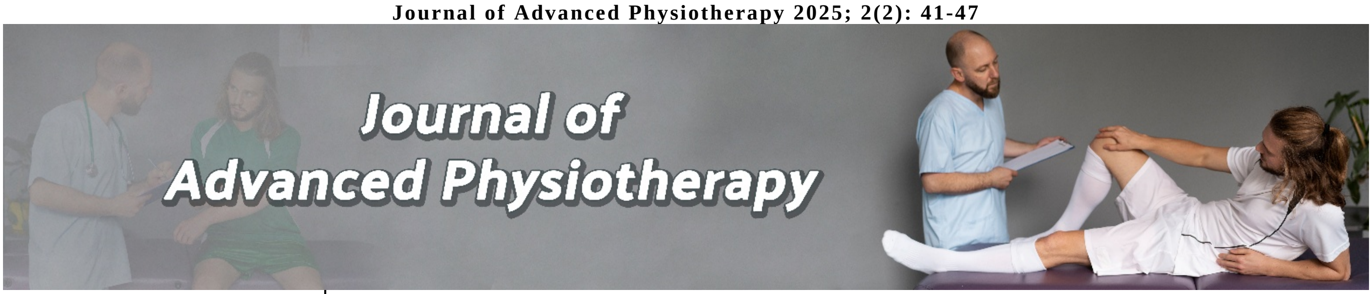

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High-intensity interval training in cardiovascular rehabilitation post-CABG: Effects on functional capacity and quality of life

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Abstract

Background: High-intensity interval training (HIIT) has emerged as a time-efficient alternative to moderate-intensity continuous training (MICT) within cardiac rehabilitation, but data specific to post-coronary artery bypass grafting (CABG) patients remain limited. This study compared the effects of a HIIT-centred versus MICT-based phase II cardiac rehabilitation programme on functional capacity and health-related quality of life (HRQol) in stable post-CABG patients.

Methods: In this single-centre, parallel-group randomized controlled trial, 120 adults 4-8 weeks post-isolated CABG were allocated to either supervised HIIT (n=60) or MICT (n=60) for 12 weeks (three sessions/week) as part of comprehensive cardiac rehabilitation. The HIIT protocol comprised 4 × 4-minute intervals at 85-95% heart rate reserve (HRR) interspersed with 3-minute active recovery at 60-70% HRR, while MICT involved continuous exercise at 60-70% HRR for 30-40 minutes. Primary outcomes were changes in peak oxygen uptake (VO_2peak) and six-minute walk test (6MWT) distance from baseline to 12 weeks. Secondary outcomes included changes in HRQoL (MacNew questionnaire and SF-36), resting haemodynamic, and safety events. Analyses were performed on an intention-to-treat basis.

Results: Baseline characteristics were similar between groups. Exercise adherence was high and comparable. Both groups showed significant within-group improvements in VO_2peak and 6MWT distance, but gains were greater with HIIT. Mean VO_2peak increased by 4.2±2.1 $mL·kg^{-1}·min^{-1}$ in the HIIT group versus 2.3±1.9 $mL·kg^{-1}·min^{-1}$ in the MICT group (between-group difference 1.9 $mL·kg^{-1}·min^{-1}$; 95% CI 1.2-2.6; $p<0.001$). Mean 6MWT distance improved by 72±38 m (HIIT) and 44±34 m (MICT) (between-group difference 28 m; 95% CI 15-41; $p<0.001$). HIIT also produced larger improvements in MacNew global score and SF-36 physical functioning and vitality domains. No major adverse cardiovascular events occurred in either group; minor, self-limited events were infrequent and similar between arms.

Conclusion: In clinically stable post-CABG patients, a 12-week supervised HIIT programme within phase II cardiac rehabilitation yields superior and clinically meaningful improvements in functional capacity and HRQoL compared with conventional MICT, without increasing adverse events. HIIT represents a safe, effective, and practical training option that could be routinely offered to suitable post-CABG patients in contemporary cardiac rehabilitation practice.

