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“Classical Music Can Reduce the Anxiety and Pain During Transfemoral Coronary Angiography: Pilot Study”

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Abstract: Unlock the secrets of musical Ingenuity. Music has healing power, to act as a stimulus and diverting feelings of anxiety, stress, and fear thereby promoting relaxation. Objectives: study was to assess the effect of Music therapy on anxiety and pain among patients undergoing transfemoral coronary angiography. Methods. In this pilot study, 40 subjects undergoing elective transfemoral Coronary angiography post-test only control design was used. The data collected for a period of Ten weeks. With the purposive sampling technique 40 samples were selected, 20 were assigned to the experimental group and 20 in control group. The demographic data was recorded from the patients undergoing transfemoral Coronary angiography. Indian Carnatic system Raga Neelambari classical music was administered for 15 minutes in the experimental group during the transfemoral coronary angiography. Routine treatment was facilitated to the patients in the control group. After 15 minutes intervention the level of anxiety score was assessed using the state Hamilton anxiety rating scale in each group. The levels of pain were measured by Wong baker pain scale. Result: The Average anxiety score in Experimental group pretest was mean 24.4 Sd 3.8 which reduced to mean 13.6 Sd 2.0 in post-test. T-value for this test was 11.6 with 19 degrees of freedom. Corresponding p-value was small (less than 0.05), two sample t-test were used for the comparison of change in anxiety score among patients undergoing coronary angiography in experimental and control group. Average change anxiety score in experimental group was 10.8 which was -0.9 in control group. T-value for this test was 12.4 with 38 degrees of freedom. Average change in anxiety score in experimental group was significantly higher than that in control group. In experimental group, at first, 90% of the patients had mild pain and 10% of them had moderate pain. In control group, at first hour, 45% of them had moderate pain and 55% of them had severe pain. At third hour, in experimental group, all of them had mild pain. and in control group, all of them had moderate pain. At sixth hour, in experimental group, none of them had pain. At sixth hour, in control group, all of them had mild pain. The pain among patients in experimental and control group was compared using Fisher's exact test. The levels of pain and anxiety. were relatively low during the transfemoral coronary angiography period. Corresponding p-value was small (less than 0.05) Conclusion: Hence it is concluded music therapy is an effective therapeutic intervention in reducing the level of anxiety and Pain among patients undergoing Coronary Angiography.

Key words: Coronary Angiography, Music, Anxiety, Pain

1.INTRODUCTION

Music Unleash the magic. Where musical excellence meets professionalism. Music possesses the capability to transform urges to encourage calmness, and through profound listening, we can harness the ability to enhance our intuition and self-awareness. Classical compositions are among the finest and most affordable, mind-altering substances in existence. Music offers genuine wellness advantages; it elevates our body's dopamine levels, reduces cortisol, and elicits a positive emotional state. One benefit of music is that when it reaches you, it can alleviate feelings of discomfort. This research aimed to assess the impact of music on discomfort and apprehension levels in individuals undergoing transfemoral angiography. One proposed mechanism might be improved management of discomfort achieved through distraction or relaxation effects induced by the music. Listening to music can influence the sensation of discomfort through various proposed mechanisms. Background: Our body contains a Descending Pain Modulating System that can obstruct and adjust discomfort signals originating from different bodily systems. The Descending Pain Modulating System acts on pain receptors and reduces nerve signal transmission, leading to diminished discomfort perception. It is suggested that the analgesic effect of music is stimulated in the brain and operates through a top-down regulation via the Descending Pain Modulating System. Similarly, music therapy is described as a potent and dependable method that aids patients in reducing discomfort, anxiety, and suffering without resorting to medication.

MATERIAL AND METHOD

Research design: A quasi-experimental post-test only control design was utilized in this study. Setting: The study conducted in the Coronary Cath lab departments and Cardiac recovery Units at Dr. D.Y. Patil Medical College and Research Hospital Pimpri, Pune.

Subjects: A purposive sample of 40 adult patients from both genders undergoing transfemoral Coronary Angiography were involved in this study. from the above-mentioned setting which was divided into two equal groups study & control group 20. patients for each group throughout 4 months with the following criteria: -

Inclusion Criteria:

1. Adult patients from both gender undergoing Transfemoral Coronary Angiography who

agrees to participate in the study.

