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ENHANCING QUALITY OF LIFE THROUGH A SUPERVISED CARDIAC REHABILITATION PROGRAM ALONG WITH A CONVENTIONAL CONDITIONING EXERCISE PROGRAM AT HOME IN CARDIOVASCULAR DISEASE PATIENTS

Shadab Uddin[1], Sumer Singh[2] Tabish Fahim,[3]

[1] Ph.D. Research Scholar, School of Life Sciences, Singhania University, Pacheri Bari, (Jhunjhunu), Rajasthan, India. Email: drshadabuddins1@gmail.com

[2] Associate Prof. & Head School of Life Sciences, Singhania University, Rajasthan, India. Email: Sumer@singhaniauniversity.ac.in

[3] Associate Professor, Department of Physiotherapy, Mahatma Gandhi Mission (MGM) School of Physiotherapy, Aurangabad, Maharashtra, India. Email: tabishfahim4u@gmail.com

Correspondence

Ph.D. Research Scholar in school of life sciences Physical Therapy, Singhania University, Pacheri Bari, (Jhunjhunu), Rajasthan 333515, India. Tel.: +91-7759870834; Email: drshadabuddins1@gmail.com

Running title

CRP Enhances QOL in CVD Patients

Abstract

Objectives: Debilitating day-to-day practices, including a sedentary lifestyle, increased unhealthy food consumption habits, no exercise, smoking, remarkably low HDL, and high cholesterol levels, lead to increased obesity, diabetes, and cardiovascular diseases (CVD), affecting the quality of life. Supervised, steady, and long-term aerobic exercise training benefits cardiorespiratory fitness, psychological status, and quality of life. Therefore, the study's objective was to determine the effect of cardiac rehabilitation program (CRP) on heart rate (HR), systolic and diastolic blood pressure (SBP and DBP), and quality of life (QOL) in CVD patients.

Materials and Methods: The study followed a two-arm parallel group randomized comparative design. Thirty participants (n=15/group) with CVD (aged between 45-76 years) were randomly allocated to two groups (CRP vs. Control). CRP Group received the CRP and a conventional conditioning exercise program (CEP) at home and the Control Group received the conventional CEP only at home. The outcomes, HR, SBP, DBP, and QOL, were assessed using a sphygmomanometer and short-form 36 (SF-36) questionnaire's physical component summary (PCS) and mental component summary (MCS) scale, respectively. The t-test and Wilcoxon test were used to analyze between and within-group comparisons for all the outcomes scores, keeping the significance level α at 95% ($p<0.05$) for all the statistical analyses.

Results: The mean scores comparison of the outcomes, HR, PCS, and MCS, were found significant (95% CI, $p<0.05$) within CRP and Control groups; however, SBP and DBP mean scores were found insignificant (95% CI, $p>0.05$) within both groups, except DBP mean score which was found significant ($p<0.05$) within CRP Group. Comparing the outcomes mean scores between the groups at four-week post-intervention, except PCS and MCS (95% CI, $p<0.05$), HR, SBP, and DBP were found to be insignificant ($p>0.05$).

Conclusions: The CRP and conventional CEP at home together and conventional CEP at home alone were equally effective in decreasing HR and improving QOL in CVD patients. However,

the CRP and conventional CEP at home together showed more effectiveness than the conventional CEP at home in improving the QOL in CVD patients.

Keywords: Cardiac rehabilitation program, conditioning exercise program, Hypertension, Quality of life, cardiovascular disease.

Introduction

Cardiovascular disease is a group of disorders that affect the heart and blood vessels. It includes coronary artery disease, heart failure, arrhythmias, and valvular heart disease. [1] These conditions can cause various symptoms, including chest pain, shortness of breath, fatigue, and weakness, leading to serious complications such as heart attack and stroke. [2] Cardiac rehabilitation programs are designed to help patients with cardiovascular disease manage their condition and improve their overall health and well-being. [3,4] These programs typically include exercise training, education on healthy lifestyle choices, and support for managing risk factors such as high blood pressure, high cholesterol, and diabetes. [5] Cardiac rehabilitation programs are recommended for patients witvariousof cardiovascular conditions, including those who have had a heart attack, heart surgery, or a heart-related procedure such as angioplasty or stenting. [6,7] Cardiac rehabilitation aims to help patients improve their exercise capacity, reduce their symptoms, and improve their overall quality of life. [4,8,9] Studies have shown that participation in a cardiac rehabilitation program can significantly improve exercise capacity, reduce the risk of future cardiovascular events, and improve overall health outcomes for patients with cardiovascular disease. [10-12] As such, cardiac rehabilitation programs are an important part of managing cardiovascular disease and are recommended by healthcare professionals worldwide. [7-12]

