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Original Article

Management of Anxiety in Coronary Artery Bypass Grafting Patients: The Influence of Chair Aerobics and Nadisodhana Pranayama-A Pilot Randomized Clinical Trial

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ABSTRACT

Background: Anxiety is a primary concern affecting the prognosis of CABG patients. Relieving anxiety is thus a component of management in patients with CABG. We use two feasible and cost-effective treatment techniques to know the improvement in symptoms of anxiety. **Objectives:** To evaluate the efficacy of chair aerobics and pranayama on anxiety in patients who underwent CABG. We hypothesized that there would be an improvement in anxiety in CABG patients after receiving the interventions. **Materials and Methods:** In a total of 21 screened, 16 met eligibility requirements. These were randomized into two, group A and group B. Group A is treated with progressive chair aerobics, and group B with Nadi-sodhana pranayama. Both groups were given standardised cardiac rehabilitation techniques. The duration was fifteen minutes of activity along with phase 1 cardiac rehabilitation. The treatment session was given once a day in the morning. The intervention starts from the post-operative day 3 to post-operative day 7. The anxiety is measured by the tool "hospital anxiety and depression scale". Heart rate is estimated to know the somatic and physiologic components of anxiety. Took all the outcome measures before the surgery and on post-operative day 7 by a blinded outcome assessor. **Results:** The results showed that the improvement in the *p*-value of HADS anxiety, depression, and heart rate of both groups is less than 0.05.

Keywords: Coronary Artery Bypass, Anxiety, Nadi-sodhana Pranayama, Chair aerobics, Cardiac rehabilitation.

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INTRODUCTION

According to the global burden of disease report, 422.7 million people worldwide have CAD.[1] Among the regional countries, the Indian population has a high prevalence compared to any other region.[2] The disease is characterized by the thickening of the arterial lumen with plaque deposit. This reduces the blood supply to the myocardium and leads to angina, myocardial infarction, and death.[3] A coronary angiogram reveals the percentage of circulatory compromise to the myocardium supplied by the occluded artery. More than 70% of the block requires surgical repair known as coronary artery bypass grafting.[4] The surgery involves diverting the blood supply to the occluded vessels and replenishing the blood supply of the myocardium. CABG is the gold standard in managing coronary artery disease.[5] The life expectancy of the surgery is very high.[6] There are many complications associated with the surgery and can be considered under two categories. The physical complications comprise myocardial infarction, stroke, and even kidney failure, and the mental complications include mood disorders, fatigue, weakness, stress, anxiety, and depression.[7,8] Among these, the prevalence of anxiety is high among the patients after cardiac surgery, which badly affects the patient's prognosis. This is a feeling of apprehension or unease felt by the patient.[9] Anxiety has mainly three components. Somatic symptoms comprise digital tremors, palpitations, and sweaty palms. The physiological component mentions tachycardia, hyperventilation, muscular tension, and an irritable bladder. The cognitive component is the undue fear of something untoward happening. These three components should address to control the anxiety. In this study, we measure the outcome of these three workings.[10] Anxiety increases sympathetic activity and reduces parasympathetic activity.[11,12] This in turn, affects the patients' reduces the prognosis. Thus, lessening anxiety is the utmost concern in CAB patients. Literature suggests the use of Nadi-sodhana Pranayama increases parasympathetic activity.[13] But the area of anxiety is unexplored.[14] Chair aerobics

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is a low-intensity activity that can improve aerobic activity and increase peak oxygen consumption.[15] Extensive research is required to prove the effectiveness of "Nadi-shodhana Pranayama" and "chair aerobics" in reducing anxiety CABG. Hence, we aim to provide evidence as to which of the two interventions is effective and feasible for the patients to reduce anxiety.