Exclusion Criteria:

1. Trans radial coronary angiography.
2. Patients from blood disease (e.g. haemophilia, sickle cell anaemia, haemolytic anaemia, leukaemia),

Study Design and Variables

For the assessment of pain, we implemented a quasi-experimental Post-test Only Control Group design, evaluating outcomes solely after the intervention between experimental and control groups. In contrast, the anxiety component utilized a quasi-experimental Repeated Measures design, focusing on within-subject pre-test and post-test comparisons. The independent variable was music therapy, specifically the administration of Indian Carnatic system Raga Neelambari classical music for 15 minutes. The dependent variables were levels of anxiety and pain as measured post-procedure using the Hamilton Anxiety Rating Scale and a standard pain assessment tool.

Research Tool and Sampling

The Hamilton Anxiety Rating Scale was utilized to assess the levels of anxiety. Pain levels were measured using a Wong-Baker Pain Scale. A purposive sampling method was used to select 40 adult patients, aged 18-75, undergoing transfemoral coronary angiography at Dr. D.Y. Patil Medical College and Research Hospital, Pimpri, Pune. The sample was equally divided into two groups of 20 each for the experimental and control groups. The study includes adult patients of any gender undergoing transfemoral coronary angiography who agree to participate. Exclusion criteria are set to omit patients undergoing trans radial coronary angiography and those with significant blood disorders, including haemophilia, sickle cell anemia, haemolytic anemia, and leukaemia, to ensure the safety and appropriateness of the intervention for all participants.

Intervention:

The intervention consisted of playing Indian Carnatic music (Raga Neelambari) for a duration of 15 minutes to the experimental group during their coronary angiography procedure. The control group received the standard care protocol without any music intervention. This musical intervention aimed to leverage the calming effects of Raga Neelambari to reduce anxiety and pain perceptions.

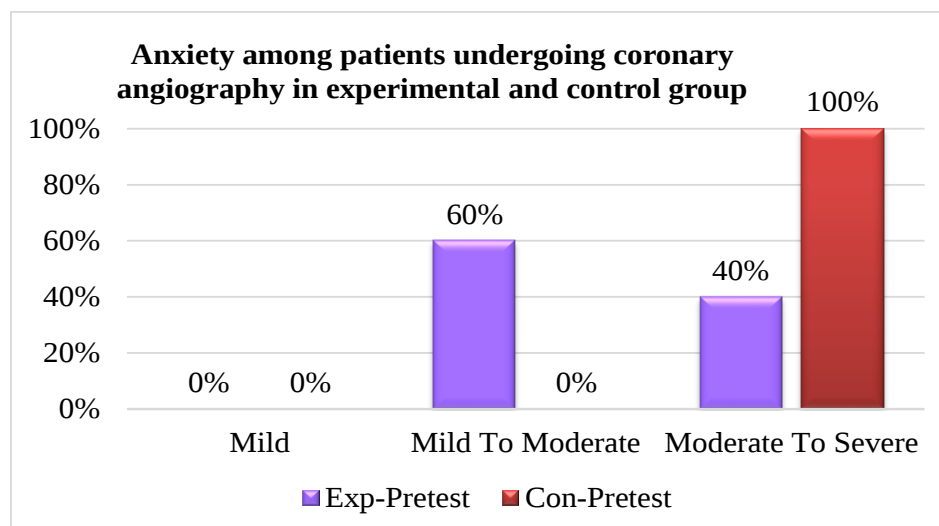
Data Collection and Data Analysis

Data on anxiety and pain levels were collected immediately after the coronary

angiography procedure using the specified scales. Demographic and clinical data were also gathered to control for potential confounding variables such as age, gender, and medical history. The collected data were analysed to compare the levels of anxiety and pain between the experimental and control groups. Statistical tests appropriate for small sample sizes and non-parametric data (e.g., Mann-Whitney U test for independent samples) were planned to assess the differences in outcomes between the two groups. Additionally, correlation analyses were to be performed to explore any associations between demographic variables and the changes in anxiety and pain levels. This structured approach aims to rigorously evaluate the efficacy of music therapy as a non-pharmacological intervention to alleviate discomfort and anxiety in a clinical setting, providing a clearer understanding of its benefits and potential applications in healthcare.

