

ORIGINAL ARTICLE

IJPHY INFLUENCE OF MUSIC THERAPY AND BREATHING EXERCISES ON ANXIETY IN POST-OPERATIVE CARDIAC DISEASED INDIVIDUALS

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ABSTRACT

Background: Asian Indians have a higher operative and overall increased mortality following coronary bypass surgery. They also have higher rates of post operative complications and repeat surgeries. Apart from physiological complications like post-operative pain, atelectasis, deep vein thrombosis, the psychological disorders are like anxiety and stress also predominantly play a major role in the morbidity of the post-surgical conditions. The aim of study is to know the influence of music therapy and breathing exercises on post-surgical cardiac diseased individuals. To evaluate the influence of music therapy and breathing exercises on physiological parameters (BP, HR, RR) in post surgical cardiac diseased individuals by using electro cardio monitor and state-trait anxiety scale.

Methods: Subjects were randomly divided into two groups. Experimental group, where the subjects received music therapy and breathing exercises. Control group, where the subjects received breathing exercises. All the participants were assessed with STAI scale and physiological parameters like blood pressure, heart rate and respiration rate for both groups before and after the treatment. Paired sample t-test was used to compare the STAI scale and physiological parameters within the groups.

Result: Results showed a significant improvement in both the groups but, more improvement was seen in experimental group compared to control group.

Conclusion: Results suggested that music therapy and breathing exercises influences more effective than breathing exercises alone.

Keywords: STAI (state trait anxiety scale), Breathing exercises, HR (Heart rate), Cardiac disease, CVD

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INTRODUCTION

Cardiovascular diseases (CVDs) accounted for around one-fourth of all deaths in India in 2008. CVDs are expected to be the fastest growing chronic illnesses between 2005 and 2015, growing at 9.2% annually. A more worrying fact is that the incidences of CVDs have increased significantly from 9.2% to 24.8% for people between the ages 25 and 69, which means losing more productive people to these diseases [1].

Cardiac hospitals in India stands at the highest position in performing 100,000 open heart surgeries per year. In the mid 1990 some 10,000 Coronary Artery Bypass Graft (CABG) surgeries were being performed annually in India. Presently the annual number is more than 60,000 [2].

They also have higher rates of post operative complications and repeat surgeries [3,4].

Apart from physiological complications like post-operative pain, atelectasis, cerebrovascular thrombosis, deep vein thrombosis, the psychological disorders are like anxiety and stress also predominantly play a major role in the morbidity of the post-surgical conditions.

The Individuals undergoing open heart surgeries exhibit from depression and anxiety after the surgery. 25% of patients undergoing the surgery experience post operative depression and anxiety. In addition, depression and anxiety are risk factors for further prognosis after surgery and continued heart-related health problems [5].

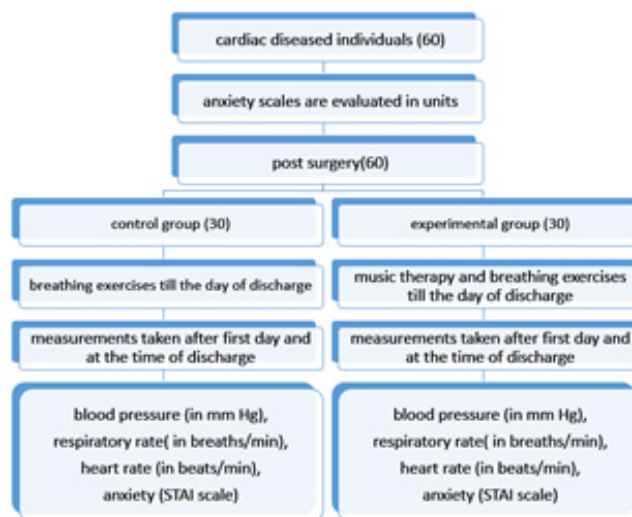
Anxiety and depression are the most common challenging psychological disorders in the normal and diseased individuals in different situations of life. In a healthy people, there are various ways to overcome the short span of anxiety and depression phase through sharing of thoughts, physical exercises (aerobics, yoga) meditation and various relaxation techniques.

Many of the iatrogenic procedures (open heart surgeries, gastrectomy surgeries, oncology surgeries, neuro surgeries) induce anxiety and depression in pre and post operative patients which becomes a major hurdle for progress of the patient. There are many studies done to overcome the anxiety and depression like relaxants, counseling, mass music therapy. But the each individual is unique, each and every person responds to different types and intensities of music. Among them, music therapy plays a major role as a non-invasive technique along with other therapies. The influence of type, intensity of music varies from an individual to individual.

Hence, the need of the study is to find out the influence of music (individualized therapy) on anxiety and depression in different post-surgical cardiovascular conditions along with physical therapy.