Quality of life (QOL) is an important outcome measure in CVD patients. Patients with CVD often experience a reduced QOL due to symptoms such as chest pain, shortness of breath, and fatigue. [9,12] Psychological factors such as anxiety and depression can also negatively impact QOL in these patients. [13] Improving QOL can help patients to manage their symptoms better, adhere to their treatment plans, and enjoy a more fulfilling life. [13,14]

Cardiac rehabilitation programs can play a key role in improving QOL in CVD patients. These programs typically include exercise training, education on CVD risk factors and lifestyle modifications, and psychological support. [3-7] By improving QOL, cardiac rehabilitation can help to reduce morbidity and mortality in patients with CVD. [1,9,14]

The growing body of evidence supports cardiac rehabilitation programs' beneficial effects on cardiovascular disease patients' quality of life. [7-12] Cardiac rehabilitation programs are designed to help patients with cardiovascular disease improve their physical and psychological well-being through exercise, education, and counseling. While these programs have been shown to reduce the risk of cardiovascular events and improve overall survival rates, the precise mechanisms by which they achieve these benefits are not yet fully understood.[15-18] Therefore, to better understand the underlying mechanisms that contribute to the positive outcomes associated with these programs and identify ways to optimize their effectiveness. This study hypothesized that there would be a significant difference in the quality of life in CVD patients following a cardiac rehabilitation program.

Moreover, the results of this study will be particularly relevant given the rising incidence of cardiovascular disease worldwide, as well as the increasing recognition of the importance of lifestyle modifications in its management. Ultimately, this research can help inform the

development of more tailored and effective cardiac rehabilitation programs that can improve the health and well-being of cardiovascular disease patients.

Materials and methods

Study design

The study was based on a two-arm parallel group randomized comparative design.

Ethical consideration

The study followed the standard ethical guidelines for conducting human research by the local ethical body. This study was conducted per the declaration of Helsinki (2010). The participants from each group returned with a signed, completed informed-consent form before the beginning of the study.

Study settings

The CVD patients were approached to participate in the study at the outpatient physiotherapy department, where a consultant physician referred them to receive the cardiac rehabilitation program. The participants were informed of the present study through in-campus posters hanging inside the physician chamber, the physiotherapy department, and outside the hospital premises. The COVID-19 pandemic safety measures were strictly followed to safeguard the study's participants, assessors, and therapists' safety. The study was completed within thirteen months, from June 2021 to August 2022.

Sample size estimation

Computer software G*Power 3.1.9.4 was used to estimate the effective sample size. A priori t-test (independent means): computer required sample size- given α (0.05), power (0.95), and effect size (mean1±SD=259.7±39.17, mean2±46.29, d=1.55). Assuming a 20% sample attrition, a total of twenty-four participants (15/group) were required to satisfy the effective power of the study. The outcomes score of the physical component summary (PCS) of the SF-36 questionnaire was used to calculate the intervention's effect size.

Study participants

The study's participants were screened and recruited based on inclusion and exclusion criteria. The inclusion criteria were as follows: CVD patients, including essential hypertension not greater than 140-159/90-94 mmHg, post coronary artery bypass grafting, Myocardial infarction, peripheral vascular disease, a chronic cerebrovascular accident within 6 to 12 months, and chronic heart disease, aged within 45 to 65 years, ejection fraction greater than 45%, and must pass the exercise stress tests. The exclusion criteria were as followings: participants with uncontrolled diabetes and metabolic disturbances, poorly controlled hypertension, acute cerebrovascular accident, neurological/muscular disorders, uncontrolled arrhythmias, hemodynamically unstable, and showed non-cooperation in the study.

