparing the two groups in terms of physiological parameters showed no significant difference between them. The study conducted by Zanjan et al(17). showed that after intervention, compared to the control group, significant changes in physiological parameters were observed in the experimental group (p<0.05) (17). Korhan et al(16). have conducted a study entitled "the impact of music therapy and physiological signs of anxiety in the patient receiving the support of mechanical ventilation on 60 patients aged 18 to 70 years old", the results showed the positive impact of music therapy on physiological parameters of respiratory rate and systolic blood pressure and the change observed in the experimental group after intervention was statistically significant than before intervention (16). Rouhi et al(25)., in their study entitled "the impact of music on the patients' anxiety and some physiological parameters before abdominal surgery", reported that after playing music, anxiety and average arterial blood pressure in the experimental group were significantly different compared to the control group (p<0.05). But, no significant difference was observed between the two groups in the heart rate and respiratory rate in minute (25). In the present study, it was tried to use safe, cheap and accessible method of music therapy, which is a new method of pain relief and relaxation, in the patients to reduce the dependence of patients on pharmacologic and possibly complicated to provide the pain relief conditions for the patients and to accelerate their recovery process (26,27). The present study showed that using music therapy is not only safe for patients but also, it can be used as an inexpensive and available method along with the pharmaceutical methods or even it can be used alone. Reduction in pain in the experimental group as the main objective of the present study approves this claim. Therefore, this method can be used in intensive care unit of open heart surgical ward to care these patients in order to deal with the pain and improve the physiological parameters. Also, it is proposed to nursing staff to consider this issue in the in-service training for nurses and in the educational courses and training programs for nursing students.

## References

1. YORKE, J., WALLIS, M. & MCLEAN ,B. 2004. Patients' perceptions of pain management after cardiac surgery in an Australian critical care unit. *Heart & Lung: The Journal of Acute and Critical Care*, 33, 33-41.
2. BALAGOPAL, P. B., DE FERRANTI, S. D., COOK, S., DANIELS, S. R., GIDDING, S. S., HAYMAN, L. L., MCCRINDLE, B. W., MIETUS-SNYDER, M. L. & STEINBERGER, J. 2011. Nontraditional risk factors and biomarkers for cardiovascular disease: mechanistic, research, and clinical considerations for youth a scientific statement from the American Heart Association. *Circulation*, 123, 2749-2769.
3. NIKRAVAN MOFRAD, M. & SHIRI, H. 2009. *Intensive Care in ICU*. Tehran: Noore Danesh Publish.
4. PANAGOPOULOU, E., MONTGOMERY, A. & BENOS, A. 2006. Quality of life after coronary artery bypass grafting: evaluating the influence of preoperative physical and psychosocial functioning. *Journal of psychosomatic research*, 60, 639-644.
5. ASADI NOGHABI, A., SHABAN, M, FAGHIHZADEH, S. & ASADI, M. 2008. Effect of phase 1 cardiac rehabilitation program on the anxiety level of patients undergoing CABG surgery. *Hayat J* 14, 5-13.
6. BABAEI, G., KESHAVARZ, M., HAIDARNIA, A. & SHAYEGAN, M. 2007. Effect of a health education program on quality of life in patients undergoing coronary artery bypass surgery. *Acta Medica Iranica*, 45, 69-75.
7. JOHNSON, B. 2001. *Physiology of pain*, London, Bailliere Tineall. P:203-10.
8. SHABAN, M, RASOOLZADEH, N., MEHRAN, A. & MORADALIZADEH, F. 2006. Study of two non-pharmacological methods, progressive muscle relaxation and music, on pain relief of cancerous patients. *Hayat*, 12, 63-72.
9. , A., VAITKŪNAS, M. & DAUNORAS, J. 2015. Measurement of Human Physiological Parameters in the Systems of Active Clothing and Wearable Technologies. *Elektronika ir Elektrotechnika*, 71, 77-82.
10. KSHETTRY, V. R., CAROLE, L. F., HENLY, S. J., SENDELBACH ,S. & KUMMER, B. 2006. Complementary alternative medical therapies for heart surgery patients: feasibility, safety, and impact. *The Annals of thoracic surgery*, 81, 201-205.