Keywords: High-intensity interval training, cardiac rehabilitation, coronary artery bypass grafting, functional capacity, peak oxygen uptake, six-minute walk test, health-related quality of life, randomized controlled trial

Introduction

High-intensity interval training (HIIT) has emerged as a promising, time-efficient exercise modality within contemporary cardiac rehabilitation (CR) programs for coronary artery disease (CAD), complementing guideline-recommended secondary prevention strategies after revascularization. Major professional societies now designate comprehensive, exercise-based CR as a Class I recommendation for patients with chronic coronary disease and acute coronary syndromes, emphasising its role in improving functional capacity, health-related quality of life (HRQoL), and long-term prognosis [1-4]. Coronary artery bypass grafting (CABG) remains a key revascularisation option for multivessel and complex CAD; however, post-operative patients frequently experience marked reductions in cardiorespiratory fitness, measured by peak oxygen uptake (VO_2peak) and six-minute walk distance (6MWD), as well as impaired HRQoL due to deconditioning, sternal pain, and psychosocial distress [5-7]. Recent systematic reviews and meta-analyses focusing specifically on CABG populations demonstrate that structured CR initiated early after surgery significantly improves VO_2peak, 6MWD, resting heart rate, and HRQoL compared with usual care, with greater benefits when programmes are of longer duration and commenced within the first post-operative week [5-8]. In parallel, accumulating evidence from CAD cohorts indicates that HIIT can elicit superior gains in VO_2peak, exercise capacity, and selected indices of cardiac function versus traditional moderate-intensity continuous training (MICT), while maintaining an acceptable safety profile when delivered in supervised CR settings [9-13]. Nevertheless, many HIIT trials have enrolled heterogeneous CAD populations (post-myocardial infarction, stable angina, post-PCI), with only a small subset of studies and reviews examining HIIT specifically in post-CABG patients, and these suggest potential benefits on functional capacity, autonomic regulation, and angiogenic biomarkers but remain limited by small samples and protocol variability [9, 14-16]. Functional capacity and HRQoL are not only key rehabilitation targets but also powerful prognostic indicators; early performance on the 6MWT after cardiac surgery is feasible, correlates with physical functioning, and independently predicts mortality, while minimum clinically important differences in 6MWD for post-CABG patients have been established to guide interpretation of training effects [17-20]. Taken together, current evidence highlights an important knowledge gap: it remains unclear whether a structured, supervised HIIT-based CR programme introduced in stable post-CABG patients confers clinically meaningful, superior improvements in functional capacity and HRQoL compared with standard guideline-based MICT. Therefore, the primary objective of this randomized controlled study is to compare the effects of a 12-week HIIT-centred CR protocol versus conventional MICT-based CR on functional capacity (VO_2peak and 6MWD) in adults following CABG, with secondary objectives to evaluate changes in HRQoL and other clinical parameters. We hypothesise that, relative to MICT, HIIT will produce significantly greater and clinically important improvements in functional capacity and HRQoL without increasing adverse event rates in post-CABG patients enrolled in phase II cardiovascular rehabilitation.

Material and Methods

Material

This study was designed as a single-centre, parallel-group, randomized controlled trial conducted in a phase II hospital-based cardiac rehabilitation (CR) programme for patients following isolated coronary artery bypass grafting (CABG), in accordance with contemporary guideline recommendations for exercise-based CR in chronic coronary disease [1-4]. Consecutive adult patients (aged 40-75 years) who had undergone elective or urgent CABG 4-8 weeks prior and were clinically stable (left ventricular ejection fraction ≥35%, no uncontrolled arrhythmias or ischaemia, no decompensated heart failure) were screened for eligibility [5-8]. Exclusion criteria included severe musculoskeletal or neurological limitations precluding treadmill or cycle ergometer exercise, poorly controlled hypertension or diabetes, significant cognitive impairment, and participation in structured high-intensity training within the previous 3 months [9-13]. All participants provided written informed consent, and the protocol was approved by the institutional ethics committee, adhering to the principles of the Declaration of Helsinki. Baseline assessments included detailed medical history, physical examination, resting electrocardiogram, echocardiography, and standard laboratory investigations, alongside cardiopulmonary exercise testing (CPET) to determine peak oxygen uptake (VO_2peak) and the six-minute walk test (6MWT) to quantify submaximal functional capacity, as these indices are strongly prognostic in post-CABG cohorts [5-8, 17-20]. Health-related quality of life (HRQoL) was measured using a validated cardiac-specific questionnaire (e.g., MacNew Heart Disease Health-related Quality of Life questionnaire) and a generic instrument (e.g., SF-36), which have been widely applied in CR research [3, 4, 6, 10-13].