MATERIALS AND METHODS

The trial design is a pilot randomized clinical trial, an outcome assessor-blinded double-arm trial. Ethical approval to conduct the study is obtained from the central ethics committee, NITTE (Deemed to be University). Sixteen CABG participants have recruited according to the selection criteria. The inclusion criteria were male and female patients who underwent CABG, aged between 30-80 years, and HADS anxiety cut-off score of 7. The exclusion criteria were patients with multiple procedures (E.g: CABG+ valve replacement), LVEF<20%, patients who receive anxiolytics, sedatives, or hypnotics, cardiac failure, heart transplantation, diabetic autonomic neuropathy, neurological disorders, patients on a mechanical ventilator. Patients were recruited into 2 groups based on the SNOSE method. They were randomized based on a computer-generated random process. After randomization, a sealed envelope is used. Patients were asked to pick one envelope and recruited to the concerned group of intervention methods. After obtaining informed consent, followed the allocation ratio to be 1:1. Group A received chair aerobics for 15 min, and Group B received Nadi-sodhana Pranayama for 15 min once a day (Figure 1 consort flow chart of the study). Both groups received standard cardiac rehabilitation.[16] Routine care is not withheld in both groups.[17,18] The tool" hospital anxiety and depression scale" measured anxiety. Heart rate is estimated to know the somatic and physiologic components of anxiety. Took all the outcome measures before the surgery and on a post-operative day 7, by a blinded outcome assessor.

RESULTS

Response Rates

Twenty-one patients underwent screening for the study. Sixteen patients were recruited for the study who met the selection criteria. Eight patients completed the treatment in the chair aerobics group. Seven patients completed the treatment in the aerobics group. Sixteen patients included in the analysis, intention to treat analysis is done (Tables 1, 2). The *p*-value of gender distribution among each group was more than 0.05, which shows that gender was equally distributed (Table 3). *P*-value of the HADS score among the chair aerobics group was 0.05, which shows improvement in the anxiety symptoms (Tables 4 and 5). HADS score among the pranayama group shows improvement, where the *p*-value was less than 0.05 (Tables 6 and 7).

DISCUSSION

The main objective of the study was to evaluate the effect of chair aerobics and Nadisodhana pranayama on anxiety in post-CABG patients. And to compare which treatment technique is more effective in reducing anxiety symptoms among the population. The following works of literature are the existing evidence for the same. And we have depicted the findings and also the novelty of our research. Shah MR *et al.* discovered the effect of Nadi-shodhana pranayama on pain, depression, and length of hospital stay in post-CABG patients. The research answered that there is a reduction in post-operative depressive function among CABG patients.[17] In line with the results, we found that the anxiety symptoms are improved within the Nadi-shodhana pranayama group. Thapa S *et al.* in their single-center prospective study, found out that chair aerobics has a positive role in vital signs among post-CABG patients. In line with the results, we found that the anxiety symptoms were improved within the chair aerobics.[14] Manikumar *et al.* included thirty patients with CABG in their experimental pre-test and post-test design. They established that nadisodhana pranayama reduced the intensity of the pain and improved chest expansion and peak expiratory flow on post-operative day 6 among CABG patients.[16] Nasirnejad *et al.* in their research, recruited 102 patients and provided rhythmic breathing after CABG for 20 min three times a day pain intensity and the anxiety were measured and compared between the groups. The results have shown a reduction in anxiety between the control and intervention groups. which correlates with our results, where the symptoms of anxiety are reduced.[19] Karunakara Padhy *et al.*, in their study 'Benefit of Pranayama for Improvement of Pulmonary Function Tests (PFT) in Post Coronary Artery Bypass Grafting (CABG) Surgery Patient,' recruited sixty patients. Thirty patients received pranayama for three months from POD-3. Pulmonary function test showed improvement in the intervention group; correlation is found with our results.[20] In their research work, that chair aerobics improves exercise tolerance and functional capacity in post-CABG patients. The 6-min walk test showed improvement.[21] Our results showed improvement in the reliable

Table 1: Shows the independent sample *t*-test of Age and BMI.

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Age	1	7	56.57	6.451	2.438
	2	8	59.50	6.719	2.375
BMI	1	7	25.543	3.3788	1.2771
	2	8	25.450	2.2463	0.7942