11. AJORPAZ, N. M., SHAHSHAHANI, M. & DIANATI, M. 2011. The effects of music on the anxiety and some physiological indices of patients before general surgery. *Journal of Kermanshah University of Medical Sciences (J Kermanshah Univ Med Sci)*, 15.
12. WONG, H., LOPEZ-NAHAS, V. & MOLASSIOTIS, A. 2001. Effects of music therapy on anxiety in ventilator-dependent patients. *Heart & Lung: The Journal of Acute and Critical Care*, 30, 376-387.
13. NILSSON, U. 2008. The anxiety-and pain-reducing effects of music interventions: a systematic review. *Aorn Journal*, 87, 780-807.
14. HUANG, S. T., GOOD, M. & ZAUSZNIIEWSKI, J. A. 2010. The effectiveness of music in relieving pain in cancer patients: a randomized controlled trial. *International journal of nursing studies*, 47, 1354-1362.
15. GUTGSELL, K. J., SCHLUCHTER, M., MARGEVICIUS, S., DEGOLIA, P. A., MCLAUGHLIN, B., HARRIS, M., MECKLENBURG, J. & WIENCEK, C. 2013. Music therapy reduces pain in palliative care patients: a randomized controlled trial. *Journal of pain and symptom management*, 45, 822-831.
16. KORHAN ,E. A., KHORSHID, L. & UYAR, M. 2011. The effect of music therapy on physiological signs of anxiety in patients receiving mechanical ventilatory support. *Journal of Clinical Nursing*, 20, 1026-1034.
17. ZENGİN, S., KABUL, S., AL, B., SARCAN, E., DOĞAN, M. & YILDIRIM, C. 2013. Effects of music therapy on pain and anxiety in patients undergoing port catheter placement procedure. *Complementary therapies in medicine*, 21, 689-696.
18. ÖZER, N., KARAMAN ÖZLU, Z., ARSLAN, S. & GUNES, N. 2010. Effect of music on postoperative pain and physiologic parameters of patients after open heart surgery. *Pain Management Nursing*.
19. SENDELBACH SE, HALM MA, DORAN KA, MILLER EH, GAILLARD P. 2006. Effects of Music Therapy on Physiological and Psychological Outcomes for Patients Undergoing Cardiac Surgery. *Journal of Cardiovascular Nursing*; 21(3):194-200.
20. BESEL, J. M. 2006. The effects of music therapy on comfort in the mechanically ventilated patient in the intensive care unit. MONTANA STATE UNIVERSITY Bozeman
21. AJORPAZ, N. M., Mohamadi, A. & Najaran, H, Khazaei, Sh. 2014. effects of music on postoperative pain in patients under open heart surgery. *Journal of nursing and midwifery studies sep*;3(3):e20213.
22. ANDERSON, P. G. & CUTSHALL, S. M. 2007. Massage therapy: a comfort intervention for cardiac surgery patients. *Clinical Nurse Specialist*, 21, 161-165.
23. ERSTAD, B. L., PUNTILLO, K., GILBERT, H. C., GRAP, M. J., LI, D., MEDINA, J., MULARSKI, R. A., PASERO, C., VARKEY, B. & SESSLER, C. N. 2009. Pain management principles in the critically ill. *CHEST Journal*, 135, 1075-1086.
24. Allred K, Byers JF, Lou sole M. The effect of music on postoperative pain and anxiety. *Pain Manag Nurs* 2010; 11(1): 15-25.
25. Roohy GH, Rahmany A, Abdollahy AA, Mahmoody GhR. The effect of music on anxiety level of patients and some of physiological responses before abdominal surgery. *J Gorgan Uni Med Sci* 2005; 7(1): 75-78 (Persian).
26. LUI, K. & LAM, A. 2002. Safety and comfort during sedation for diagnostic or therapeutic procedures.
27. LALEGANI, H., ESMAEELI, S., KARIMI, M., MOGHANI, M. & JIVAD, N. 2014. The effect of deep-slow and regular breathing on pain intensity of burn dressing. *Journal of Critical Care Nursing*, 6, 223-228.