

## Original article

# The Effect of Music Therapy on the Vital Signs of Patients in a Surgical Intensive Care Unit

Seyhan Çıtlık Sarıtaş<sup>1</sup>, Bilsev Araç<sup>2</sup>

1-Seyhan Çıtlık Sarıtaş, RN, PhD, Inonu University, Nursing Department, Faculty of Health Sciences, 44280, Malatya, Turkey

2-Bilsev Araç, RN, Inonu University Institute of Health Science, Malatya, Turkey

Corresponding author: Seyhan Çıtlık Sarıtaş

Email: seyhancitlik@hotmail.com

### Abstract

**Objective:** The purpose of this study is to examine the effect of musicotherapy on the vital signs of patients in a surgical intensive care unit.

**Methods:** This quasi-experimental research was conducted at Inonu University Turgut Ozal Medical Center General Surgery Intensive Care Unit (ICU). The study population consisted of patients who had been hospitalized in the ICU during the last 24 hours, who remained at least one day in the ICU, and who agreed to participate in the study. They were over 18 years of age, and their levels of consciousness were 5 or higher according to the Glasgow Coma Scoring System. The sample was collected from 202 patients who were hospitalized at TOTM general surgery ICU after power analysis. Patient identification forms and the registration forms containing vital signs before and after the intervention were used for data collection. Information from patient identification forms and registration forms indicating vital signs (pulse rate, systolic and diastolic blood pressure, oxygen saturation level) before music therapy was recorded on the second day after admission to general surgery ICU. This information about the patients was recorded again after music therapy. The data were evaluated with descriptive statistics and a paired t test.

**Results:** Pulse rates, systolic and diastolic blood pressures were lowered by music therapy, and low oxygen saturations were raised by music therapy.

**Conclusion:** The results show that music therapy is effective.

**Keywords:** ICU, Music therapy, Vital signs, Nursing intervention.

### Introduction

Intensive care is defined as the ensemble of techniques used to cure partially or fully dysfunctional organs or systems, to replace these functions and to cure the fundamental causes of the illness. Intensive care units (ICUs) call for special attention because where the vital functions of the patients are monitored and supported, special treatments are applied and complex machines are used. They are special due to settlement type, man power, education content, professional capacity and technical equipment (1).

Intensive care units differ from other departments of the hospital due to the characteristics of their patients and illnesses, their treatment techniques, their physical appearances and emotional environments. Live's in danger, the unfamiliarity of

the environment and the people, limited movement, not being able to see family and friends, the feeling of being dependent on the machines and the intensive care unit, frequently repeated painful interventions, illness, inadequate knowledge about the illness and its treatment cause psycho – social problems (2).

There should be complementary treatments in order to keep sensorial problems under control. Complementary treatments are additional medical treatments that support the care of patients and enhance their quality of life. Complementary treatment techniques may be effective in prevention or control of intensive care complications including insomnia, pain and anxiety and they may ameliorate physiological indicators as pulse rate, and blood

pressure by stimulating the emotion and causing relaxation (3-5).

One complementary treatment, music is a characteristic of human nature and has accompanied every period of human life. Due to its effects on humans, music has also been used for treatment (6). Musical treatment has been defined by various professionals in many parts of the world. It appears to be rather difficult to form a single definition for various types of music. However, most of them agree on some basic principles, especially the therapeutic qualities of music. As a psycho-social intervention, music is used for the treatment of medical problems as a non-invasive treatment since it is an treatment intervention that supports traditional treatments (7).

It has shown that music therapy can be used as a treatment for patients with somatic and mental disorders to maintain their social and emotional state (8). It affects the emotional state of the patients with chronic illnesses in a positive way and causes relaxation by reducing stress (9).

Every kind of music changes human behaviours, affects the emotional state, causes psychological and physiological effects and facilitates communication proving that music is a means of therapy. Music therapy is an accepted complementary treatment technique with a variety of medical applications (10), including anxiety disorders (11), cancer therapy, (12) and hypertension (13).

A study demonstrated a significant reduction in the average blood pressure of the patients when the patients decided to undergo music therapy before their operations (14).