Outcomes measures

The study outcome measures, such as HR and BP (systolic and diastolic BP), were assessed by a sphygmomanometer; QOL was measured by a short-form 36 questionnaire (PCS and MCS subscales). [19] The SF-36 questionnaire consists of 36 items representing eight subscales that cover the domains of physical functioning, role limitation due to physical health problems, bodily pain, general health vitality, social functioning, role limitation due to personal or emotional problems, social functioning, and emotional well-being. Individual subscales and two summary scores, physical component summary (PCS) and mental component summary (MCS), may be computed. [15,19]

The average score of two readings for each outcome measure was recorded and considered for the data analysis to observe the intervention effects. The study duration was four weeks, and the outcomes scores were assessed at baseline and four-week post-intervention by the same assistant physiotherapist kept blinded to the group allocation. The instruments used in this study were as follows; sphygmomanometer (Diamond Mercurial Type Regular BP Monitor, Model: BPMR-111, Industrial Electronic & Allied Products, India), pulse oximeter (CONTEC pulse oximeter, CONTEC Medical Systems Co., Ltd. China), stethoscope (3M^{TM} Littman Stethoscope, USA.), stopwatch, treadmill, measuring tape, and weight cuffs.

Procedures

Thirty participants diagnosed with CVD were referred to O.P.D. physiotherapy, screened, and recruited for the study based on inclusion and exclusion criteria, randomly allocated to the experimental, i.e., CRP Group (cardiac rehabilitation program (CRP) and conventional CEP at home and Control group (conventional CEP at home only), and obtained the signed informed consent form from the participants before the start of the study. A simple random sampling method of randomization was used to allocate the participants to the intervention group using a lottery technique in which thirty chits with equally written group numbers (15/group) were enclosed and mixed inside a jar. The participants were instructed to take a chit individually from the JAR. According to the written group number, they were allocated simultaneously to the CRP and Control groups. Baseline measurements were taken for the outcomes by an assistant physiotherapist before the start of the study intervention. In addition to the conventional CEP at home, the CRP group received a cardiac rehabilitation program. However, the participants from the control group were instructed to do only conventional CEP at home. The CRP and conventional CEP were explained by a specialist physiotherapist (cardiac physiotherapist) who was not blind to the participants' group distribution. The assistant physiotherapist, who was kept blind to the group allocation, took the outcomes scores at baseline and 4 weeks post-intervention. Two readings were recorded for each outcome score, and the average score of the two readings was taken for the data analysis. A CONSORT (2010) flow diagram presents the study procedures, including enrolment, randomization, allocation, follow-up, and analysis, in Figure 1.