METHODOLOGY

STUDY ALGORITHM



MATERIALS

The materials used in the study are ECG, Sphygmomanometer, wrist watch, State-trait anxiety questioner, written informed consent.

The variables and tests used are presented in Table:1

Table 1: Dependent Variables and Tests

Variables	Instruments	Units
Blood pressure	Sphygmomanometer, stethoscope, wrist watch	MmHg
Heart rate	ECG	Beats/minute
Respiratory rate	Wrist watch	Breaths/minute

The study was conducted experimentally in Sri Venkateswara institute of medical sciences university, Tirupathi, Andhra Pradesh. The total size sample was 60 they were randomly divided into control group n = 30, experimental group n = 30 pre operatively by simple randomization method who were diagnosed for open heart surgery.

Inclusion Criteria

The individuals planned for open heart surgery such as atrial septal defect (ASD), ventricular septal defect (VSD), aortic valve diseases, mitral valve disease, tricuspid valve disease, CABG and congenital heart disease and post operative open heart surgery individuals are included in this study.

Exclusion Criteria

The individuals who are unresponsive after surgery, and mental incompetence and who are not willing to participate in this study are excluded. A total of 60 samples are selected and all the samples were assessed for anxiety before surgery and the physiological measures of blood pressure (BP) in mmHg, respiratory rate (RR) in breaths / min and heart rate (HR) in beats /min in units and after surgery.

Outcome Measures

Anxiety Scale: Trait anxiety scale was measured by using the State – Trait anxiety scale.

PROCEDURE

Prior to the commencement of the procedure, informed written consent was taken from the participants. A total of 60 samples are selected and all the samples were assessed for anxiety before surgery and the physiological measures of blood pressure (BP) in mmHg, respiratory rate (RR) in breaths / min and heart rate (HR) in beats /min in units and after surgery.

The sixty (60) subjects were randomly allocated to two groups of thirty (30) each. All the participants were screened for inclusion and exclusion criteria and then they were requested to participate in the study. Trait anxiety was measured by State – Trait anxiety scale and physiological variables such as Heart rate, Blood pressure, Respiratory rate are measured before and after intervention as an interventional outcome measures.

Then participants were randomly allocated into 2 groups:

1. Control group
2. Experimental group

The two groups were received anxiety scale and physiological variables such as Heart rate, Blood pressure and Respiratory rate are measured post operatively before and after intervention.

INTERVENTIONS

Control group:

The subjects in the control group were asked to perform simple, deep slow breathing exercise at 6 breaths per min, for 30 min. They were trained to perform this breathing exercise, such that each breathing cycle consisted of 4 seconds of inspiration and 6 seconds of expiration. They could do the half an hour breathing exercise either as on sitting or as two equally divided sittings, at any convenient time of the day, either in the sitting or in the supine position adopting any convenient posture. The physiological variables and anxiety scales were assessed post-operatively before and after intervention.

Experimental group:

The subjects were taught deep slow breathing exercises for 10 min as per the protocol of control group and music (individualized) therapy for 20 min. The patient is positioned in supine lying comfortably, the music is provided to the patient by using headphones and mp3 player. The headphone used in the protocol is Sony MDH is connected to the mp3 player and the earpieces are connected to the patient. Then the music is selected by the patient by himself and session is carried out for 20 min. The physiological variables and anxiety scales were assessed post-operatively before and after intervention.

STATISTICAL ANALYSIS AND RESULTS

Statistical analysis was done using software “SPSS 20 version”. For this purpose the data was entered into Microsoft excel spread sheet, tabulated and subjected to statistical analysis.

The outcome measures of this study are state-trait anxiety scale and physiological parameters like blood pressure in

mmHg in units, heart rate in beats per min in units and respiratory rate in breaths per min. in units.

To compare the pre and post treatment effect within group paired simple t-test was used. The parameters observed were state -trait anxiety scale and physiological parameters like blood pressure in mmHg, heart rate in beats per min. and respiratory rate in breaths per min. for both groups.

Group	N	Values	Mean ± SD
Experimental	30	Pre-therapeutic	42.9±6.23
	30	Post-therapeutic	34±4
Control	30	Pre-therapeutic	38.03±4.84
	30	Post-therapeutic	36.37±3.91

Table 2: The results showed that pre and post mean values of state anxiety were (42.9) and (34) in experimental and (38.03) and (36.37) in control group.

