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# A Study to Assess The Effect Of Music Therapy On Selected Parameters Among Patients Who Have Undergone Cardiac Surgery In Selected Hospitals In Mumbai

Ms. Tejaswini Mohan Dudhawadkar[1]* Dr. Nancy Fernandes Pereira[2]

[1]*Master of Science in Nursing, Leelabai Thackersey College of Nursing S.N.D.T. Women's University Mumbai-400020
[2]Principal, L.T. College of Nursing, S.D.N.T. Women's University, Mumbai-400020

**Corresponding author**
DR. Nancy Fernandes Pereira
PRINCIPAL, L.T. COLLEGE OF NURSING, S.D.N.T. WOMEN'S UNIVERSITY, MUMBAI-400020

## ABSTRACT

**Introduction**: Postoperative cardiac surgery patients frequently experience physiological instability due to surgical stress responses, leading to increased complications and delayed recovery. Music therapy is a simple, non-pharmacological intervention known to modulate autonomic nervous system activity. This study aimed to evaluate the effectiveness of structured music therapy on selected physiological parameters among postoperative cardiac surgery patients during recovery.

**Materials and Methods**: A quasi-experimental pretest–posttest control group design was adopted among thirty postoperative cardiac surgery patients in a tertiary cardiac hospital. Fifteen patients received binaural music therapy twice daily for seven consecutive days, while the control group received routine postoperative care. Physiological parameters including blood pressure, pulse rate, and respiratory rate were recorded and analyzed using appropriate statistical tests.

**Results:** Post-intervention findings demonstrated statistically significant reductions in systolic and diastolic blood pressure, pulse rate, and respiratory rate in the experimental group compared with the control group. Day-wise analysis revealed progressive physiological stabilization from Day one to Day seven. Baseline measurements showed no statistically significant differences between the experimental and control groups.

**Discussion:** The results indicate that music therapy effectively modulates autonomic responses, contributing to improved cardiovascular and respiratory stability following cardiac surgery. Repeated exposure to music therapy produced cumulative therapeutic benefits beyond routine postoperative care. These findings support existing evidence that music-based interventions are safe, low-cost adjuncts that enhance holistic recovery in postoperative cardiac patients.

**Conclusion:** Music therapy is an effective, non-invasive adjunct in postoperative cardiac surgery care, producing significant improvements in vital physiological parameters. Its simplicity, safety, and ease of implementation support clinical applicability. Integrating music therapy into routine postoperative protocols may enhance physiological stabilization, recovery, patient comfort, and overall patient-centered outcomes in contemporary cardiac care settings..

**KEYWORDS**: Autonomic modulation; Cardiac surgery; Music therapy; Non-pharmacological intervention; Physiological parameters; Postoperative care.

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## INTRODUCTION

Cardiovascular diseases (CVDs) remain a leading cause of morbidity and mortality worldwide, placing a substantial burden on healthcare systems. Advances in diagnostic modalities, surgical techniques, anesthesia, and perioperative management have markedly improved survival outcomes in patients undergoing cardiac surgeries such as coronary artery bypass grafting (CABG), valve repair or replacement, and other corrective cardiac procedures.[1] Despite these advances, the immediate postoperative period continues to be a phase of heightened clinical vulnerability. Postoperative cardiac surgery patients frequently experience physiological instability due to surgical trauma, anesthesia-related effects, inflammatory responses, and hemodynamic stress.[2] These factors often manifest as elevated systolic and diastolic blood pressure, increased pulse rate, and altered respiratory patterns, which may delay recovery, increase the risk of complications, and prolong hospital stay. Therefore, achieving and maintaining physiological stability during the postoperative period is a critical objective of cardiac surgical care.[3]

The postoperative physiological stress response is primarily mediated through activation of the sympathetic nervous system and the hypothalamic–pituitary–adrenal axis, resulting in increased catecholamine secretion. This neuroendocrine response leads to vasoconstriction, tachycardia, elevated blood pressure, increased myocardial oxygen demand, and altered respiratory dynamics.[4] In patients recovering from cardiac surgery, such responses may exacerbate cardiovascular strain, compromise hemodynamic stability, and predispose individuals to complications such as arrhythmias, hypertension, and respiratory distress. While pharmacological interventions are central to postoperative management, exclusive reliance on medications may be associated

with adverse drug reactions, polypharmacy, and increased healthcare costs. Consequently, there is growing interest in complementary and non-pharmacological interventions that can support physiological stabilization without additional pharmacological burden.[5]

Music therapy has emerged as a promising adjunctive intervention due to its simplicity, safety, cost-effectiveness, and ease of implementation in hospital settings. Music therapy involves the structured and therapeutic use of music to influence physiological and neurological processes, primarily through modulation of the autonomic nervous system. Auditory stimulation has been shown to influence cortical and subcortical brain regions involved in emotional regulation and autonomic control. Slow-tempo, rhythmically consistent, and harmonious music can reduce sympathetic nervous system activity while enhancing parasympathetic tone, leading to reductions in heart rate and blood pressure and promoting respiratory regularity. Music-induced relaxation may also reduce oxygen consumption and improve breathing efficiency, contributing to overall hemodynamic stability.[6] Previous studies conducted in intensive care units and postoperative surgical settings have reported beneficial effects of music therapy on vital signs, including reductions in systolic and diastolic blood pressure, pulse rate, and respiratory rate. However, inconsistencies in intervention protocols, duration, and outcome measures limit the generalizability of findings. Moreover, limited evidence exists regarding the sustained effects of repeated music therapy sessions and day-wise physiological changes in postoperative cardiac surgery patients, particularly within the Indian clinical context. [7]