RESULT

Figure :1



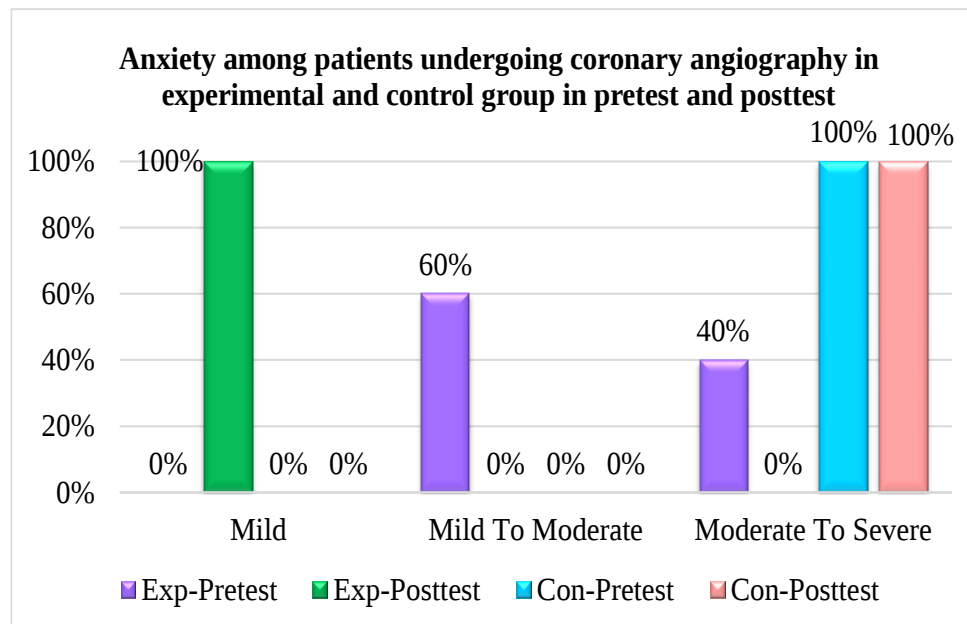
(n=40: Experimental group n=20, control group n=20)

Objective 1: To assess anxiety before Coronary angiography

In experimental group, 60% of the patients undergoing coronary angiography had mild to moderate anxiety (Score 18-24) and 40% of them had moderate to severe anxiety (Score 25-56). In control group, all of them had moderate to severe anxiety (Score 25-56).

Anxiety	Experimental				Control			
	Pretest		Post-test		Pretest		Post-test	
	Freq	%	Freq	%	Freq	%	Freq	%
Mild (Score <17)	0	0%	20	100%	0	0%	0	0%
Mild To Moderate (Score 18–24)	12	60%	0	0%	0	0%	0	0%
Moderate To Severe. (Score 25–56)	8	40%	0	0%	20	100%	20	100%

Figure :2



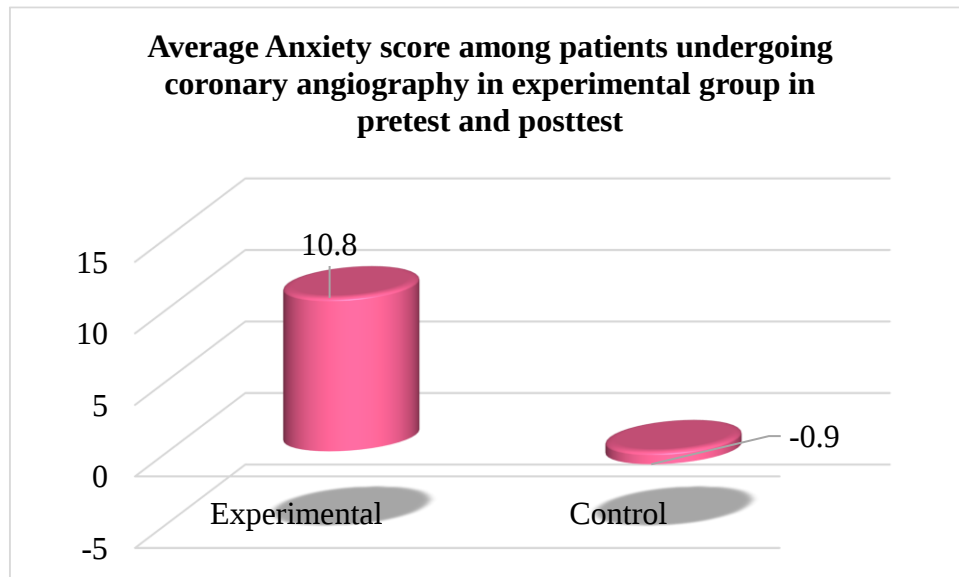
(n=40: Experimental group n=20, control group n=20)

Objective 2: To assess effect of Music on anxiety and Pain post femoral sheath removal among patients undergoing coronary angiography.