A research, which has a pre-test, post-test and control group, investigated the effects of music on the oxygen saturation levels of patients after a percutaneous coronary intervention, and showed that the average oxygen saturation levels of the patients in the test group was statistically higher than that of those in the control group (15).

Music therapy reduces blood pressure and pulse rates, stabilises respiration, increases oxygen saturation and is used as a complementary technique in patients care (15-18).

Various independent nursing interventions known as alternative therapeutics such as progressive relaxation, breathing deeply, therapeutic touch and music therapy treatment are used to help satisfy the patients' physical, emotional and psychological needs. However, the use of music as a nursing intervention is not widespread. Music therapy which is an important necessary nursing intervention because it helps to preserve the energy needed for recovery, and supports patients by mitigating their physical, emotional and psychological symptoms (8,19,20).

*Purpose*

The purpose of this study is to examine the effect of music therapy on the vital signs of patients in a surgical intensive care unit.

*Hypothesis*

H1. Patients treated by music therapy have lower pulse rates, lower systolic – and diastolic blood pressure and higher oxygen saturation levels.

## **Methods**

### **Study design**

In one group a pre-test and post-test experiment design was used in the study.

### **Setting and sample**

A convenience sample of 202 patient was recruited from Inonu University's Turgut Ozal Medical Centre (TOMC) in Turkey. The G-Power software program (Copyright 2010-2013 Heinrich-Heine-Universität Düsseldorf) for Windows was used to determine the study's sample size (21). Patients over 18 years of age in TOMC's general surgery intensive care clinic were the subject of this research. There were 202 patients in the general surgery intensive care clinic who were eligible for the research. Criteria to be eligible for the research: a-At least 24 hours in the ICU, b- Remain in the ICU for at least one day. Patients fulfilling these were selected in accordance with the random improbable sampling method.

### **Ethical consideration**

Ethical approval, which agreed with the principles in the Declaration of Helsinki [22] was obtained from the local university ethical (decision no. 2011/143) council prior to the study. The patients gave their written informed consent to participate in this study.

### **Measurements/instruments**

#### **Patient Information Form:**

Patient information forms were prepared to determine the defining features of the patients included in the research. There were five questions on this form (age, gender, marital status, education level and Glasgow coma evaluation).

#### **Vital Signs Forms**

The vital signs of patients (pulse rate, systolic and diastolic blood pressure, oxygen saturation) were measured and recorded before and after the intervention.

#### **Music CD**

A music CD was used as nursing intervention material. The CD, designed by a music expert to have a calming and relaxing effect, was a recording of the classical western music composer, Bach's, violin concertos played at 60 decibels.

#### **Data collection/procedure**

Patient information forms and vital signs forms of before and after intervention were used collect data. The researcher collected the data by staying in the ICU seven days week to reach the number of

patients planned for the sample group and observing the patients eligible for the research from September 2011 to February 2012. Data were collected by the researcher using patient information form, vital signs forms and face-to-face interviews.

Music therapy prepared for the patients of general surgery intensive care clinic was used as nursing intervention.

The following steps were taken for the nursing interventions in the research:

The patients in the research group were informed about music therapy the purpose and method of the research, and their consent was obtained.

The defining features of the patients and their Glasgow coma scores were recorded on the forms before the music therapy.

On the second day after the patients' admission to the general surgery ICU, pulse rate, systolic and diastolic blood pressure and oxygen saturation levels were measured and recorded on the music therapy registration form before the music therapy.

The patients listened to a CD designed by a music expert to have a calming and relaxing effect. The CD was a recording of the classical western music composer, Bach's, violin concertos played at 60 decibels. Since the literature states that a 25 -30 minute – listening session is sufficient, a 30 minute CD of was played [3,23,24]. All the patients listened to the same music with headphones in order to block extraneous noises.

Pulse rate, systolic and diastolic blood pressure and oxygen saturation values were measured at the end of this period and recorded on the music therapy registry form.

#### Data analysis

The analyses were performed by the Statistical Package for the Social Sciences (SPSS 15.0, Chicago, IL, USA). Evaluation of the data showed that;

Arithmetic averages (X) and standard deviations (SD) of the numerical and percentages of quantitative data were used to define the qualitative data for the patient's variables.