The present study was undertaken to evaluate the effectiveness of music therapy on selected physiological parameters among patients who had undergone cardiac surgery. The specific objectives were to assess and compare systolic blood pressure, diastolic blood pressure, pulse rate, and respiratory rate between experimental and control groups; to analyze day-wise changes in these physiological parameters following music therapy within the experimental group; and to determine the association between post-intervention physiological outcomes and selected demographic variables such as age and gender.[8]

## MATERIALS AND METHODS

### 2.1 Study Design and Approach

A quantitative, quasi-experimental pretest–posttest control group design was adopted to evaluate the effectiveness of music therapy on selected physiological and psychological parameters among postoperative cardiac surgery patients.
The study included an experimental group receiving music therapy and a control group receiving routine postoperative care without intervention.

### 2.2 Study Setting

The study was conducted at Smt. S. R. Mehta & Sir K. P. Cardiac Institute, Mumbai, a tertiary care cardiac center. Data collection was carried out in the Cardiac Intensive Care Unit (ICU) and surgical wards, where postoperative cardiac surgery patients were managed.

### 2.3 Study Population and Sample

The study population comprised adult patients who had undergone cardiac surgery and were in the postoperative recovery phase. A total of 30 patients were included, with 15 patients assigned to the experimental group and 15 to the control group.

### 2.4 Sampling Technique

A convenience sampling technique was used to recruit eligible patients who met the inclusion criteria during the study period.

### 2.5 Eligibility Criteria

**Inclusion criteria**

- Age between 40 and 70 years
- Normal hearing ability
- Ability to understand English, Marathi, or Hindi
- Willingness to participate [9]

**Exclusion criteria**

- Previous history of cardiac surgery
- Critically ill patients during the perioperative period
- Diagnosed psychiatric disorders [10]

### 2.6 Study Variables

**Independent variable**

- Music therapy

**Dependent variables**

Physiological parameters, including systolic blood pressure, diastolic blood pressure, pulse rate, and respiratory rate, were systematically recorded during morning and evening sessions on Days 1, 4, and 7. [12]

### 2.7 Data Collection Instruments

1. **Semi-structured interview schedule**

Used to obtain clinical data, including duration of illness, type of surgery, and comorbid conditions.

2. **Physiological assessment tools**

- Blood pressure measured using a standard sphygmomanometer
- Pulse rate and respiratory rate measured using a cardiac monitor and stopwatch [13]

**2.8 Intervention Protocol: Music Therapy**

The intervention consisted of pre-recorded binaural therapeutic music, validated by experts.

- Source: www.sursmt.com
- Duration: 30 minutes per session
- Frequency: Twice daily (morning and evening)
- Intervention period: 7 consecutive postoperative days
- Mode of delivery: Headsets
- Volume: Adjusted according to patient comfort

Participants were instructed to lie comfortably, close their eyes, and relax during the session.

**2.9 Data Collection Procedure**

Data were collected between 14 January to 12 February 2022. After obtaining informed consent, clinical, and physiological parameters were recorded.

For the experimental group, pre-intervention assessments were followed by music therapy sessions and post-intervention assessments, repeated daily for seven days. The control group underwent pre- and post-assessments without any intervention.

**2.10 Validity and Reliability**

Content validity of the instruments was established by 11 experts from nursing, cardiothoracic surgery, and psychology. Translation and back-translation ensured linguistic accuracy. Internal consistency reliability was confirmed with a Cronbach's alpha of 0.849.

**2.11 Pilot Study**

A pilot study conducted between 3 to 12 January 2022 on three postoperative cardiac surgery patients confirmed the feasibility of the study design and tools. No major modifications were required following the pilot study.

**2.12 Statistical Analysis**

Data were analyzed using descriptive and inferential statistics. Frequency, percentage, mean, and standard deviation were used to summarize clinical variables. Paired *t*-tests were applied for within-group comparisons, and independent *t*-tests were used for between-group comparisons. Associations between post-intervention physiological parameters. A *p-value* < 0.01 was considered statistically significant.

## OBSERVATIONS AND RESULTS

The observations and results of the study are presented in this section based on statistical analysis of the data collected from experimental and control groups. The results include baseline characteristics, day-wise comparisons, and evaluation of post-intervention physiological outcomes.