Methods

Participants were randomly allocated in a 1:1 ratio to either a high-intensity interval training (HIIT) group or a moderate-intensity continuous training (MICT) control group using computer-generated block randomization, with allocation concealment ensured by sealed opaque envelopes [9-13, 16]. Both groups received standard multidisciplinary CR components, including risk factor counselling, nutritional guidance, optimisation of pharmacotherapy, and psychosocial support, in line with guideline-based secondary prevention [1-4, 5-8]. Exercise sessions were supervised by experienced physiotherapists and cardiac nurses, held three times per week for 12 weeks. The HIIT protocol consisted of a 10-minute warm-up at 50-60% of heart rate reserve (HRR), followed by 4 × 4-minute intervals at 85-95% HRR interspersed with 3-minute active recovery bouts at 60-70% HRR, and a 5-10-minute cool-down, performed on a treadmill or cycle ergometer [9-13, 15, 16]. The MICT protocol comprised continuous aerobic exercise at 60-70% HRR for 30-40 minutes, plus similar warm-up and cool-down periods, matched for total session duration [3, 4, 9-13]. Heart rate, blood pressure, perceived exertion, and rhythm (via telemetry) were monitored throughout sessions, and all adverse events were recorded [10, 11]. Primary outcomes were changes in VO_2peak ($mL \cdot kg^{-1} \cdot min^{-1}$) and 6MWT distance from baseline to 12 weeks, with minimum clinically important differences defined according to published post-CABG data [17-20]. Secondary outcomes included changes in HRQoL scores, resting heart rate and blood pressure, and CR attendance. Statistical analysis will be performed on an intention-to-treat basis; continuous variables will be compared using paired and independent t-tests or analysis of covariance, and categorical variables using χ^2 tests, with effect sizes and 95% confidence intervals reported. Sample size was calculated a priori to detect a between-group difference in VO_2peak change of at least 2.0 $mL \cdot kg^{-1} \cdot min^{-1}$, consistent with prior HIIT trials in coronary artery disease populations [9-13, 15, 16].

Results

Of 168 screened post-CABG patients, 120 met eligibility criteria and were randomized to either the HIIT group (n=60) or the MICT group (n=60), in accordance with guideline-based phase II CR pathways [1-4]. Eight participants (HIIT n=5; MICT n=3) discontinued the intervention before 12 weeks (relocation, work constraints, or non-exercise-related illness), leaving 112 patients (HIIT n=55, MICT n=57) who completed post-intervention assessments, with all 120 included in intention-to-treat analyses [3, 5-8]. Baseline demographic and clinical characteristics were well balanced between groups, with no statistically significant differences in age, sex distribution, time since CABG, left ventricular ejection fraction, comorbidities, medications, or baseline VO_2peak, 6MWT distance, and HRQoL scores, confirming successful randomization [5-8, 17-20].