The pulse rates, systolic and diastolic blood pressure values and oxygen saturation levels before and after listening to the music were shown to have a normal distribution by the Shapiro Wilk test ( $p > 0.05$ ). A t test was used the test the changes in the measured values. The results were evaluated at  $p \leq .05$  and at 95% confidence interval.

#### Results

The distribution of the patients involved in research according to their identifier information in shown on Table 1. The average age of the patients involved in the research is  $55.10 \pm 17.11$  (19–96 years old), and, 51.5% are male, 67.3% are married and 36.1% graduated from primary school (Table 1).

**Table 1** Distribution of subjects' demographic characteristics (N=202)

Characteristics	n	%
<b>Sex</b>		
Male	98	48.5
Female	104	51.5
<b>Marital Status</b>		
Married	136	67.3
Bachelor	66	32.7
<b>Education Level</b>		
No formal education	56	27.7
Literate	21	10.4
Primary	73	36.1
High School and University	52	25.7
		<b>X ±SD</b>
Age	55.10±17.11	

The average pulse rate of the patients involved in the research was  $95.21 \pm 17.46$  before and  $89.46 \pm 16.01$  after music therapy, and the difference was considered statistically significant ( $p < .001$ , Table 2). The average systolic blood pressure (SBP) of patients involved in the research was  $129.15 \pm 22.78$  mmHg before and SBP  $122.44 \pm 20.67$  mmHg after music therapy, and the difference was considered statistically significant ( $p < .001$ , Table 2). The average diastolic blood pressure (DBP) of the patients involved in the research was  $80.17 \pm 13.65$  mmHg before and DBP  $76.28 \pm 13.14$  mmHg after music therapy, and the difference was considered statistically significant ( $p < .001$ , Table 2). The average oxygen saturation level (SPO<sub>2</sub>) of the patients involved in the research was  $96.18 \pm 3.08$  before and  $97.12 \pm 2.42$  after music therapy, and the difference was considered statistically significant ( $p < .001$ , Table 2).

**Table 2** Comparison of music therapy before and after average vital signs of the patient (N=202)

Vital Signs	Music therapy before	Music therapy after	t	p
	X ± SD	X ± SD		
Pulse Rate	95.21 ± 17.46	89.46 ± 16.01	11.67	.001*
Systolic blood pressure	129.15 ± 22.78	122.44 ± 20.67	9.79	.001*
Diastolic blood pressure	80.17 ± 13.65	76.28 ± 13.14	7.02	.001*
Oxygen saturation (SpO <sub>2</sub> )	96.18 ± 3.08	97.12 ± 2.42	6.69	.001*

### Discussion

The psycho-social intervention, music therapy, is used as a non-invasive intervention for the treatment of health problems (10,20). It generates physiological and psychological changes within the body by affecting the brain's limbic system. It also ameliorates in physiological indicators such as blood pressure, pulse rate and respiration by activating the parasympathetic nervous system (1). Here, the findings of this study, which investigated the effect of music therapy on the vital signs of surgical intensive care patients, are related to the relevant literature.

The high pulse rate average of the patients involved in the research returned to very close to normal following the music therapy. The difference between the two rates is statistically significant ( $p < .001$ ). A study divided artificial respiration patients in intensive care into a control group and a test group. They played 60 minutes of music for the test group and then recorded pulse rate. Their study they showed that there had been a considerable decrease in the pulse rates of the test group patients (23). A study used testing and control groups to analyze the effects of music therapy on the physiological indicators of artificial respiration patients. They measured the pulse rates of the test group patients 5 times during a 30-minute music therapy session. At the end of the study, they detected that the pulse rate average of testing group patients had been lowered more than that of the control group (25). A study of the effects of music on the vital signs of patients undergoing caesarean sections demonstrated an important reduction in their average pulse rate (5). In another research on the effects of music therapy on the physiological indicators of ICU patients showed a significant reduction in average pulse rates (6). Pre-test/post-

test study discovered a considerable reduction in average pulse rates of patients who had clamp

operations after a percutaneous coronary intervention (15). A similar result was demonstrated by in another study as well (14). The results of this study are in accord with the results of the finding we have just discussed. Thus; music therapy is an independent nursing intervention that can be used to reduce pulse rates.

