Original article

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

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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.*

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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 anxietyand they may ameliorate physiological indicators as pulse rate, and blood

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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).

Ithas 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 stres (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. Us 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).

Aresearch, 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 thesewere 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

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

The average pulse rate of the patients involved in the research was 95.21 ± 17.46 before and 89.46 ± 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±22.78 mmHg before and SBP 122.44±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 ± 13.65 mmHg before and DBP 76.28±13.14 mmHg after music therapy, and the difference was considered statistically significant ($p<.001$, Table 2). The average oxygen saturation level (SPO_2) of the patients involved in the research was 96.18 ± 3.08 before and 97.12±2.42 after music therapy, and the difference was considered statistically significant ($p<.001$, Table 2).

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

	Music therapy before	Music therapy after		
Vital Signs	X ± SD	X ± SD	t	p
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_2)	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). Apre-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 anotherstudy 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 listeninged 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). Astudy etermined 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). Astudy 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

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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 studiesas well (5, 25). The results of this studyis 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_2 averages rose considerably after music therapy, and the difference between them was found statistically significant (p<.001). A research, useds 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, andshowed 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_2.

This conclusion confirms the hypothesis that music therapylowers 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.

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