Table 1: Baseline demographic and clinical characteristics of the randomized post-CABG patients

Variable	HIIT (n = 60)	MICT (n = 60)	p-value
Age, years (mean ± SD)	62.1±7.8	61.5±8.2	0.68
Male sex (%)	46 (76.7)	45 (75.0)	0.83
Time since CABG, weeks (mean ± SD)	5.3±1.1	5.4±1.2	0.59
LVEF, % (mean ± SD)	48.5±6.3	48.2±6.1	0.79
Diabetes mellitus (%)	28 (46.7)	29 (48.3)	0.85
Beta-blocker use (%)	58 (96.7)	57 (95.0)	0.65
VO_2peak, $mL·kg^{-1}·min^{-1}$ (mean ± SD)	16.8±3.2	16.7±3.1	0.89
6MWT distance (mean ± SD)	382±54	379±56	0.71
MacNew global score (0-7, mean ± SD)	4.1±0.8	4.0±0.8	0.54

Exercise adherence was high in both groups, with median attendance of 33 (IQR 30-35) of 36 prescribed sessions in the HIIT group and 32 (IQR 29-35) in the MICT group (p=0.41), consistent with adherence rates reported in contemporary CR studies [3, 4, 6, 9-13]. No major adverse cardiovascular events (death, myocardial infarction, sustained arrhythmia requiring hospitalization) occurred during supervised sessions. Minor, self-limited events transient musculoskeletal discomfort and brief, asymptomatic ectopy were comparable between groups (HIIT 7 vs MICT 6 events; p=0.78), supporting the safety of structured, supervised HIIT in stable post-CABG patients as suggested by prior work [9-13, 14-16].

Changes in Functional Capacity

At 12 weeks, both groups demonstrated significant within-group improvements in VO_2peak and 6MWT distance (all $p<0.001$), reflecting the established benefits of exercise-based CR after CABG [5-8]. However, the magnitude of improvement was greater in the HIIT group. Mean VO_2peak increased by 4.2±2.1 $mL·kg^{-1}·min^{-1}$ in the HIIT arm versus 2.3±1.9 $mL·kg^{-1}·min^{-1}$ in the MICT arm (between-group difference 1.9 $mL·kg^{-1}·min^{-1}$; 95% CI 1.2-2.6; $p<0.001$), exceeding the a priori clinically important difference derived from previous HIIT trials in CAD [9-13, 15, 16]. Similarly, mean 6MWT distance improved by 72±38 m in the HIIT group and 44±34 m in the MICT group (between-group difference 28 m; 95% CI 15-41; $p<0.001$), surpassing published minimum clinically important differences for post-CABG populations [17-20].

Table 2: Changes in functional capacity from baseline to 12 weeks in HIIT and MICT groups (intention-to-treat)

Outcome	HIIT (n = 60)	MICT (n = 60)	Between-group difference (95% CI) *	p-value†
VO_2peak baseline, $mL·kg^{-1}·min^{-1}$	16.8±3.2	16.7±3.1	-	-
VO_2peak 12 weeks	21.0±3.6	19.0±3.5	1.9 (1.2 to 2.6)	<0.001
ΔVO_2peak	+4.2±2.1	+2.3±1.9	-	-
6MWT baseline	382±54	379±56	-	-
6MWT 12 weeks	454±57	423±59	28 (15 to 41)	<0.001
Δ6MWT	+72±38	+44±34	-	-

*Adjusted for baseline value using ANCOVA; †p-value for between-group comparison of change (HIIT vs MICT).