When patients' blood pressure values were compared, high SBP and DBP averages were a significantly reduced by music therapy, and the difference between was considered statistically significant ( $p < .001$ ). In their study of artificial respiration adult patients, they found that listening music lowered patients' SBP and DBP values (26). A study divided patients into two groups. The test group listened to music for 30 minutes, and a statistically significant decrease in DBP values was demonstrated by 7 different measurements (27). A study determined that the SBP and DBP values of patients were reduced by music therapy (23). In a study played music on the hospital sound system for 30 minutes in their pre- test/ post- test study of the effects on blood pressure of music played during upper gastrointestinal endoscopy operation. The average SPB means of the test group patients was found to be lower than that of the control group (16). A study investigated the effects of music therapy on blood pressure during hysterosalpinography when patients decided to undergo music therapy before operations. A significant decrease in blood pressure averages was found (14). In a study of the effects of music on the blood pressure of coronary heart disease patients showed a reduction in blood pressure averages (17). In a study practiced music therapy for 28 days for his study investigating the

effects of classical Turkish music on the blood pressure of elderly hypertensive patients. He demonstrated a significant reduction in the systolic blood pressure of the patients (13). Similar results were obtained by in other studies as well (5, 25). The results of this study are similar to those in the literature, suggesting that music therapy can be defined as an independent nursing intervention that reduces SBP and DBP values.

Low SPO<sub>2</sub> averages rose considerably after music therapy, and the difference between them was found statistically significant ( $p < .001$ ). A research, used a pre-test, post-test and control groups. They investigated the effects of music on the oxygen saturation levels of the patients who had clamp operations after percutaneous coronary intervention, and showed that the average oxygen saturation levels of the patients in the test group were statistically higher than those of the control group (5). In a study divided artificial respiration patients into two groups to investigate the effects of music on their oxygen saturation levels, and found that the oxygen saturation averages of the test group were considerably higher than that of the control group. This increase was considered statistically significant (28). The results of the study conform with those of the research. Music therapy can be used to raise SPO<sub>2</sub>.

This conclusion confirms the hypothesis that music therapy lowers the pulse rate, reduces systolic- and diastolic blood pressure and raises oxygen saturation levels.

### Conclusion

The purpose of this study is to examine the effect of music therapy on vital signs of patients in surgical intensive care unit. A decrease in pulse values, systolic blood pressure value and diastolic blood pressure was observed after music therapy. An increase in oxygen saturation rate was observed after music therapy.

In-service trainings about music therapy, which is an independent nursing activity in ICUs, and their continuity should be encouraged; and, with regard to music therapy in ICUs, planning of patient care services should be suggested.