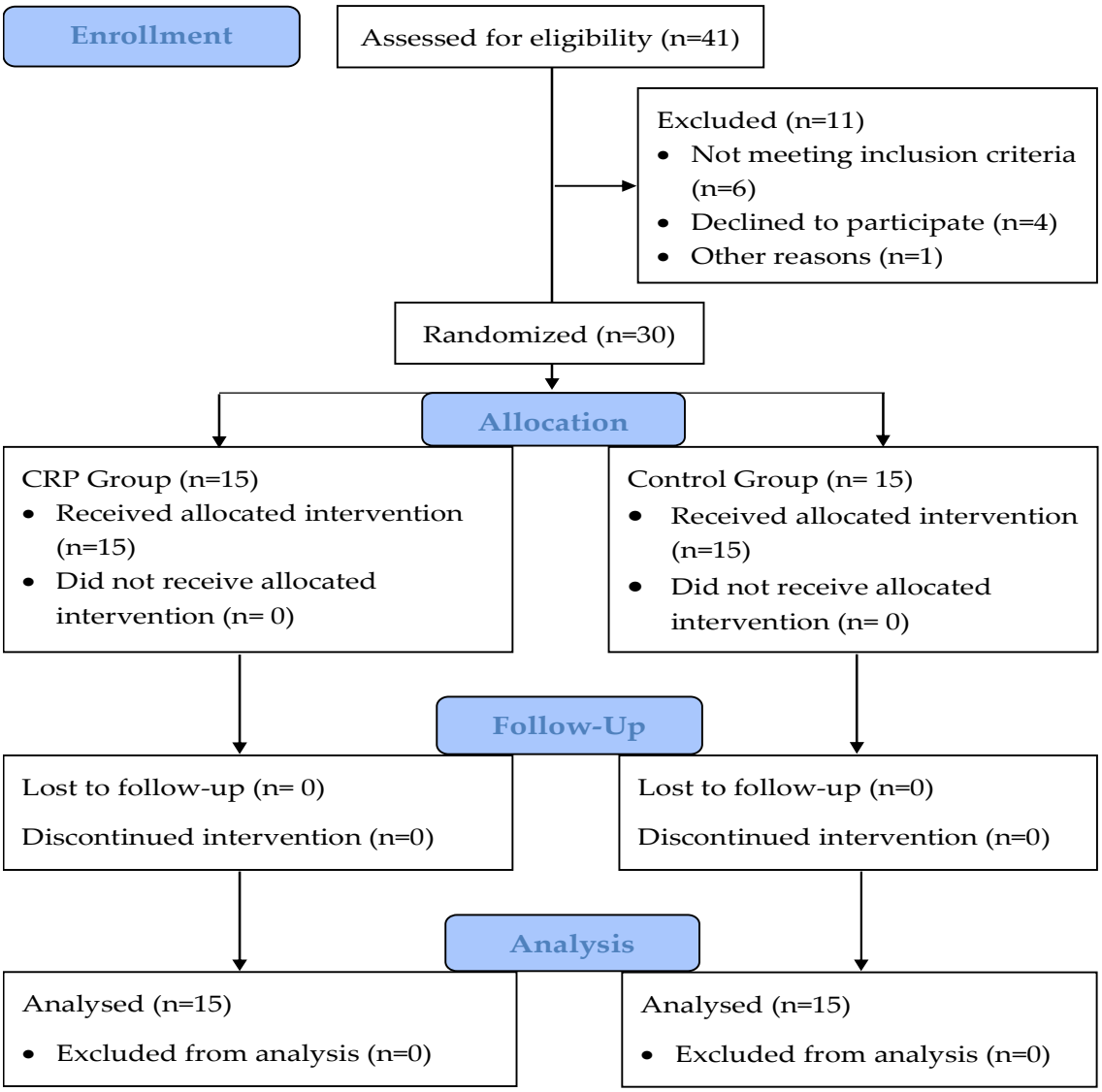

Figure 1. A CONSORT (2010) flow diagram presents the study's procedures, including enrolment, randomization, allocation, follow-up, and analysis.

Intervention

The participants from the CRP group performed a cardiac rehabilitation program under the supervision of a specialist physical therapist. They were instructed to perform conventional CEP at home, too. However, the participants from the Control group were instructed to perform only conventional CEP at home. The stipulated exercise protocol for both groups was advised to continue until three alternate days a week for four weeks.

Cardiac rehabilitation program (CRP) [16-18]

CRP, an exercise regime, was developed, which included a warm-up phase for 10 minutes, a conditioning phase for 20 minutes, and a cool-down phase for 10 minutes. Protocol was followed for three alternate days per week for 4 weeks. The vital parameters, such as HR, RR,

SPO_2, and BP, were monitored every 10 minutes during the training session to avoid uneven consequences. Blood pressure was recorded again at the end of the exercise session in a sitting position. Intermittent rest periods for 5 minutes were given to the patients whenever required.

Warm-up phase

It starts before the strengthening phase, including the following exercise patterns with ten repetitions per day: 1). Simple neck movements, including neck flexion, extension, and lateral side flexion; 2). Deep breathing exercises, including butterfly exercises and cross-shoulder breathing 3). Upper limb free exercises, including shoulder flexion, extension, protraction, and retraction; 4). Trunk mobility exercises, including bilateral side flexion, flexion, extension, and bilateral trunk rotation; and 5). Knee marching in standing with hands supported.

Conditioning phase

It starts after the warm-up phase. It exhibits light-weight resistance exercises and aerobic training on a treadmill for a total duration of 20 minutes. A lightweight resistance exercise was carried out using 1/2kg weight cuffs for the upper and lower limbs, with ten repetitions of each movement per session.

Aerobic training was carried out using a treadmill, keeping zero elevation (0^0) and training intensity at 70% of the maximum heart rate for ten-minute per session. [17]

Cool down phase

It starts at the end of the conditioning phase. It exhibits the stretching and flexibility exercises of the targeted limb/muscles and the exercises done in the warm-up phase. The patients were also asked to follow regular walking at their own pace for 30 minutes daily.

Conventional conditioning exercise program (CEP) [20]

The conventional CEP was also followed for the same duration. Under the exercise regimen, they were instructed to do the following for 10 repetitions each twice per day as follows: 1). Simple neck movements (including neck flexion and extension, deep breathing exercises (butterfly breathing and cross shoulder breathing techniques), upper limb free exercises (shoulder flexion, extension, protraction, and retraction). Trunk mobility exercises (flexion, extension, bilateral side flexion, and bilateral trunk rotation).