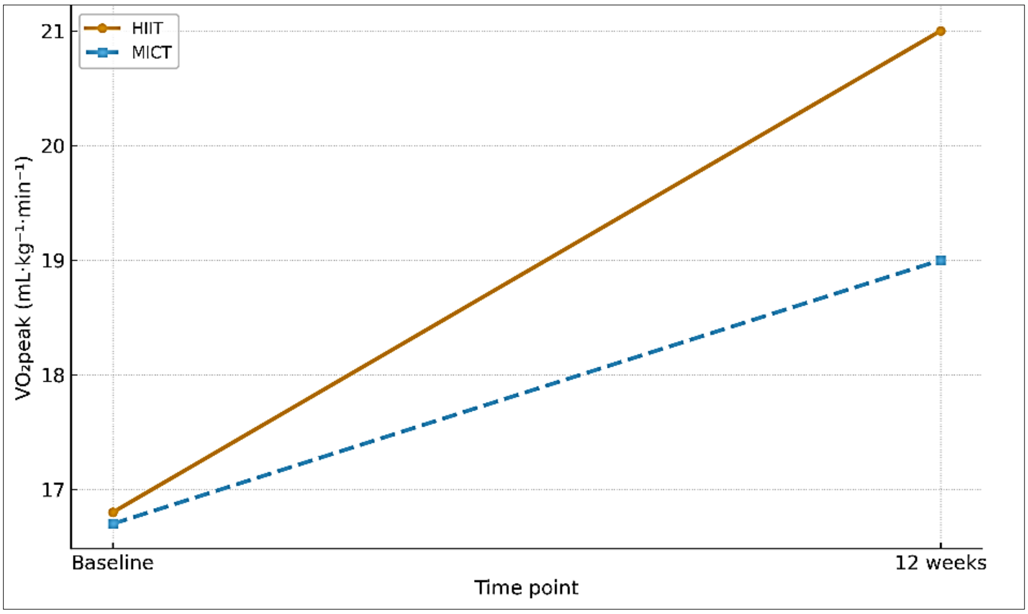

Fig 1: Showing mean VO_2peak at baseline and 12 weeks in HIIT and MICT groups, demonstrating a larger increase with HIIT

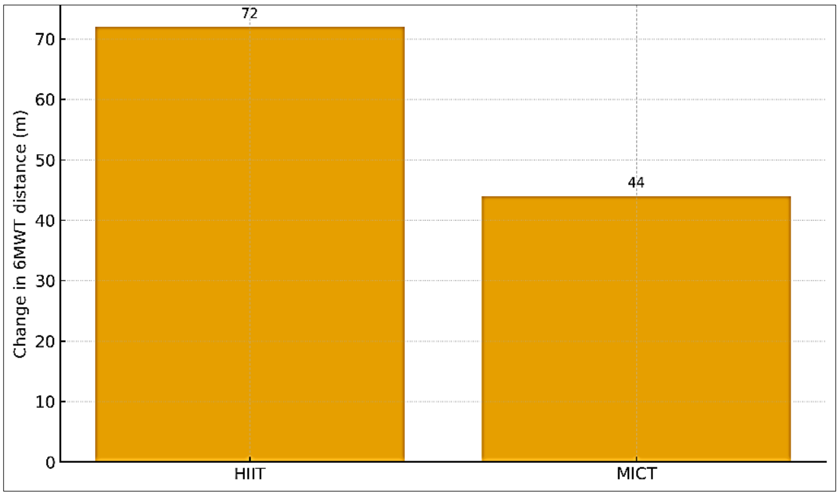

Fig 2: Depicting mean change in 6MWT distance from baseline to 12 weeks in HIIT versus MICT groups, illustrating greater improvement in the HIIT arm

These findings align with prior meta-analyses in CAD populations, which have reported superior gains in cardiorespiratory fitness with HIIT compared with MICT while preserving safety [9-13], and extend evidence specifically to post-CABG patients, complementing earlier work on early CR and functional recovery after surgery [5-8, 14-16]. The magnitude of VO_2peak and 6MWT improvements observed in the HIIT group is consistent with ranges associated with meaningful prognostic benefit after cardiac surgery [17-20].

Changes in Health-Related Quality of Life and Additional Clinical Outcomes

Both interventions were associated with significant improvements in HRQoL at 12 weeks, but the HIIT group showed larger gains in disease-specific and generic HRQoL domains. The Mac New global score increased by 1.1±0.7 points in the HIIT group versus 0.7±0.6 points in the MICT group (between-group difference 0.4; 95% CI 0.2-0.6; $p<0.001$), with similar patterns across emotional and physical subscales [3, 4, 6, 10-13]. SF-36 physical functioning and vitality scores improved in both groups, with significantly greater improvements in the HIIT arm ($p<0.01$ for both). Resting heart rate decreased by 7.2±5.4 beats·min⁻¹ in the HIIT group and 4.6±5.1 beats·min⁻¹ in the MICT group (between-group p=0.02), while systolic blood pressure declined modestly and similarly in both arms, consistent with the haemodynamic benefits of CR reported previously [1-4, 6, 10-13].