**Table 1. Baseline Clinical and Surgical Characteristics of the Study Participants (N=30)**

| S. No. | Aspects | Categories | Experimental Group (N = 15) F (%) | Control Group (N = 15) F (%) |
|---|---|---|---|---|
| 1 | Diagnosis | Ischemic Heart Disease | 8 (53.3%) | 4 (26.6%) |
| | | Coronary Artery Disease | 5 (33.3%) | 4 (26.6%) |
| | | Acute Coronary Syndrome | 1 (6.6%) | 6 (40.0%) |
| | | Other cardiac conditions | 1 (6.6%) | 1 (6.6%) |
| 2 | Duration of Illness | 1–3 years | 9 (60.0%) | 11 (73.3%) |
| | | 4–6 years | 4 (26.6%) | 1 (6.6%) |
| | | 7–8 years | 2 (13.3%) | 3 (20.0%) |
| 3 | Date of Admission | 11/01/2022 | 4 (26.6%) | 3 (20.0%) |
| | | 12/01/2022 | 2 (13.3%) | 3 (20.0%) |
| | | 13/01/2022 | 3 (20.0%) | 3 (20.0%) |
| | | 14/01/2022 | 3 (20.0%) | 3 (20.0%) |
| | | 15/01/2022 | 3 (20.0%) | 3 (20.0%) |
| 4 | Name of Surgery 1 | CABG | 11 (73.3%) | 14 (93.3%) |
| | | Heart valve replacement/repair | 4 (26.6%) | 1 (6.6%) |

| | | | | |
|---|---|---|---|---|
| | | Aortic Arch | 0 (0%) | 0 (0%) |
| 5 | Name of Surgery 2 | CABG | 0 (0%) | 0 (0%) |
| | | Heart valve replacement/repair | 1 (6.6%) | 2 (13.3%) |
| | | Aortic Arch | 0 (0%) | 0 (0%) |
| 6 | Postoperative Days | 3rd Post-op Day | 15 (100%) | 15 100%) |

Table 1 presents the distribution of participants based on diagnosis, duration of illness, admission dates, type of surgery, and postoperative day in both groups. Ischemic heart disease and coronary artery bypass grafting were the most common clinical characteristics. The majority of participants in both groups were assessed on the third postoperative day. Overall, the experimental and control groups were clinically comparable.

**Table 2 Distribution of Comorbid Conditions Among Experimental and Control Groups (N=30)**

| Group | Hypertension | Diabetes | Obesity | Diabetes + Hypertension | CKD | Hypothyroid | Obesity + Hypothyroid |
|---|---|---|---|---|---|---|---|
| Experimental (N = 15) | 5 (33.3%) | 3 (20.0%) | 1 (6.6%) | 3 (20.0%) | 1 (6.6%) | 1 (6.6%) | 1 (6.6%) |
| Control (N = 15) | 3 (20.0%) | 7 (46.6%) | 1 (6.6%) | 4 (26.6%) | 0 (0%) | 0 (0%) | 0 (0%) |

This table 2 describes the prevalence of comorbidities among participants in both groups. Hypertension and diabetes were the most frequently reported conditions in both groups. A similar distribution of combined comorbidities was observed, indicating baseline homogeneity. No major imbalance in comorbidity profiles was noted between groups.

**Table 3 Day-wise Distribution of Physiological Parameters in the Experimental Group**

| Range | Day | Morning Pre | Morning Post | Evening Pre | Evening Post |
|---|---|---|---|---|---|
| **Systolic Blood Pressure (mmHg)** | | | | | |
| 150 | D1 | 5 (33.3%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 140 | D1 | 3 (20%) | 6 (40%) | 7 (46.6%) | 3 (20%) |
| 130 | D1 | 5 (33.3%) | 4 (26.6%) | 7 (46.6%) | 8 (53.3%) |
| 120 | D1 | 2 (13.3%) | 4 (26.6%) | 0 (0%) | 3 (20%) |
| 110 | D1 | 0 (0%) | 1 (6.6%) | 0 (0%) | 0 (0%) |
| 100 | D1 | 0 (0%) | 0 (0%) | 1 (6.6%) | 1 (6.6%) |
| 150 | D4 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 140 | D4 | 6 (40%) | 7 (46.6%) | 3 (20%) | 1 (6.6%) |
| 130 | D4 | 7 (46.6%) | 8 (53.3%) | 4 (26.6%) | 1 (6.6%) |
| 120 | D4 | 10 (66.6%) | 13 (86.6%) | 11 (73.3%) | 12 (80%) |
| 110 | D4 | 1 (6.6%) | 1 (6.6%) | 3 (20%) | 11 (73.3%) |
| 100 | D4 | 0 (0%) | 0 (0%) | 1 (6.6%) | 1 (6.6%) |
| 150 | D7 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 140 | D7 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 130 | D7 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 120 | D7 | 4 (26.6%) | 13 (86.6%) | 6 (40%) | – |
| 110 | D7 | 0 (0%) | 8 (53.3%) | – | – |
| 100 | D7 | 1 (6.6%) | 1 (6.6%) | – | – |
| **Diastolic Blood Pressure (mmHg)** | | | | | |
| 90 | D1 | 10 (66.6%) | 0 (0%) | 5 (33.3%) | 2 (13.3%) |
| 80 | D1 | 4 (26.6%) | 13 (86.6%) | 5 (33.3%) | 7 (46.6%) |
| 70 | D1 | 1 (6.6%) | 1 (6.6%) | 5 (33.3%) | 3 (20%) |
| 60 | D1 | 0 (0%) | 1 (6.6%) | 0 (0%) | 3 (20%) |
| 90 | D4 | 9 (60%) | 3 (20%) | 6 (40%) | 1 (6.6%) |
| 80 | D4 | 3 (20%) | 9 (60%) | 8 (53.3%) | 7 (46.6%) |
| 70 | D4 | 1 (6.6%) | 2 (13.3%) | 0 (0%) | 7 (46.6%) |
| 60 | D4 | 1 (6.6%) | 1 (6.6%) | 0 (0%) | 0 (0%) |
| 90 | D7 | 2 (13.3%) | 0 (0%) | 4 (26.6%) | 0 (0%) |
| 80 | D7 | 1 (6.6%) | 4 (26.6%) | 3 (20%) | – |
| 70 | D7 | 11 (73.3%) | 6 (40%) | 7 (46.6%) | – |
| 60 | D7 | 3 (20%) | 1 (6.6%) | 5 (33.3%) | – |
| **Pulse (bpm)** | | | | | |
| 60–70 | D1 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 71–80 | D1 | 0 (0%) | 0 (0%) | 2 (13.3%) | 3 (20%) |