At baseline and after 4 weeks, outcome measures viz. quality of life (QOL) was determined by the physical and mental summary scales (PCS and MCS) of SF-36 questionnaires. The required data were collected for the given variables and evaluated statistically.

Statistical analysis

A statistical package for social science version 26 (IBM SPSS Inc. Armonk, USA) was used to analyze the study's data. A Shapiro-Wilk test of normality was performed to check the normal distribution of the data within each group. An unpaired t-test was used to analyze the between-group comparison for the mean HR, SBP, and DBP scores post-intervention. The between-group factor was time and outcomes, measured at baseline and after 4 weeks for all four dependent variables. A paired t-test was used to analyze the outcomes scores within-group across the two-time points. A non-parametric test, i.e., the Wilcoxon-signed test and the Wilcoxon rank-sum test, were used to quantify the intervention effects on participants' QOL within and between groups. The two variables of the physical and mental components of the SF-36 questionnaire were compared at baseline and after a 4-week post-intervention. For all the statistical analyses, the confidence interval alpha (α) was set at 95% to be considered a significant value ($p<0.05$).

Results

Out of forty-one, thirty-participant with CVD were recruited for the study. Eleven participants were excluded due to the following reasons; meeting the exclusion criteria of the study(n=6), the unavailability of time (n=4), and other reason (n=1). The selected participants (n=30) were randomly distributed into two groups, an experimental group, i.e., the CRP Group (n=15), and a Control group (n=15). A Shapiro-Wilk normality test revealed a normal distribution for the participants' characteristics (age, height, and weight) and the baseline outcome measures of HR, SBP, and DBP, except PCS and MCS, within each group. In Tables-4, the letter 't' and 'z' represents the t and z-statistics of the t-test and Wilcoxon test, respectively. The participants' characteristics and baseline scores for all the outcomes are presented in Table 1.

Table 1. Participants' demographic characteristics and baseline measures of the outcomes (N=30).

Variables	Groups	Mean ±SD	Minimum	Maximum
Weight(kgs)	CRP Group	62.46±7.70	52.00	78.00
	Control Group	66.60±6.27	54.00	76.00
Height(cms)	CRP Group	163±7.06	153.00	176.00
	Control Group	165.3±4.12	158.00	172.00
Age(years)	CRP Group	59±7.29	48.00	76.00
	Control Group	58.8±6.73	45.00	72.00
Heart rate	CRP Group	87.13±14.71	72.00	122.00
	Control Group	84.33±9.80	74.00	108.00
Systolic BP (mmHg)	CRP Group	123.66±12.61	100.00	150.00
	Control Group	123.66±9.67	110.00	148.00
Diastolic BP (mmHg)	CRP Group	81.33±5.81	70.00	90.00
	Control Group	84.73±10.26	70.00	110.00
PCS	CRP Group	162.27±37.8	99.72	265.55
	Control Group	131.72±31.24	90.55	186.20
MCS	CRP Group	188.06±82.46	83.50	361.66
	Control Group	130.18±26.99	80.50	184.50

BP: Blood Pressure; PCS: Physical Component Summary Scale; MCS: Mental Component Summary Scale; SD: Standard Deviation; m: Meter; mmHg: millimeter of mercury (Hg).

Within-group comparison

The within-group comparison revealed insignificant differences (95% CI, $p>0.05$) for the outcomes (HR, SBP, and DBP) except PCS and MCS (95% CI, $p<0.05$) when comparing the baseline scores with 4-week post-intervention scores within CRP Group, presented in Table 2. However, except SBP scores (95% CI, $p>0.05$), all the outcomes (HR, DBP, PCS, and MCS) showed significant differences (95% CI, $p<0.05$) within the Control Group compared to the baseline scores with 4-week post-intervention scores, presented in Table 3.

Table 2. Within-group comparison for the mean HR, SBP, DBP, PCS, and MCS scores within CRP Group (n=15) using paired t-test and Wilcoxon signed-rank test.

Variables	Baseline	4 Weeks	Paired t-test	
	Mean ± SD	Mean ± SD	t	P

Heart rate	87.13 ± 14.71	82.06 ± 14.48	3.134	.007*
Systolic BP (mmHg)	123.66 ± 12.61	120.46 ± 8.13	1.045	.314
Diastolic BP (mmHg)	81.33 ± 5.81	78.66 ± 8.54	1.586	.135
			z	p
PCS	162.27 ± 37.8	297.8 ± 40.32	3.408	.001*
MCS	188.06 ± 82.4	307.98 ± 48.36	3.409	.001*

*- Significant value if p<0.05; BP: Blood Pressure; PCS: Physical Component Summary Scale; MCS: Mental Component Summary Scale; SD: Standard Deviation; m: Meter; mmHg: millimeter of mercury (Hg).