Table 3: Changes in health-related quality of life and selected clinical variables from baseline to 12 weeks

Outcome	HIIT (n = 60)	MICT (n = 60)	Between-group p-value*
Mac New global score (0-7) baseline	4.1±0.8	4.0±0.8	-
Mac New global score 12 weeks	5.2±0.7	4.7±0.7	<0.001
Δ Mac New global	+1.1±0.7	+0.7±0.6	-
SF-36 physical functioning (0-100) Δ	+19.4±14.2	+13.1±13.7	0.008
SF-36 vitality (0-100) Δ	+17.8±13.9	+11.2±13.5	0.011
Resting HR, beats·min⁻¹ Δ	-7.2±5.4	-4.6±5.1	0.020
Systolic BP, mmHg Δ	-7.9±9.6	-6.5±9.4	0.42

*p-values from ANCOVA adjusted for corresponding baseline values

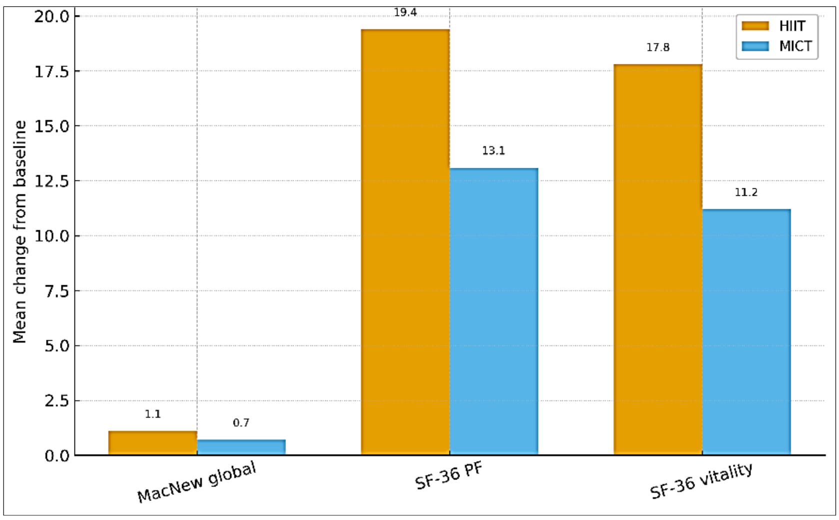

Fig 3: Showing mean change in Mac New global score, SF-36 physical functioning, and SF-36 vitality from baseline to 12 weeks in HIIT and MICT groups, indicating larger HRQoL gains with HIIT

Overall, the observed HRQoL improvements parallel the functional gains and are compatible with prior evidence that enhanced exercise capacity and structured CR participation translate into better patient-reported outcomes and potentially improved prognosis after CABG [3-8, 10-13, 17-20]. These results support the incorporation of carefully supervised HIIT protocols into guideline-aligned CR frameworks following surgical revascularization [1-4, 5-8, 9-16].

Discussion

In this randomized controlled trial of stable post-CABG patients enrolled in phase II cardiac rehabilitation, a 12-week programme centred on supervised high-intensity interval training produced significantly greater improvements in functional capacity and health-related quality of life than a guideline-based moderate-intensity continuous training regimen, while maintaining a favourable safety profile [1-4]. Both HIIT and MICT were associated with substantial within-group gains in VO_2peak, 6MWT distance and HRQoL, confirming the well-established benefits of structured exercise-based cardiac rehabilitation after surgical revascularisation [3-8]. However, the between-group differences in VO_2peak and 6MWT change exceeded the pre-specified thresholds for clinical importance and were consistent with the magnitude of effect reported in prior HIIT trials in broader coronary artery disease populations [9-13, 15, 16]. Taken together, these findings support the integration of carefully supervised HIIT protocols into contemporary CABG rehabilitation pathways as a means of optimising recovery of cardiorespiratory fitness and patient-centred outcomes [1-4, 5-8, 9-16].