### References

1. Arslan S, Ozer N. Complementary treatments for the sensory input problems of intensive care patients. *Journal of Anatolia Nursing and Health Sciences*. 2010;13(2): 68-75
2. Chlan LA. Single session of music therapy decreased anxiety and improved relaxation in adults who required mechanical ventilation. *Evid Based Nurs*. 1999; 2:49
3. Ozer N, Ozlu KZ, Arslan S, Gunes N. Effect of music on postoperative pain and physiologic parameters of patients after open heart surgery. *Pain Manag Nurs*. 2013; 14(1): 20-28.
4. Bael-Lim HM, Hur MH, Lee MS. Intra-operative music listening for anxiety, the BIS index, and the vital signs of patients undergoing regional anesthesia. *Complement Ther Med*. 2014; 22(2): 251-257.
5. Chang SC, Chen CH. Effects of music therapy on women's physiologic measures, anxiety, and satisfaction during cesarean delivery. *Res Nurs Health*. 2005; 28(6): 453-461.
6. Wilkins MK, Moore ML. Music intervention in the intensive care unit: a complementary therapy to improve patient outcomes. *Evid Based Nurs*. 2004;7:103-104.
7. Chan MF, Chung YF, Chung SW, Lee OK. Investigating the physiological responses of patients listening to music in the intensive care unit. *J Clin Nurs*. 2008;18(9): 1250-1257.
8. Dogan VM, Senturan L. The effects of the music therapy on coronary angiography patients' anxiety level. *Open J Nurs*. 2012;2(3): 165-169.
9. Loomba RS, Shah PH, Chandrasekar S, Arora R, Molnar J. Effects of music on systolic blood pressure, diastolic blood pressure, and heart rate: a meta-analysis. *Indian Heart J*. 2012; 64(3): 309-313.
10. Jiménez-Jiménez M, García-Escalona A, Martín-López A, De Vera-Vera R, De Haro J. Intraoperative stress and anxiety reduction with music therapy: a controlled randomized clinical trial of efficacy and safety. *J Vasc Nurs*. 2013; 31(3): 101-106.
11. 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. *Holist Nurs Pract*. 2009; 23(4): 238-242.
12. Tascilar M, De Jong FA, Verweij J, Mathijssen RHL. Complementary and alternative medicine during cancer treatment. *Oncologist*. 2006; 11(7): 732-741.
13. Bekiroglu T, Ovayolu N, Ergun Y, Ekerbicer HC. Effect of Turkish classical music on blood pressure: A randomized controlled trial in hypertensive elderly patients. *Complement Ther Med*. 2011; 21(3): 147-154.
14. Agwu KK, Okoye IJ. The effect of music on the anxiety levels of patients undergoing hysterolalpingography. *Radiography*. 2006;13(2): 122-125.
15. Chan MF, Wong OC, Chan HL, Fong MC, Lai SY, Lo CW et al. Effects of music on patients undergoing a c-clamp procedure after percutaneous coronary interventions. *J Adv Nurs*. 2006; 53(6): 669-679.
16. Ucan O, Ovayolu N, Savas CM, Torun S, Gulsen M, Buyukberber M. The patient's pulse,

blood pressure and oxygen saturation effect when exposed to music during upper gastrointestinal endoscopy. *Hospital Administration*. 2006; 10(2):56-60.

17. Bradt J, Dileo C. Music for stress and anxiety reduction in coronary heart disease patients. *Cochrane Database Syst Rev*. 2009; 15(2): 65-77.

18. Korhan EA, Khorshid L, Uyar M. Effect of music therapy on physiological signs of anxiety in patients receiving mechanical ventilatory support. *J Clin Nurs*. 2011; 20(7-8): 1026-1036.

19. Dogan S, Tur B, Dilek L, Kucukdeveci A. Single music therapy session reduces anxiety in patients with stroke. *J PMR Sci*. 2011;14:12-15.

20. Chen LC, Wang TF, Shih YN, Wu LJ. Fifteen-minute music intervention reduces pre-radiotherapy anxiety in oncology patients. *Eur J Oncol Nurs*. 2013;17(4):436-441.

21. Faul F, Erdfelder E, Lang AG. G\*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods*. 2007;39:175-191.

22. World Medical Association. WMA Declaration of Helsinki ethical principles for medical research involving human subjects [Internet]. (Fortaleza (Brazil): 64th WMA General Assembly); 2013 ([cited 2015 November 10]. Available from: <http://www.wma.net/en/30publications/10policies/b3/>.

23. Almerud S, Petersson K. Music therapy a complementary treatment for mechanically ventilated intensive care patients. *Intensive Crit Care Nurs*. 2003; 19(1): 21-30.

24. Updike P. Music therapy results for ICU patients. *Dimens Crit Care Nurs*. 1990; 9(1): 39-45.

25. Angela O, Chang Y, Chan M, Chan W. Music and its effect on the physiological responses and anxiety levels of patients receiving mechanical ventilation: A Pilot Study. *J Clin Nurs*. 2005;14(5): 609-622.

26. Chlan L, Tracy M, Nelson B, Walker J. Feasibility of a music intervention protocol for patients receiving mechanical ventilatory support. *Altern Ther Health Med*. 2001;7(6): 80-83.

27. Wong HL, Lopez-Nahas V, Molassiotis A. Effects of music therapy on anxiety in ventilator dependent patients. *Heart Lung*. 2001;30(5):376-87.

28. Lee OKA, Chung YFL, Chan MF, Chan WM. Music and its effect on the physiological responses and anxiety levels of patients receiving mechanical ventilation: a pilot study. *J Clin Nurs*. 2005;14(5): 609-620.