Table 3. Within-group comparison for the outcomes of HR, SBP, DBP, PCS, and MCS within the Control Group (n=15), using paired t-test and Wilcoxon signed-rank test.

Variables	Baseline	4 Weeks	Paired t-test	
	Mean ± SD	Mean ± SD	t	P
Heart rate	84.33 ± 9.80	81.86 ± 7.72	2.581	.022*
Systolic BP (mmHg)	123.66 ± 9.67	121.13 ± 8.23	1.363	.194
Diastolic BP (mmHg)	84.73 ± 10.26	78.33 ± 10.80	2.469	.027*
			z	p
PCS	131.72 ± 31.24	188.76 ± 50.38	3.351	.001*
MCS	130.18 ± 26.99	189.17 ± 55.91	3.296	.001*

*- Significant value if p<0.05; BP: Blood Pressure; PCS: Physical Component Summary Scale; MCS: Mental Component Summary Scale; SD: Standard Deviation; m: Meter; mmHg: millimeter of mercury (Hg).

Between-group comparison

The between-group comparison revealed insignificant differences (95% CI, p>0.05) for all the outcomes (HR, SBP, and DBP) except PCS and MCS (95% CI, p<0.05) compared to the scores between the groups at 4-week post-intervention (CRP vs. Control), presented in Table 4.

Table 4. Between-group comparison for mean HR, SBP, DBP, PCS, and MCS scores at 4 weeks post-intervention, using unpaired t-test and Wilcoxon rank-sum test (95% CI).

Variables	CRP Group	Control Group	Unpaired t-test	
	Mean ± SD	Mean ± SD	t	P
Heart rate	82.06 ± 14.48	81.86 ± 7.72	.047	.963
Systolic BP	120.46 ± 8.13	121.13 ± 8.23	2.23	.825
Diastolic BP	78.66 ± 8.54	78.33 ± 10.80	.094	.926
			z	p
PCS	297.8 ± 40.32	188.76 ± 50.38	4.418	.001*
MCS	307.98 ± 48.36	189.17 ± 55.19	4.295	.002*

*- Significant value if $p<0.05$; BP: Blood Pressure; PCS: Physical Component Summary Scale; MCS: Mental Component Summary Scale; SD: Standard Deviation; m: Meter; mmHg: millimeter of mercury (Hg).

Discussion

This study aimed to determine CRP's effect on CVD participants' quality of life. During baseline readings, CRP and Control Groups were demographically identical without significant differences in their descriptive statistics.

It has been demonstrated that intense physical activities and fitness minimize the causes of mortality and mortality rate of CVD. Therefore, for health promotion, exercising regularly within intensities ranging from 4o to 90% of the maximum volume of oxygen uptake per minute per kilogram (VO2 max) is endorsed among patients with CVD. However, aerobic or conditioning exercise programs are often conducted at low to moderate intensities. A previous study has revealed a significant contrary relationship between participation in CRP and reduced progression of CAD. [18]

The results of this randomized controlled study demonstrated that with aerobic exercise training at low to moderate intensities, the enhancement in quality of life was evident in both the groups: the CRP group and the Control group, after a 4-week cardiac rehabilitation program. Within-group analysis (CRP group) revealed a statistically significant result in heart rate (p=.007) and QOL (p=.001). Similar statistically significant results were obtained from the Control group in heart rate (p=.022) and QOL (P=.000). Strikingly, there was a significant p-value for DBP (p=.022). Heart rate, oxygen saturation, and perceived exertion rate were measured during the running/walking. [21]

The present study is one of the few reported on a four-week multidisciplinary cardiac rehabilitation program. It has been of significant importance in improving the participants' quality of life. A similar study was conducted for ten weeks and four weeks of CRP involving CVD patients, including MI and CABG (n=60), and reported that the CRP significantly enhanced the general health, life well-being, and exercise capacity following the CRP within-group. However, insignificant differences were detected between-group analyses. [22] This is consistent with the current study's findings, where no significant results were found in the between-group analysis. But indeed, these data advocate that short-term courses of CRP are advantageous to CVD patients in improving their quality of life and promoting more widespread use of the CRP.