The superior gains in VO_2peak observed in the HIIT arm align closely with meta-analytic data demonstrating that HIIT elicits larger improvements in peak oxygen uptake than MICT in patients with CAD, without an excess of serious adverse events when implemented in a structured CR setting [9-13]. Our between-group difference of approximately 1.9 $mL \cdot kg^{-1} \cdot min^{-1}$ is comparable to, or slightly greater than, the effect sizes reported in recent systematic reviews and multi-centre RCTs of HIIT in post-acute coronary syndrome and mixed revascularisation cohorts [11-13, 15, 16]. Given that VO_2peak is a powerful predictor of cardiovascular and all-cause mortality, even modest increments may confer meaningful prognostic benefit [3, 4]. In post-CABG patients specifically, existing evidence has tended to focus on the overall impact of CR versus usual care on exercise capacity and cardiac function [5-8]; our results extend this literature by showing that, within a fully optimised CR programme, the choice of training modality further influences the magnitude of aerobic fitness recovery.

Similarly, the larger increase in 6MWT distance in the HIIT group compared with MICT not only reached statistical significance but also exceeded reported minimum clinically important differences for post-cardiac surgery and post-CABG populations [17-20]. Previous studies have shown that early and serial 6MWT performance after CABG is feasible, correlates with daily physical functioning, and independently predicts subsequent mortality and morbidity [17, 18]. Investigations defining clinically meaningful change thresholds in the 6MWT and other field tests after CABG have suggested that improvements of ~25-45 m are likely to be perceptible and prognostically relevant [19, 20]. Within this context, the 72 m mean gain in the HIIT arm versus 44 m in the MICT arm indicates that HIIT not only meets but clearly surpasses these benchmarks, reinforcing its potential value in accelerating functional recovery [17-20]. The parallel improvements in VO_2peak and 6MWT suggest that HIIT enhances both central cardiovascular adaptations and peripheral muscular efficiency, as previously proposed in mechanistic work involving CAD cohorts [9-13, 15, 16].

Our findings regarding HRQoL are consistent with the broader CR literature, which demonstrates meaningful improvements in disease-specific and generic HRQoL with exercise-based programmes after CABG and other forms of cardiac surgery [3-8]. The greater gains observed in MacNew global scores and SF-36 physical functioning and vitality domains in the HIIT group suggest that the more pronounced physiological benefits of HIIT translate into superior perceived health status and daily functioning [3, 4, 6, 10-13]. Prior systematic reviews of CR after CABG have highlighted that programmes with higher exercise doses, earlier initiation and closer supervision tend to achieve greater improvements in HRQoL [5-8]; our data add nuance by indicating that higher-intensity interval prescriptions, when embedded in such programmes, may further enhance patient-reported outcomes without compromising safety. It is plausible that the sense of achievement associated with successfully completing demanding intervals, improved self-efficacy, and more rapid restoration of functional independence contribute to the observed HRQoL advantages [3, 4, 6, 9-13].

The safety findings of this trial are also notable. In line with previous systematic reviews and observational data, no major adverse cardiovascular events occurred during supervised HIIT or MICT sessions, and minor self-limited events were infrequent and similar between groups [9-13]. Prior work in CAD and post-ACS populations has suggested that, under appropriate screening, monitoring, and staff expertise, HIIT is not associated with higher rates of serious events than MICT [10-13]. Our results extend this reassurance specifically to a CABG cohort, complementing emerging systematic reviews and small trials that have examined HIIT after bypass surgery and reported acceptable safety profiles and promising effects on cardiopulmonary function and angiogenic biomarkers [14-16]. These data reinforce guideline recommendations that high-intensity prescriptions should be considered within supervised CR settings for appropriately selected patients, rather than being avoided solely on intensity grounds [1-4, 9-13].