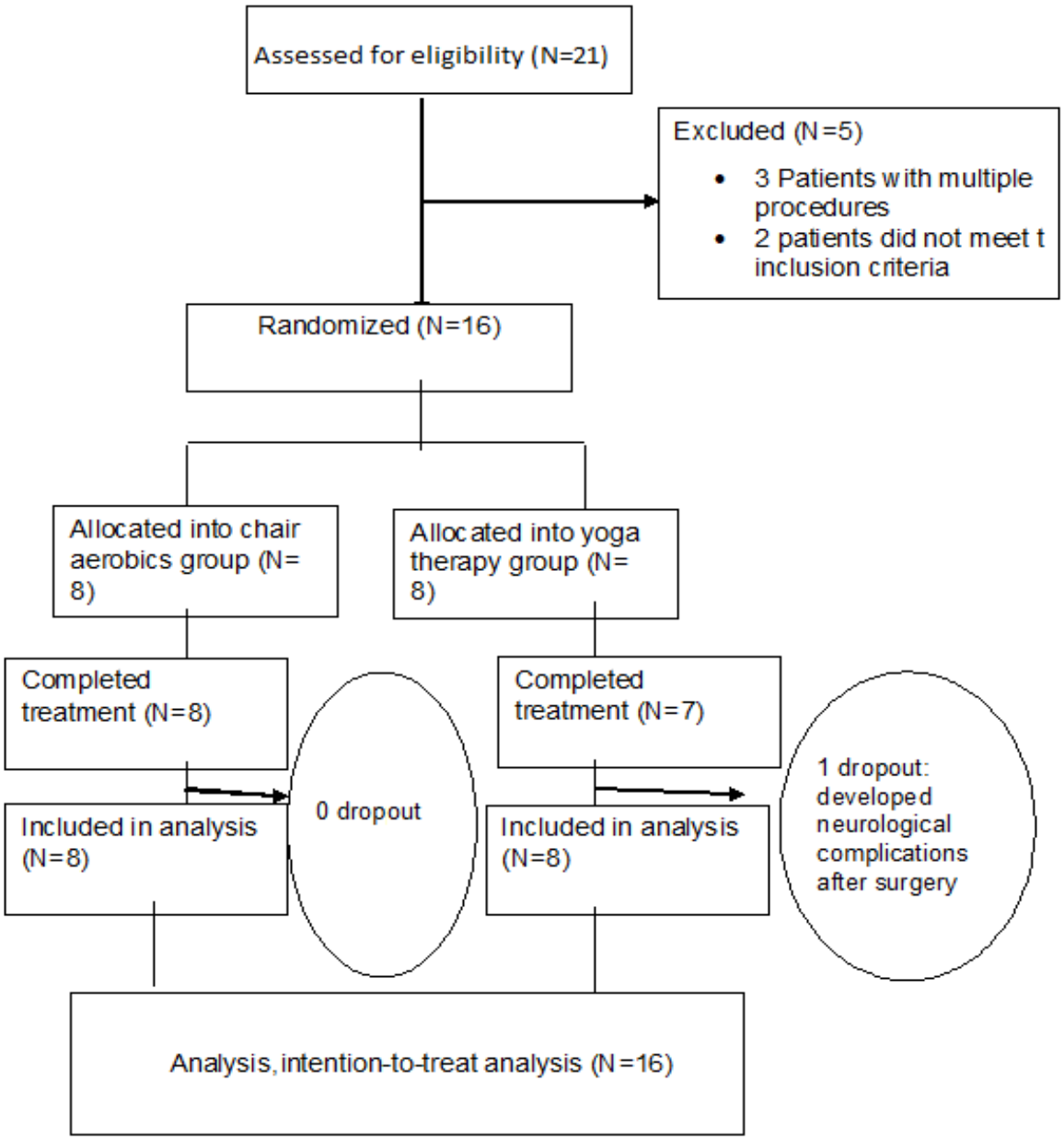

Figure 1: (Consort flow chart of the study).

Table 2: Shows independent sample test of the gender distribution among each group.

Independent Samples Test						
t-test for Equality of Means						
		t	*P*	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Age		-0.858	0.407	-2.929	-10.304	4.447
BMI		0.063	0.950	0.0929	-3.0668	3.2525

The *p*-value is more than 0.05 which shows that gender distributed equally.

and valid outcomes in CABG patients, such as the, heart rate, and Hospital Anxiety and Depression Scale.[22-24] Above stated literature found the effect of either intervention among the CABG patients. There is a need for chair aerobics and nadishodhana pranayama research on anxiety in CABG patients. The prevalence of anxiety in phase 1 cardiac rehabilitation is high.[25,26] The area of anxiety was unexplored, and also quality research is required in this field to provide evidence.[27] We found that nadisodhana pranayama

Table 3: Shows chi square test of the gender distribution.
Chi square test

Group * Gender Crosstabulation					
			Gender		Total
			F	M	
Group	1	Count	1	6	7
		% within Group	14.3%	85.7%	100.0%
	2	Count	3	5	8
		% within Group	37.5%	62.5%	100.0%
Total		Count	4	11	15
		% within Group	26.7%	73.3%	100.0%

Table 4: Shows chi square test and continuity correction.