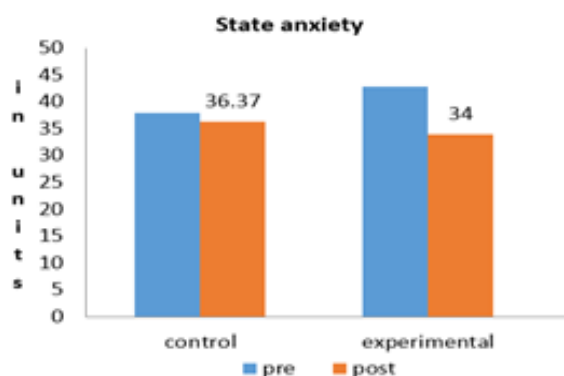


Figure 1: There was a significant difference between pre and post intervention of both groups but compared to control group, experimental group shows highly significant results.

Table 3: Comparison of mean difference of Physiological parameters in Post operative cardiac diseased individuals in experimental group and control group

	Group	N	Mean	t-value	p-value
HR	Experimental	30	10.4	0.825	0.413
	Control group	30	8.77	0.825	0.413
RR	Experimental	30	8.2	3.274	0.002
	Control group	30	4.67	3.274	0.002
Systolic	Experimental	30	10.33	2.922	0.005
	Control group	30	5.17	2.922	0.005
diastolic	Experimental	30	6.67	1.033	0.306
	Control group	30	5	1.033	0.306

Table 3: The results showed that mean values of heart rate (10.4), respiratory rate (8.2), systolic blood pressure (10.33) and diastolic blood pressure (6.67) in experimental group and heart rate (8.77), respiratory rate (4.67), systolic blood pressure (5.17) and diastolic blood pressure (6.67)

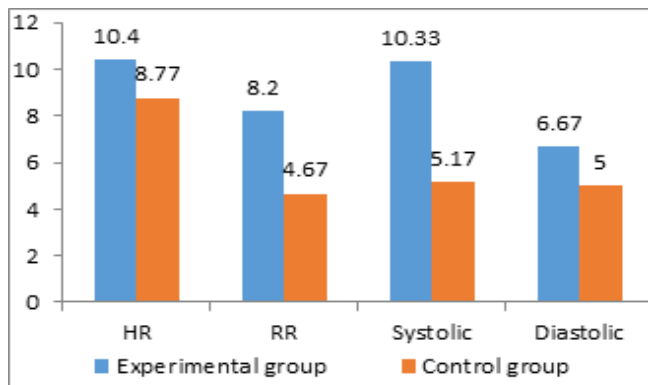


Figure 2: There was a significant difference between pre and post intervention of both groups but compared to control group, experimental group shows highly significant results.

DISCUSSION

The results of the present study shows that both the subjects in experimental and control group shows there is a significant reduction in anxiety, heart rate, respiratory rate, and blood pressure but there is a more significant reduction in experimental group than control group.

In the present study the influence of music therapy in post operative cardiac diseased individuals have showed significant results.

Timberlake and colleagues found that 37% of their CABG patients were depressed during the pre-operative period. After 8 days postoperatively, this figure has raised to 50%. The CABG patients who were depressed or anxious preoperatively had higher levels of post-operative mood disturbance than those who were not depressed or anxious prior to the surgical procedure. Anxiety were more likely to be depressed both pre and post-operatively. Although postoperative rates of both depression and anxiety decreased over time, the 12-month rates of both were higher among patients with cardiovascular disease than in the general population [6].

The mechanism for the ability of music to regulate stress, arousal, and emotions is that it initiates reflexive brainstem responses. Music modulates brainstem mediated functions, including heart rate, blood pressure, body temperature, skin conductance, and muscle tension.

These effects are largely mediated by tempo. Slow music and musical pauses are associated with a decrease in heart rate, respiration and blood pressure, and faster music will increase the above parameters. It indicates that brainstem neurons tend to fire synchronously with tempo.

Oxytocin, a neuropeptide released by the posterior pituitary gland, regulates stress and anxiety, affective motivational status, and perceptual selectivity related to social information. Non-drug therapies, such as music, exert similar therapeutic effects via oxytocinergic regulation.

Music therapy can also affect physiological responses and activities within the nervous system, endocrine system, and cardiovascular system, consequently leading to mental and bodily stabilization, improved emotion, cognitive

function and positive behaviors (Blood & Zatorre, 2001; Boso, Politi, Barale, & Emanuele, 2006; Jung; Urich, Houtmans & Gold, 2007)

In psychosocial aspects, music therapy by using musical interaction as a means of communication and expression can reduce psychotic symptoms, negative emotion i.e., depression, anxiety and the behavioral patterns of people with mental disorders (Gold et al.; Jung; Urich et al.).

Music therapy helps to regulate heart rate which in turn regulates BP by reflex bradycardia mechanism.