The baseline heart rate and blood pressure readings in all the subjects (n=30) were similar without significant differences. With the improvement in the quality of life, a significant decline in HR was revealed in both groups ($p<0.05$). Significant changes were seen in the DBP (p=.027) of the Control group in contrast to the CRP group during within-group analysis. In the CRP group, heart rate and blood pressure increased during strength training sessions but returned to their resting levels once the session was over. The increase in SBP during the strength training in the CRP group was due to circulatory changes in response to the training session. There was an increased metabolic demand due to muscle work and improved muscle flow. Arterial vasoconstriction and increased cardiac output, too, resulted in increased heart rate and blood pressure values. [23,24]

A previous study reported that no between-group differences were detected in subjects under a 4-week and 10-week cardiac rehabilitation. [22] These results aligned with the current study, where

heart rate and blood pressure declined with no between-group differences. Reduction in blood pressure was also seen in patients with hypertension who underwent short-term endurance training programs after CABG. [25] The decline in blood pressure can be explained due to the relative increase in vagal activity and reduction in sympathetic activity. [25]

In contrast, another study reported on the early short-term intensive cardiac rehabilitation program (2-3 months) in an intervention group (n=105) and control group came up with puzzling results. [26] Smoking cessation influenced the body weight of the experimental group, which was relatively profound. No changes in blood lipid levels were present. It became clear that exercise alone does not impact total or LDL cholesterol except when associated with robust diet modifications. The resting systolic and diastolic pressure was significantly higher. They postulated that the deceptive increase in blood pressure was possible because of the impulsive retrieval of the left ventricular function post-CABG and acute MI. [26]

Quality of life was the main outcome measure of CVD patients in this study. The prime goal of inclusive CRP is to encourage positive lifestyle adaptations and supports CVD patients in incorporating these behaviors into their daily lives. CRP has revealed an improvement in functional capacity and quality of life. [27] The cardiac rehabilitation program has been practiced primarily in supervised institution-based settings. But recently, home-based aerobic exercises have been advocated to be as effective as institution-based cardiac rehabilitation in improving short-term functional capacity, health-related quality of life (HQRL), and perceived social support (PSS) in CVD patients. [28]

The promising effects of the short-term CRP on the PCS and MCS score of SF36 remained significantly higher than the baseline in both groups ($p<.05$). Both the groups revealed significantly higher physical HRQL per the PCS of the SF36 at baseline and after the completion of the study.

These results of this study are similar to a previous study finding which revealed that if a designated CRP is continued until six months, its observed effects on the study outcomes, including cardiovascular fitness and psychological and vocational status, would be maintained for the next 12 months in the home group while declined in the hospital group. [27] Also supported by another study that revealed maintaining the intervention effects for 1-5 years. [9] Though the current study's duration was relatively small, the results of the above-mentioned studies complied with the current study regarding improved exercise capacity and quality of life in both groups.

However, since this study aimed to see the improvement in the participants' quality of life, these findings only strongly support that both the groups maintained a higher PCS and MCS statistically after the between-group analysis was done.

The current study was limited to a relatively short intervention duration and assessment/follow-up program to observe CRP's long-term effects on CVD patients. A Hindi version of the SF 36 questionnaire was not introduced as it could guide more efficiently in matching/ticking the actual problems with the real question, which could bias the results. The study's report generalizability could limit to a particular geographical area as the study sample was taken from one hospital representing a particular local area. Furthermore, educational awareness was not provided on weight management and smoking cessation. Future studies should consider these limitations to observe the long-term effect of the cardiac rehabilitation program, make more aware of weight management and smoking cessation, economic evaluation in terms of cost-effectiveness for each

program session, and generalize the reports globally. It should also evaluate the cost-effectiveness of each program session.

Conclusion

The cardiac rehabilitation and conventional conditioning exercise program at home together and the conventional conditioning exercise program at home alone were equally effective in reducing heart rate and improving quality of life in cardiovascular diseases patients. However, the cardiac rehabilitation and conventional conditioning exercise program at home together showed more effectiveness than the conventional conditioning exercise program at home alone in improving the quality of life in cardiovascular disease patients. Physical therapists should consider either the cardiac rehabilitation and conventional conditioning exercise program at home together or the conventional conditioning exercise program at home alone, depending on the treatment goals based on the individuals' assessment.

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Conflict of interest

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