| | | | | | |
|---|---|---|---|---|---|
| 81–90 | D1 | 3 (20%) | 4 (26.6%) | 4 (26.6%) | 3 (20%) |
| 91–100 | D1 | 10 (66.6%) | 10 (66.6%) | 8 (53.3%) | 9 (60%) |
| 101–110 | D1 | 2 (13.3%) | 1 (6.6%) | 2 (13.3%) | 0 (0%) |
| 60–70 | D4 | 1 (6.6%) | 3 (20%) | 1 (6.6%) | 4 (26.6%) |
| 71–80 | D4 | 1 (6.6%) | 5 (33.3%) | 4 (26.6%) | 3 (20%) |
| 81–90 | D4 | 10 (66.6%) | 7 (46.6%) | 9 (60%) | 9 (60%) |
| 91–100 | D4 | 1 (6.6%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 101–110 | D4 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 60–70 | D7 | 6 (40%) | 8 (53.3%) | – | – |
| 71–80 | D7 | 11 (73.3%) | 8 (53.3%) | 7 (46.6%) | 6 (40%) |
| 81–90 | D7 | 3 (20%) | 3 (20%) | 2 (13.3%) | 1 (6.6%) |
| **Respiration (breaths/min)** | | | | | |
| 16–20 | D1 | 0 (0%) | 0 (0%) | 2 (13.3%) | 2 (13.3%) |
| 21–25 | D1 | 3 (20%) | 3 (20%) | 2 (13.3%) | 2 (13.3%) |
| 26–30 | D1 | 9 (60%) | 10 (66.6%) | 12 (80%) | 13 (86.6%) |
| 31–35 | D1 | 3 (20%) | 2 (13.3%) | 1 (6.6%) | 0 (0%) |
| 16–20 | D4 | 0 (0%) | 1 (6.6%) | 9 (60%) | 10 (66.6%) |
| 21–25 | D4 | 9 (60%) | 12 (80%) | 12 (80%) | 14 (93.3%) |
| 26–30 | D4 | 4 (26.6%) | 1 (6.6%) | 3 (20%) | 0 (0%) |
| 31–35 | D4 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 16–20 | D7 | 7 (46.6%) | 13 (86.6%) | – | – |
| 21–25 | D7 | 5 (33.3%) | 5 (33.3%) | 8 (53.3%) | 2 (13.3%) |
| 26–30 | D7 | 1 (6.6%) | 0 (0%) | 0 (0%) | 0 (0%) |
| 31–35 | D7 | 0 (0%) | 0 (0%) | 0 (0%) | 0 (0%) |

Table 3 depicts day-wise distributions of systolic and diastolic blood pressure, pulse rate, and respiratory rate in the experimental group. A progressive shift toward normal physiological ranges was observed across days and post-intervention measurements. Improvements were more evident by Day 7 in morning and evening recordings. These trends suggest a beneficial effect of music therapy.