Chi-Square Tests		
	Value	*p*
Pearson Chi-Square	1.029[a]	0.310
Continuity Correction	0.184	0.668

The *p*-value is more than 0.05.

Table 5: Shows paired *t*-test between pre and post-test values of HADS ANXIETY, HADS DEPRESSION and Heart rate of group 1 (chair aerobics group).

		Mean	Std. Deviation
Pair 1	HADSANX.PRE	8.71	1.496
	HADSANX.POST	5.14	2.116
Pair 2	HADSDE.PRE	7.86	1.069
	HADSDE.POST	4.86	2.116
Pair 4	HRPRE	83.29	4.152
	HRPOST	77.14	1.464

The mean value showed significant difference in all the parameters. Paired t-Test Group = 1 Paired Samples Statisticsa
All the parameters showed difference in the mean value.

Table 6: Shows paired sample test between pre and post-test values of HADS ANXIETY, HADS Depression and Heart rate of group 1 (chair aerobics group).

Group = 1						
Paired Samples Test[a]						
		Paired Differences			T	P
		Mean	95% Confidence Interval of the Difference			
			Lower	Upper		
Pair 1	HADSANX.PRE - HADSANX.POST	3.571	2.395	4.748	7.426	0.001
Pair 2	HADSDE.PRE - HADSDE.POST	3.000	1.806	4.194	6.148	0.001
Pair 4	HRPRE – HRPOST	6.143	2.168	10.118	3.781	0.009
Group = 1The *p* value showed significant difference in each parameter.Paired *T*-Test						

Table 7: Shows paired *t* test value for group 2 (Nadishodhana pranayama group).

Group = 2 Paired Samples Statistics[a]				
		Mean	Std. Deviation	Std. Error Mean
Pair 1	HADSANX.PRE	11.14	2.795	1.056
	HADSANX.POST	6.00	1.915	0.724
Pair 2	HADSDE.PRE	9.43	1.397	0.528
	HADSDE.POST	5.86	1.215	0.459
Pair 4	HRPRE	92.43	6.828	2.581
	HRPOST	84.14	4.880	1.844

Table 8: Shows paired sample test between pre and post-test values of HADS ANXIETY, HADS DEPRESSION, and Heart rate of group 1 (chair aerobics group).

Group = 2 The mean value showed significant difference in all the parameters. Paired Samples Test[a]						
		Paired Differences			*t*	*P*
		Mean	95% Confidence Interval of the Difference			
			Lower	Upper		
Pair 1	HADSANX.PRE - HADSANX.POST	5.143	3.338	6.948	6.971	0.001
Pair 2	HADSDE.PRE - HADSDE.POST	3.571	1.812	5.331	4.967	0.003
Pair 4	HRPRE-HRPOST	8.286	4.963	11.608	6.102	0.001

Group = 2The *p* value showed significant difference in each parameter.

has a positive role in anxiety among CABG patients. And chair aerobics has a positive role in anxiety among CABG patients. The comparison between the group showed that chair aerobics treatment is superior in reducing anxiety symptoms compared to the pranayama group. Hence, we concluded that both interventions are helping to improve the symptoms of anxiety. Studies with a larger sample size need to be done to provide more reliable results.

CONCLUSION

The study's findings suggest that both interventions may be equally effective in reducing symptoms among CABG patients, However, the results need to be interpreted carefully, owing to the small sample size. Future studies on larger sample sizes and long-term follow-up are warranted.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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SUMMARY

Anxiety is a common entity after cardiac surgery. Both the interventions effectively improve anxiety in CABG patients. Chair aerobics is found to be more effective in improving anxiety. Both the interventions are safe to administer in patients without any deleterious effect.