An increase in blood pressure can be caused by increased cardiac output, increased total peripheral resistance, or both. The baroreceptors in the carotid sinus sense this increase in blood pressure and relay the information to the cardiovascular centres in the medulla oblongata. In order to maintain homeostasis, the cardiovascular centres activate the parasympathetic nervous system. Via the vagus nerve, the parasympathetic nervous system stimulates neurons that release the neurotransmitter acetylcholine (ACh) at synapses with cardiac muscle cells. Acetylcholine then binds to M2 muscarinic receptors, causing the decrease in heart rate that is referred to as reflex bradycardia.

Hammer(1996) used the State- trait anxiety inventory and individuals self reports to determine if guided imagery accompanied by music would decrease participants perceived level of situational stress (measured as state anxiety). It was reported that those who received guided imagery treatment in conjunction with music reported significantly less stress after 10 sessions than did participants who did not receive therapy. The self reported decrease in anxiety is evidence that music is helpful in dealing with the cognitive component of stress.

Breathing regulates the cardiac parameters such as ejection fraction, aortic pressure, and pulmonary arterial pressure, preload and afterload and tissue oxygenation [7,8]. Diaphragmatic breathing may reduce sympathetic activity by enhancing central inhibitory rhythm. Due to increased tidal volume during deep diaphragmatic breathing, there is the activation of the Hering-Breuer reflex⁹ which reduces the chemoreflex sensitivity and might enhance the baroreflex and reduce the sympathetic activity [9-13]. It seems that deep breathing induces generalized decrease in the excitatory pathways regulating respiratory and cardiovascular system. The respiratory and cardiovascular systems share similar control mechanisms and alterations in one system will modify the functioning of the other[12].

In present study anxiety is reduced significantly both in control and experimental group but the anxiety levels are more reduced in experimental group (by music therapy and breathing exercises.) than control group.(by breathing exercises only.)

CONCLUSION

The present study on influence of music therapy and breathing exercises on anxiety and depression in post surgical cardiac diseased individuals has shown difference in

both experimental and control groups. Thus it is concluded that music therapy and breathing exercises is more effective than breathing exercise alone to decrease anxiety and physiological parameters like BP, HR and RR in subjects with post surgical cardiac conditions.

LIMITATIONS

Length of hospital stay is different from patient to patient. The number of music sessions is very short.

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ANNEXURE

SELF EVALUATION QUESTIONNAIRE STAI FORM Y-1

Please provide the information

Name

Age

Gender

A number of statements which peoples who used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now. There is no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

1. I feel calm 1 2 3 4
2. I feel secure 1 2 3 4
3. I am tense 1 2 3 4
4. I am regretful 1 2 3 4
5. I feel at ease 1 2 3 4
6. I feel upset 1 2 3 4
7. I am presently worrying about possible misfortunes..... 1 2 3 4
8. I feel rested 1 2 3 4
9. I feel anxious 1 2 3 4
10. I feel comfortable 1 2 3 4
11. I feel self-confident 1 2 3 4
12. I feel nervous 1 2 3 4
13. I am jittery 1 2 3 4
14. I feel "high strung" 1 2 3 4
15. I am relaxed 1 2 3 4
16. I feel content 1 2 3 4
17. I am worried 1 2 3 4
18. I feel over-excited and rattled 1 2 3 4
19. I feel joyful 1 2 3 4
20. I feel pleasant 1 2 3 4

STAI FORM Y2

Directions

A number of statements which peoples who used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you generally feel. There is no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

- 21. I feel pleasant. 1 2 3 4
- 22. I feel nervous and restless 1 2 3 4
- 23. I feel satisfied with myself 1 2 3 4
- 24. I wish I could be as happy as others seem to be 1 2 3 4
- 25. I feel like a failure 1 2 3 4
- 26. I feel rested 1 2 3 4
- 27. I am "calm, cool, and collected" 1 2 3 4
- 28. I feel that difficulties are piling up so that I cannot overcome the 1 2 3 4
- 29. I worry too much over something that really doesn't matter 1 2 3 4
- 30. I am happy..... 1 2 3 4
- 31. I have disturbing thoughts 1 2 3 4
- 32. I lack self-confidence 1 2 3 4
- 33. I feel secure 1 2 3 4
- 34. I make decisions easily..... 1 2 3 4
- 35. I feel inadequate 1 2 3 4
- 36. I am content 1 2 3 4
- 37. Some unimportant thought runs through my mind and bothers me.....1 2 3 4
- 38. I take disappointments so keenly that I can't put them out of my mind.... 1 2 3 4
- 39. I am a steady person 1 2 3 4
- 40. I get in a state of tension or turmoil as I think over my recent concerns and interests1 2 3 4

- 1- NOT AT ALL
- 2- SOMEWHAT
- 3- MODERATELY SO
- 4- VERY MUCH SO