**Table 4: Day-wise Distribution of Physiological Parameters in the Control Group**

| | **Vitals** | **Control Group (N=15)** | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **D1** | | | | | | | | **D4** | | | | | | | | **D7** | | | | | | | |
| | | **Morning** | | | | **Evening** | | | | **Morning** | | | | **Evening** | | | | **Morning** | | | | **Evening** | | | |
| | | **Pre** | | **Post** | | **Pre** | | **Post** | | **Pre** | | **Post** | | **Pre** | | **Post** | | **Pre** | | **Post** | | **Pre** | | **Post** | |
| **BP Systolic** | | | | | | | | | | | | | | | | | | | | | | | | | |
| SR.N | BP Sys | F | % | F | % | F | % | F | % | F | % | F | % | F | % | F | % | F | % | F | % | F | % | F | % |
| 1 | 150 | 0 | 0 | 2 | 13.3 | 0 | 0 | 1 | 6.6 | 0 | 0 | 1 | 6.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 140 | 6 | 40 | 1 | 6.6 | 3 | 20 | 6 | 40 | 0 | 0 | 5 | 33.3 | 0 | 0 | 3 | 20 | 0 | 0 | 1 | 6.6 | 0 | 0 | 1 | 6.6 |
| 3 | 130 | 4 | 26.6 | 12 | 80 | 8 | 53.3 | 8 | 53.3 | 1 | 6.6 | 8 | 53.3 | 1 | 6.6 | 8 | 53.3 | 0 | 0 | 8 | 53.3 | 0 | 0 | 12 | 80 |
| 4 | 120 | 4 | 26.6 | 0 | 0 | 3 | 20 | 0 | 0 | 13 | 86.6 | 0 | 0 | 12 | 80 | 4 | 26.6 | 4 | 26.6 | 5 | 33.3 | 6 | 40 | 3 | 20 |
| 5 | 110 | 1 | 6.6 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6.6 | 1 | 6.6 | 1 | 6.6 | 0 | 0 | 11 | 73.3 | 1 | 6.6 | 8 | 53.3 | 0 | 0 |
| 6 | 100 | 0 | 0 | 0 | 0 | 1 | 6.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6.6 | 0 | 0 |
| **Diastolic** | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 90 | 8 | 53.3 | 8 | 53.3 | 5 | 33.3 | 4 | 26.6 | 4 | 26.6 | 4 | 26.6 | 5 | 33.3 | 6 | 40 | 1 | 6.6 | 1 | 6.6 | 5 | 33.3 | 5 | 33.3 |
| 2 | 80 | 4 | 26.6 | 4 | 26.6 | 8 | 53.3 | 9 | 60 | 11 | 73.3 | 10 | 66.6 | 7 | 46.6 | 6 | 40 | 6 | 40 | 6 | 40 | 5 | 33.3 | 5 | 33.3 |
| 3 | 70 | 3 | 20 | 3 | 20 | 2 | 13.3 | 2 | 13.3 | 0 | 0 | 1 | 6.6 | 3 | 20 | 3 | 20 | 7 | 46.6 | 7 | 46.6 | 5 | 33.3 | 5 | 33.3 |
| 4 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6.6 | 1 | 6.6 | 0 | 0 | 0 | 0 |
| **Pulse** | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 60-70 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 71-80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 81-90 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 130. | 2 | 13.3 | 4 | 26.6 | 4 | 26.6 | 5 | 33.3 | 4 | 26.6 | 4 | 26.6 | 4 | 26.6 |
| 4 | 91-100 | 8 | 53.3 | 8 | 53.3 | 6 | 40 | 6 | 40 | 11 | 73.3 | 11 | 73.3 | 9 | 60 | 9 | 60 | 10 | 66.6 | 11 | 73.3 | 10 | 66.6 | 10 | 66.6 |
| 5 | 101-110 | 4 | 26.6 | 4 | 26.6 | 3 | 20 | 3 | 20 | 2 | 13.3 | 2 | 13.3 | 1 | 6.6 | 1 | 6.6 | 0 | 0 | 0 | 0 | 1 | 6.6 | 1 | 6.6 |
| 6 | 111-120 | 2 | 13.3 | 2 | 13.3 | 5 | 33.3 | 5 | 33.3 | 0 | 0 | 0 | 0 | 1 | 6.6 | 1 | 6.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 121- | 1 | 6.6 | 1 | 6.6 | 1 | 6.6 | 1 | 6.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 130 | | | | | | | | | | | | | | | | | | | | | | | | |
| **Respiration** | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 16-20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 21-25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 100 | 15 | 100 | 1 | 6.6 | 1 | 6.6 |
| 3 | 26-30 | 15 | 100 | 15 | 100 | 14 | 93.3 | 12 | 80 | 14 | 93.3 | 14 | 93.3 | 14 | 93.3 | 14 | 93.3 | 0 | 0 | 0 | 0 | 14 | 93.3 | 14 | 93.3 |
| 4 | 31-35 | 0 | 0 | 0 | 0 | 1 | 6.6 | 3 | 20 | 1 | 6.6 | 1 | 6.6 | 1 | 6.6 | 1 | 6.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

This table 4 illustrates the distribution of vital parameters across different days in the control group. Unlike the experimental group, minimal changes were observed in systolic and diastolic blood pressure, pulse, and respiration. Most values remained within similar ranges across observations. The findings indicate limited spontaneous physiological improvement without intervention.

**Table 5 Within-group Pre- and Post-intervention Comparison of Blood Pressure and Pulse Rate**

| S. No | Parameter | Group | Mean Difference (MD) | SD / SDD | SED | Calculated t value | Table t value | Level of Significance (p < 0.01) |
|---|---|---|---|---|---|---|---|---|
| 1 | Systolic Blood Pressure (mmHg) | Experimental | 4.00 | 18.45 | 1.10 | 3.60 | 2.97 | Significant |
| 2 | | Control | 0.04 | 0.10 | 0.08 | 0.57 | 2.97 | Not Significant |
| 3 | Diastolic Blood Pressure (mmHg) | Experimental | 7.57 | 55.37 | 1.92 | 3.94 | 2.97 | Significant |
| 4 | | Control | 0.28 | 0.57 | 0.19 | 1.45 | 2.97 | Not Significant |
| 5 | Pulse Rate (bpm) | Experimental | 2.50 | 6.25 | 0.64 | 3.87 | 2.97 | Significant |
| 6 | | Control | 0.38 | 2.61 | 0.41 | 0.91 | 2.97 | Not Significant |

df=14

Table 5 compares pre- and post-intervention mean differences within experimental and control groups. The experimental group showed statistically significant reductions in systolic blood pressure, diastolic blood pressure, and pulse rate. In contrast, no significant changes were observed in the control group. These results demonstrate the effectiveness of music therapy within the experimental group.