REFERENCES

1. Shafiq S, Dervash MA. Coronary artery disease: The culprit behind the trounced productivity with special reference to India. Int J Biotechnol Biomed Sci. 2020;6(1). Gupta R, Mohan I, Narula J. Trends in coronary heart disease epidemiology in India. Ann Glob Health. 2016 Mar 1;82(2):307-15. doi: 10.1016/j.aogh.2016.04.002, PMID 27372534.
2. Jinnouchi H, Kolodgie FD, Romero M, Virmani R, Finn AV. Pathophysiology of coronary artery disease. Invessel Based Imaging Techniques. *2020*;211-27. Cham: Springer.doi: 10.1007/978-3-030-25249-6_11.
3. Adjedj J, Stoyanov N, Muller O. Comparison of coronary angiography and intracoronary imaging with fractional flow reserve for coronary artery disease evaluation: An anatomical-functional mismatch. Anatol J Cardiol. 2018;20(3):182-9. doi: 10.14744/AnatolJCardiol.2018.42949, PMID 30152800.
4. Correa-Rodríguez M, Abu Ejheisheh M, Suleiman-Martos N, Membrive-Jiménez MJ, Velando-Soriano A, Schmidt-RioValle J, *et al*. Prevalence of depression in coronary artery bypass surgery: A systematic review and meta-analysis. J Clin Med. 2020;9(4):909. doi: 10.3390/jcm9040909, PMID 32225052.
5. Melly L, Torregrossa G, Lee T, Jansens JL, Puskas JD. Fifty years of coronary artery bypass grafting. J Thorac Dis. 2018 ;10(3):1960-7. doi: 10.21037/jtd.2018.02.43, PMID 29707352.
6. Head SJ, Milojevic M, Daemen J, Ahn JM, Boersma E, Christiansen EH, *et al*. Mortality after coronary artery bypass grafting versus percutaneous coronary intervention

with stenting for coronary artery disease: A pooled analysis of individual patient data. Lancet. 2018;391(10124):939-48. doi: 10.1016/S0140-6736(18)30423-9, PMID 29478841.