In experimental group, in pretest, 60% of the patients undergoing coronary angiography had mild to moderate anxiety (Score 18-24) and 40% of them had moderate to severe anxiety (Score 25-56). In post-test, all of them had mild anxiety (score <17).

In control group, in pretest and post-test, all of them had moderate to severe anxiety (Score 25-56). This indicates there is remarkable improvement in the anxiety among patients undergoing coronary angiography after Music Intervention.

Figure: 3



(n=40: Experimental group n=20, control group n=20)

Researcher applied two sample t-test for the comparison of change in anxiety score among patients undergoing coronary angiography in experimental and control group. Average change anxiety score in experimental group was 10.8 which was -0.9 in control group. T-value for this test was 12.4 with 38 degrees of freedom. Corresponding p-value was small (less than 0.05), the null hypothesis is rejected. Average change in anxiety score in experimental group was significantly higher than that in control group. It is evident that the anxiety among patients undergoing coronary angiography improved significantly after Music Intervention.

Two sample t-test were used for the effect of Music on anxiety and Pain post femoral sheath removal among patients undergoing coronary angiography.

Test	Mean	SD	T	df	p-value
Experimental	10.8	4.1	12.4	38	0.000
Control	-0.9	0.6			

The average change in anxiety score for the experimental group was 10.8, compared to -0.9 in the control group. The t-value for this test was 12.4 with 38 degrees of freedom. The change in anxiety scores in the experimental group was significantly greater than in the control group. Initially, 90% of patients in the experimental group reported mild discomfort, while 10% experienced moderate discomfort. In the control group, 45% reported moderate discomfort and 55% had severe discomfort at the first hour. By the third hour, all participants in the experimental group reported mild discomfort, while all in the control group experienced moderate discomfort. By the sixth hour, no patients in the experimental group reported discomfort, whereas all in the control group reported mild discomfort. Pain levels between the experimental and control groups were compared using Fisher's exact test.

Table: 1

Timepoint	Wong-Baker Pain	Experimental		Control		p-value
		Freq	%	Freq	%	
1st hr	No	0	0%	0	0%	0.000
	Mild	18	90%	0	0%	
	Moderate	2	10%	9	45%	
	Severe	0	0%	11	55%	
4th hr	No	0	0%	0	0%	0.000
	Mild	20	100%	0	0%	
	Moderate	0	0%	20	100%	
	Severe	0	0%	0	0%	
6th hr	No	20	100%	0	0%	0.000
	Mild	0	0%	20	100%	
	Moderate	0	0%	0	0%	
	Severe	0	0%	0	0%	

(n=40: Experimental group n=20, control group n=20)

Comparison of Pain among patients undergoing coronary angiography:

In experimental group, at first, 90% of the patients had mild pain and 10% of them had moderate pain. In control group, at first hour, 45% of them had moderate pain and 55% of them had severe pain. At third hour, in experimental group, all of them had mild pain. At third hour, in control group, all of them had moderate pain. At sixth hour, in experimental group, none of them had pain. At sixth hour, in control group, all of them had mild pain. The pain among patients in experimental and control group was compared using Fisher's exact test. Corresponding p-value was small at first, third and sixth hours. It is evident that the Music Intervention was significantly effective on pain among patients undergoing coronary angiography.

4.Discussion:

Ronak Delewi and Wieneke Vlastra (2016) conducted a study on the anxiety levels of patients undergoing coronary procedures in the post-coronary care unit. Background: High levels of anxiety are linked with poorer outcomes in individuals with coronary artery disease. Little is known about anxiety levels in patients undergoing coronary interventions. Objective: This research aimed to investigate the anxiety scores of patients undergoing transfemoral coronary angiography at various stages of their hospital stay and to identify patient characteristics associated with increased anxiety levels. Methods: Patients undergoing coronary angiography were included in a prospective cohort study. Anxiety levels were assessed using the self-reported Visual Analogue Scale of Anxiety, ranging from 0 to 100. Multivariate linear regression analyses were used to determine correlations between baseline characteristics and anxiety levels at different time points. Results: A total of 2604 patients participated, with 70.4% being male, and an average age of 65 ± 12 years. Anxiety scores were highest before the procedure (44.2 ± 27.0 mm). Female patients had significantly higher pre-procedure anxiety scores (50.4 ± 26.5) compared to males (41.5 ± 26.8 , $p=0.02$). Other factors associated with higher anxiety levels included age over 65 years, lower educational attainment, and an acute primary condition. Conclusion: In the largest cohort studied to date, anxiety levels among patients undergoing transfemoral coronary angiography were highest immediately before the procedure, especially in those aged 65 years, female patients, and those with lower education levels.

Farzaneh Mozaffari, Hossein Tavangar et al. (2022) conducted a randomized clinical trial comparing the effects of muscle relaxation and music therapy on anxiety among patients preparing for coronary angiography. Background: Procedures related to coronary angiography often induce anxiety, which can lead to various complications, necessitating effective interventions for management. Non-pharmacological therapies for anxiety management have gained considerable interest. Objective: This study aimed to evaluate the effects of muscle relaxation and music therapy on anxiety among patients scheduled for coronary angiography. Methods: A randomized controlled trial was conducted with 105 participants. Subjects from the cardiology wards of Namazi Hospital, Shiraz, Iran, were randomly assigned to three groups: music, relaxation, and control. Participants in the music and relaxation groups received 20-minute sessions of music therapy and muscle relaxation, respectively. Anxiety levels were assessed both before and after

the interventions using the Spielberger State Anxiety Inventory. Data were analysed using chi-square tests, paired-sample t-tests, and one-way ANOVA. Results: The mean anxiety scores in the relaxation and music groups significantly decreased from 51.08 ± 6.98 and 49.02 ± 7.74 at baseline to 41.88 ± 5.16 and 44.28 ± 5.21 at post-test ($p < 0.01$), respectively. No significant change was observed in the control group ($p = 0.081$). Conclusion: Both muscle relaxation and music therapy effectively reduce anxiety among patients undergoing angiography. Adam C. Lieber and Javin Bose (2018) performed a systematic review and meta-analysis on the impact of music therapy on anxiety and physiological parameters during coronary angiography.

LIMITATIONS OF THE STUDY

- The study's sample size limits the generalizability of the findings to broader populations.
- The study primarily assessed immediate post-procedural outcomes, without examining the long-term effects of music therapy on anxiety and pain management.
- Reliance on self-reported measures for anxiety and pain may introduce variability based on individual perceptions.
- The study did not investigate the potential effects of different types of music or varying durations of exposure, which could influence the effectiveness of music therapy.
- Inclusion criteria based on language (Marathi, Hindi, English) may exclude non-speakers, affecting inclusivity and representation.

RECOMMENDATION

- Future research should involve larger and more diverse sample sizes to enhance the generalizability of the findings and confirm the efficacy of music therapy across different populations.
- Conducting multicenter trials can provide a broader perspective on the effectiveness of music therapy by accounting for variations in institutional practices and patient demographics.

- It is recommended to include longitudinal studies that assess the long-term effects of music therapy on anxiety and pain management, providing insights into the duration of its benefits.
- Future studies should incorporate objective physiological measures, such as heart rate variability and blood pressure, alongside subjective assessments to gain a comprehensive understanding of the impact of music therapy.
- Research should explore various types of music and different durations of exposure to determine the most effective conditions for implementing music therapy in clinical settings

CONCLUSION

In conclusion, this study highlights the substantial therapeutic benefits of music therapy in alleviating anxiety and pain in patients undergoing coronary angiography. The experimental group demonstrated a significant reduction in anxiety levels post-intervention, alongside a high percentage of participants reporting mild or no pain at various timepoints, in stark contrast to the control group, which experienced moderate to severe pain. These findings underscore the effectiveness of music therapy as a valuable non-pharmacological intervention that enhances patient comfort during invasive procedures. The results align with existing literature that supports the role of music therapy in managing anxiety and pain, advocating for its integration into clinical practice. By incorporating music therapy into routine care protocols, healthcare providers can markedly improve patient outcomes and overall experiences during coronary angiography and similar procedures.

Conflict of Interest- None to declare

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