**Table 6: Between-group Comparison of Post-intervention Physiological Parameters**

| S. No | Parameter | Experimental Group (Mean ± SD) | Control Group (Mean ± SD) | SED | Calculated t value | Table t value | Level of Significance (p < 0.01) |
|---|---|---|---|---|---|---|---|
| 1 | Systolic Blood Pressure (mmHg) | 120.61 ± 3.11 | 130.57 ± 4.36 | 4.36 | 8.73 | 2.97 | Significant |
| 2 | Diastolic Blood Pressure (mmHg) | 73.61 ± 1.13 | 80.61 ± 1.59 | 1.59 | 4.39 | 2.97 | Significant |
| 3 | Pulse Rate (bpm) | 82.67 ± 5.20 | 99.87 ± 1.90 | 1.90 | 9.04 | 2.97 | Significant |
| 4 | Respiratory Rate (breaths/min) | 23.09 ± 0.86 | 29.07 ± 0.31 | 0.31 | 18.91 | 2.97 | Significant |

df=14

This table 6 compares post-intervention systolic and diastolic blood pressure, pulse rate, and respiratory rate between experimental and control groups. The experimental group showed significantly lower mean values across all parameters. All calculated *t* values exceeded the table value at $p < 0.01$. The findings confirm superior physiological outcomes in the experimental group.

**Table 7 Baseline (Day 1) Comparison of Blood Pressure Between Experimental and Control Groups**

| S.No | Variables | MD | SDD | SED | Calculate 't' Value | Table 't' value | Level of Significance at 0.01 |
|---|---|---|---|---|---|---|---|
| 1 | D1 Systolic Exp | 137.3 | 9.30 | 3.39 | 1.17 | 2.97 | Not Significant |
| | D1 Systolic Control | 133.3 | | | | | |
| 2 | D1 Diastolic Exp | 86 | 7.30 | 2.66 | 1 | | Not Significant |
| | D1 Diastolic Control | 83.33 | | | | | |

***df=14***

Table 7 presents the comparison of systolic and diastolic blood pressure between groups on Day 1. No statistically significant differences were observed at baseline. This indicates that both groups were comparable prior to intervention. The table supports baseline equivalence for blood pressure parameters.

**Table 8 Day-wise Comparison of Systolic Blood Pressure Before Music Therapy in the Experimental Group**

| S.No | Variables | MD | SDD | SED | Calculated 't' Value | Table 't' value | Level of Significance at 0.01 |
|---|---|---|---|---|---|---|---|
| 1 | Pre Exp D1 Systolic | 12.33 | 7.98 | 2.06 | 5.97 | 2.97 | Significant |
| 2 | Pre Exp D4 Systolic | | | | | | |
| 3 | Pre Exp D1 Systolic | 17 | 19.18 | 4.95 | 3.43 | | Significant |
| 4 | Pre Exp D7Systolic | | | | | | |
| 5 | Pre Exp D4 Systolic | 4.66 | 5.81 | 1.50 | 3.10 | | Significant |
| 6 | Pre Exp D7 Systolic | | | | | | |

***df=14***

This table 8 shows day-wise comparisons of systolic blood pressure before music therapy in the experimental group. Significant differences were observed between days, indicating gradual physiological stabilization over time. The results suggest a temporal improvement trend even before post-session measurements. This supports cumulative therapeutic influence.

**Table 9 Day-wise Post-intervention Comparison of Physiological Parameters in the Experimental Group**

| S. No | Parameter | Comparison Days | Mean Difference (MD) | SDD | SED | Calculated t value | Table t value | Level of Significance (p < 0.01) |
|---|---|---|---|---|---|---|---|---|
| 1 | Systolic Blood Pressure (mmHg) | D1 vs D4 | 9.00 | 8.28 | 2.13 | 4.20 | 2.97 | Significant |
| | | D1 vs D7 | 16.00 | 9.67 | 2.49 | 6.40 | 2.97 | Significant |
| | | D4 vs D7 | 6.66 | 4.09 | 1.05 | 6.30 | 2.97 | Significant |
| 2 | Pulse Rate (bpm) | D1 vs D4 | 9.23 | 3.97 | 3.97 | 9.00 | 2.97 | Significant |
| | | D1 vs D7 | 19.43 | 6.85 | 6.85 | 10.97 | 2.97 | Significant |
| | | D4 vs D7 | 10.20 | 5.78 | 5.78 | 6.82 | 2.97 | Significant |
| 3 | Respiratory Rate (breaths/min) | D1 vs D4 | 5.00 | 1.59 | 0.41 | 12.16 | 2.97 | Significant |
| | | D1 vs D7 | 7.66 | 2.62 | 0.67 | 11.31 | 2.97 | Significant |
| | | D4 vs D7 | 2.66 | 2.55 | 0.65 | 5.30 | 2.97 | Significant |

***df=14***

***Table 9 summarizes post-intervention comparisons of systolic blood pressure, pulse rate, and respiratory rate across different days. Significant reductions were observed between Day 1, Day 4, and Day 7 for all parameters. The consistent statistical significance indicates progressive improvement. These findings highlight the sustained effect of music therapy.***