7. Chaudhury S, Saini R, Bakhla AK, Singh J. Depression and anxiety following coronary artery bypass graft: Current Indian scenario. Cardiol Res Pract. 2016;2016:2345184. doi: 10.1155/2016/2345184, PMID 27034884.
8. Açıkel MET. Evaluation of depression and anxiety in coronary artery bypass surgery patients: A prospective clinical study. Braz J Cardiovasc Surg. 2019;34(4):389-95. doi: 10.21470/1678-9741-2018-0426, PMID 31364347.
9. Chialà O, Vellone E, Klompstra L, Ortali GA, Strömberg A, Jaarsma T. Relationships between exercise capacity and anxiety, depression, and cognition in patients with heart failure. Heart Lung. 2018;47(5):465-70. doi: 10.1016/j.hrtlng.2018.07.010, PMID 30087002.
10. Hsiao CY, Tsai HC, Chi MH, Chen KC, Chen PS, Lee IH, *et al*. The association between baseline subjective anxiety rating and changes in cardiac autonomic nervous activity in response to tryptophan depletion in healthy volunteers. Medicine. 2016 ;95(19):e3498. doi: 10.1097/MD.0000000000003498, PMID 27175645.
11. Mohan E, Mohan B, Khetarpal BK, Kaur MR, Katyal S, Singh AN, *et al*. Acute hemodynamic response to pranayama in postcoronary artery bypass graft patients. J Pract Cardiovasc Sci. 2018;4(3):206. doi: 10.4103/jpcs.jpcs_37_18.
12. Kim K, Lee S, Kim JH. Diminished autonomic neurocardiac function in patients with generalized anxiety disorder. Neuropsychiatr Dis Treat. 2016;12:3111-8. doi: 10.2147 /NDT.S121533, PMID 27994467.
13. Tripathy M, Sahu B. Immediate effect of Nadi Shodhana pranayama on blood glucose, heart rate and blood pressure. J Am Sci. 2019;15(5):65-70.
14. Thapa S, Pattanshetty RB. Effect of Chair aerobics as low-intensity exercise training on heart rate, blood pressure, and six-minute walk distance in post coronary artery bypass graft surgery patients through phase I cardiac rehabilitation. Nepalese Heart J. 2016;13(1):19-23. doi: 10.3126/njh.v13i1.14540.
15. Ashok A, Kumar KUD, Gopalakrishnan M. Outcome of chair aerobics and pranayama on anxiety and exercise tolerance in coronary artery bypass grafting patients: Study protocol of a randomized clinical trial. Int J Surg Protoc. 2021;25(1):238-43. doi: 10.2 9337/ijsp.166, PMID 34722956.
16. Manikumar M, R. M, Pahinian A, Jeganathan A, Krishnakumar K A. Efficacy of Nadishodhan pranayama–alternate nostril breathing (ANB) on functional improvement in post CABG patient. Biomed Pharmacol J. 2018;11(1):553-6. doi: 10 .13005/bpj/1406.
17. Shah MR, Kothari PH. Effects of nadi-Shodhana pranayama on depression, anxiety, stress and peak expiratory flow rate in post CABG patients: Experimental study. Int J Health Sci Res. 2019;9(10):40-5.
18. Winkelmann ER, Dallazen F, Bronzatti AB, Lorenzoni JC, Windmöller P. Analysis of steps adapted protocol in cardiac rehabilitation in the hospital phase. Rev Bras Cir Cardiovasc. 2015 Jan;30(1):40-8. doi: 10.5935/1678-9741.20140048, PMID 25859866.
19. Nasirnejad S, Molavynejad S, Jahani S, Maraghi E. Effect of Rhythmic breathing on the Severity of Pain and Anxiety in Patients after Coronary artery Bypass Graft: A clinical trial study. Pak J Med Health Sci. 2020;14(2):1260-5.
20. Padhy K, Devi N, Kosuri M, Ponangi SV. Benefit of pranayama for improvement of pulmonary function tests (PFT) in post coronary artery bypass grafting (CABG) surgery patients. jebmh. 2020;7(44):2579-82. doi: 10.18410/jebmh/2020/532.
21. Jadhav KG, Devi TP. Effect of Step Aerobics Applied Early in Phase 2 Cabg Subjects on Functional Capacity and Exercise Tolerance. Indian J Forensic Med Toxicol. 2020;14(2)
22. AbuRuz ME, Momani A, Shajrawi A. The association between depressive symptoms and length of hospital stay following coronary artery bypass graft is moderated by perceived control. Risk Manag Healthc Policy. 2021;14:1499-507. doi: 10.2147/RMHP .S306162, PMID 33883956.
23. Saba MA, Goharpey S, Attarbashi Moghadam B, Salehi R, Nejatian M. Correlation between the 6-min walk test and exercise tolerance test in cardiac rehabilitation after coronary artery bypass grafting: A cross-sectional study. Cardiol Ther. 2021;10(1):201-9. doi: 10.1007/s40119-021-00210-0, PMID 33586086.
24. Jasubhai S. Effect of quick coherence technique on psychophysiological coherence, heart rate, stress, anxiety, depression and feeling state in young adults in India. J Psychiatr Neurosci. 2021;3(1):1-9.
25. Rao A, Zecchin R, Newton PJ, Phillips JL, DiGiacomo M, Denniss AR, *et al*. The prevalence and impact of depression and anxiety in cardiac rehabilitation: A longitudinal cohort study. Eur J Prev Cardiol. 2020;27(5):478-89. doi: 10.1177/204748 7319871716, PMID 31597473.
26. Zheng X, Zheng Y, Ma J, Zhang M, Zhang Y, Liu X, *et al*. Effect of exercise-based cardiac rehabilitation on anxiety and depression in patients with myocardial infarction: A systematic review and meta-analysis. Heart Lung. 2019;48(1):1-7. doi: 10.1016/j.hrtln g.2018.09.011, PMID 30366575.
27. Abeeshna A, Gopalakrishnan M, Dhanesh KKU. Management of Anxiety in Coronary artery Bypass Grafting Patients: The influence of Chair Aerobics and Nadisodhana Pranayama A Pilot Randomized Clinical Trial. Authorea. May 10, 2022.doi: 10.22541/ au.165216062.20582135/v1.

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