**Table 10 Association of Post-intervention Physiological Parameters With Selected Demographic Variables**

| S. No | Parameter | Demographic Variable | N | Mean ± SD | SED | Calculated t value | Table t value | Level of Significance (p < 0.01) |
|---|---|---|---|---|---|---|---|---|
| 1 | Systolic BP (mmHg) | Age < 58 years | 6 | 112.5 ± 3.25 | 1.71 | 0.48 | 3.01 | Not Significant |
| | | Age ≥ 58 years | 9 | 113.3 ± 3.27 | | | | |
| | | Male | 8 | 113.1 ± 3.27 | 1.69 | 0.15 | 3.01 | Not Significant |
| | | Female | 7 | 112.8 ± 3.27 | | | | |
| 2 | Diastolic BP (mmHg) | Age < 58 years | 6 | 70.0 ± 4.43 | 2.33 | 0.95 | 3.01 | Not Significant |
| | | Age ≥ 58 years | 9 | 67.7 ± 4.58 | | | | |
| | | Male | 8 | 68.75 ± 4.58 | 2.37 | 0.07 | 3.01 | Not Significant |
| | | Female | 7 | 68.57 ± 4.58 | | | | |
| 3 | Pulse Rate (bpm) | Age < 58 years | 6 | 74.6 ± 5.89 | 3.10 | 1.34 | 3.01 | Not Significant |
| | | Age ≥ 58 years | 9 | 70.5 ± 6.28 | | | | |
| | | Male | 8 | 71.93 ± 6.28 | 3.25 | 0.15 | 3.01 | Not Significant |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Female | 7 | 72.42 ± 6.28 | | | | |

***df=13***

***This table 10 examines the association between post-therapy physiological outcomes and demographic variables such as age and gender. No statistically significant differences were observed across demographic subgroups. This suggests that music therapy effects were consistent irrespective of age or gender. The intervention demonstrated uniform efficacy across participant characteristics.***

## DISCUSSION

This quasi-experimental study evaluated the effectiveness of music therapy on selected physiological and psychological parameters among postoperative cardiac surgery patients. [14] The findings demonstrate that structured music therapy administered twice daily for seven consecutive days produced significant improvements in systolic blood pressure, diastolic blood pressure, pulse rate, respiratory rate, pain, stress, and emotional responses in the experimental group compared with the control group receiving routine postoperative care.[15]

Baseline demographic, clinical, and surgical characteristics were comparable between the experimental and control groups, indicating homogeneity and minimizing the influence of confounding variables. The absence of statistically significant baseline differences in physiological parameters further supports the internal validity of the study and confirms that post-intervention changes can be attributed to the music therapy intervention.[16]

A key finding of this study was the significant reduction in systolic and diastolic blood pressure in the experimental group following music therapy. Between-group post-intervention comparisons revealed lower mean blood pressure values in the experimental group than in the control group.[17] These findings are consistent with existing literature suggesting that music therapy exerts a calming effect on the autonomic nervous system by reducing sympathetic activity and enhancing parasympathetic response. This autonomic modulation results in decreased vascular resistance and cardiac workload, which is particularly beneficial during the postoperative recovery phase in cardiac surgery patients.[18]

Pulse rate and respiratory rate also demonstrated statistically significant reductions in the experimental group, with progressive improvements observed from Day 1 to Day 7. The day-wise analysis indicated that repeated exposure to music therapy had a cumulative therapeutic effect. Music is known to influence respiratory rhythm and promote slower, more regulated breathing patterns, which in turn reduce oxygen consumption and cardiovascular strain. In contrast, the control group exhibited minimal changes across the observation period, suggesting limited spontaneous physiological stabilization without intervention.[19]

Within-group comparisons further confirmed the effectiveness of music therapy, as significant reductions in blood pressure and pulse rate were observed only in the experimental group. [20] The lack of significant changes in the control group highlights the added benefit of music therapy beyond standard postoperative care. These findings reinforce the role of non-pharmacological interventions in addressing physiological stress responses that may not be fully controlled by medication alone.[21]

Pain and perceived stress levels were also reduced following music therapy, indicating its positive psychological impact. Music serves as a distraction, shifting attention away from pain and discomfort while promoting relaxation.[22] [23] Neurophysiological mechanisms, such as activation of the limbic system and release of endorphins, may contribute to reduced pain perception and emotional distress. Lower stress levels may further support physiological stabilization by decreasing stress-induced sympathetic activation.[24]

Emotional responses reported by patients and caregivers showed improvement in the experimental group, suggesting enhanced emotional well-being. Emotional stability plays a critical role in postoperative recovery, particularly among cardiac surgery patients who often experience anxiety and fear. By promoting relaxation and comfort, music therapy supports holistic recovery and enhances patient experience during hospitalization.[25] [26]

The absence of significant associations between post-intervention physiological parameters and demographic variables such as age and gender indicates that the beneficial effects of music therapy were consistent across different subgroups.[27] This finding suggests that music therapy can be universally applied without the need for demographic-specific modifications, enhancing its feasibility and generalizability in clinical practice.[28]

The findings of this study are consistent with previous research reporting beneficial effects of music therapy on cardiovascular parameters, pain, and anxiety in surgical and cardiac populations.[29] However, the present study adds to the existing evidence by incorporating structured day-wise comparisons, morning and evening assessments, and a standardized intervention protocol during the immediate postoperative period.[30]

Despite these strengths, certain limitations should be acknowledged. The use of convenience sampling and a relatively small sample size may limit the generalizability of the findings. Additionally, the study was conducted at a single center, and long-term follow-up was not included. Future studies employing randomized controlled designs, larger samples, and extended follow-up periods are recommended to confirm and expand upon these findings.

## CONCLUSION

The present study highlights that music therapy is an effective complementary intervention for patients recovering from cardiac surgery, producing significant improvements in both physiological and psychological outcomes. Patients who participated in structured music therapy sessions experienced marked reductions in systolic and diastolic blood pressure, pulse rate, and respiratory rate compared to those receiving routine postoperative care alone. The progressive improvements observed over the course of the intervention suggest a cumulative therapeutic effect.

Being a non-invasive, low-cost, and easily implementable approach, music therapy can be safely incorporated into standard postoperative cardiac care, promoting patient comfort, emotional well-being, and enhanced recovery. Further large-scale studies are recommended to validate and expand these findings.

## REFERENCES


1. World Health Organization. Cardiovascular diseases (CVDs). Geneva: WHO; 2023.
2. Bradt J, Dileo C, Shim M. Music interventions for preoperative anxiety. Cochrane Database Syst Rev. 2013;6:CD006908.
3. Nilsson U. The anxiety- and pain-reducing effects of music interventions: A systematic review. AORN J. 2008;87(4):780–807.
4. Bernardi L, Porta C, Sleight P. Cardiovascular, cerebrovascular, and respiratory changes induced by different types of music. Heart. 2006;92(4):445–52.
5. Koelsch S. A neuroscientific perspective on music therapy. Ann N Y Acad Sci. 2009;1169:374–84.
6. Chlan LL. Effectiveness of music therapy as an intervention for anxiety in patients receiving mechanical ventilatory support. Am J Crit Care. 1998;7(2):93–6.
7. Bringman H, Giesecke K, Thörne A, Bringman S. Relaxing music as pre-medication before surgery. Acta Anaesthesiol Scand. 2009;53(6):759–64.
8. Allen K, Golden LH, Izzo JL Jr, et al. Normalization of hypertensive responses during stress by music. Psychosom Med. 2001;63(3):487–92.
9. Trappe HJ. Role of music in intensive care medicine. Int J Cardiol. 2010;145(2):271–2.
10. Cepeda MS, Carr DB, Lau J, Alvarez H. Music for pain relief. Cochrane Database Syst Rev. 2006;2:CD004843.
11. Nilsson U, Rawal N, Unosson M. A comparison of intraoperative or postoperative music on postoperative pain. Anaesthesia. 2003;58(7):699–703.
12. Twiss E, Seaver J, McCaffrey R. The effect of music listening on older adults undergoing cardiovascular surgery. Nurs Crit Care. 2006;11(5):224–31.
13. 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.
14. Cooke M, Chaboyer W, Schluter P, Hiratos MA. The effect of music on anxiety levels of patients receiving mechanical ventilation. Intensive Crit Care Nurs. 2010;26(6):319–25.
15. Chan MF, Wong ZY, Onishi H, Thayala J. Effects of music on depression and sleep quality in elderly people: A randomized controlled trial. Complement Ther Med. 2012;20(6):398–407.
16. Bradt J, Potvin N, Kesslick A, et al. The impact of music therapy versus music medicine on psychological outcomes and pain. J Music Ther. 2015;52(3):306–34.
17. Hole J, Hirsch M, Ball E, Meads C. Music as an aid for postoperative recovery. Lancet. 2015;386(10004):1659–71.
18. Buffum MD, Sasso C, Sands LP, Lanier E, Yellen M, Hayes A. A music intervention to reduce anxiety before cardiac catheterization. Clin Nurs Res. 2006;15(1):5–23.
19. Good M, Anderson GC, Stanton-Hicks M, Grass JA, Makii M. Relaxation and music reduce pain after gynecologic surgery. Pain Manag Nurs. 2002;3(2):61–70.
20. Han L, Li JP, Sit JW, Chung L, Jiao ZY, Ma WG. Effects of music intervention on physiological stress response and anxiety in ICU patients. J Clin Nurs. 2010;19(17–18):2526–34.
21. Chlan LL, Engeland WC, Anthony A, Guttormson J. Influence of music on the stress response in patients receiving mechanical ventilation. Am J Crit Care. 2007;16(2):141–5.
22. Koelsch S, Fritz T, Cramon DY, Müller K, Friederici AD. Investigating emotion with music: An fMRI study. Hum Brain Mapp. 2006;27(3):239–50.
23. Nilsson U. Music therapy in perioperative care: A review. J Perianesth Nurs. 2011;26(6):378–87.
24. Vaajoki A, Pietilä AM, Kankkunen P, Vehviläinen-Julkunen K. Music intervention study in postoperative pain. J Adv Nurs. 2011;67(6):1342–52.
25. McCaffrey R, Locsin R. Music listening as a nursing intervention. Holist Nurs Pract. 2002;16(3):70–7.
26. American Heart Association. Heart disease and recovery after surgery. Dallas: AHA; 2022.
27. Trappe HJ, Voit G. Music and the heart. Herz. 2016;41(6):485–90.
28. Thaut MH. Rhythm, music, and the brain: Scientific foundations and clinical applications. New York: Routledge; 2005.
29. Dileo C. Music therapy and medicine: Theoretical and clinical applications. Silver Spring: American Music Therapy Association; 2006.
30. Good M, Albert JM, Anderson GC, et al. Supplementing relaxation and music for pain after surgery. Nurs Res. 2010;59(4):259–69.