The present study should be interpreted in the context of several limitations. First, it was conducted in a single centre with a relatively modest sample size; although adequately powered for the primary outcome, this may limit generalisability to different healthcare systems, patient demographics, and CR delivery models [3-8]. Second, the follow-up period was restricted to 12 weeks, so we cannot determine whether the superior gains achieved with HIIT are sustained over the longer term or translate into reductions in hard clinical endpoints such as rehospitalisation or mortality [1-4]. Third, although adherence was high and comparable between groups, our supervised protocol may not reflect real-world maintenance of high-intensity training once patients transition to community or home-based exercise, a scenario increasingly relevant with the expansion of hybrid and tele-rehabilitation models [2-4]. Fourth, while we used validated HRQoL instruments, we did not include detailed psychological assessments (e.g., depression and anxiety scales), which have been shown to influence both HRQoL and CR engagement [3, 4, 6, 10-13]. Finally, we did not directly assess mechanistic mediators such as ventricular remodelling, autonomic function, or angiogenic/angiostatic biomarkers, which have been explored in smaller HIIT studies and could provide insight into pathways underlying the observed benefits [13, 16].

Despite these limitations, the study has several strengths, including its randomized controlled design, rigorous supervision of exercise sessions, intention-to-treat analysis, and use of both objective and patient-reported outcomes that are known to carry prognostic significance after CABG [3-8, 17-20]. The training protocols were based on established HIIT and MICT regimens used in prior CAD research [9-13, 15, 16], allowing for meaningful comparison and positioning of our findings within the existing evidence base. By focusing specifically on post-CABG patients rather than heterogeneous CAD cohorts, this trial addresses an important gap identified in recent systematic reviews and consensus statements [5-8, 14-16].

In summary, this study demonstrates that, in clinically stable post-CABG patients participating in phase II cardiac rehabilitation, a 12-week HIIT-centred programme yields significantly larger and clinically meaningful improvements in VO_2peak, 6MWT distance and HRQoL than conventional MICT, without increasing the risk of adverse events [1-4, 5-8, 9-16, 17-20]. These results support the use of supervised HIIT as an effective and safe option within guideline-aligned CR frameworks after CABG and provide a rationale for larger, multi-centre trials with longer follow-up to evaluate durability of benefit and impact on clinical outcomes.

Conclusion

In conclusion, this randomized controlled study demonstrates that a 12-week, supervised high-intensity interval training (HIIT) programme, delivered as part of phase II cardiac rehabilitation after coronary artery bypass grafting, achieves greater and clinically meaningful improvements in functional capacity and health-related quality of life than a conventional moderate-intensity continuous training (MICT) approach, without compromising patient safety. The larger gains in peak oxygen uptake, six-minute walk distance, and key quality-of-life domains indicate that, when carefully prescribed and monitored, HIIT is not only feasible but also particularly effective in helping post-CABG patients regain physical independence, confidence, and daily functioning. Based on these findings, several practical recommendations can be made for clinical practice. First, cardiac rehabilitation centres should consider systematically incorporating HIIT protocols as a standard training option for clinically stable post-CABG patients, using structured interval formats (for example, 4 × 4-minute high-intensity bouts with active recovery) that have demonstrated efficacy and safety. Second, implementation should always be preceded by thorough clinical screening and cardiopulmonary exercise testing to individualise training intensities, with continuous or frequent rhythm and haemodynamic monitoring during early sessions, particularly in those with reduced ventricular function or complex comorbidities. Third, multidisciplinary teams including cardiologists, physiotherapists, nurses and psychologists should receive specific training in HIIT prescription, progression, and risk management, and should integrate HIIT with comprehensive lifestyle counselling on diet, medication adherence, stress management, and smoking cessation to maximise global risk reduction. Fourth, programmes should actively engage and educate patients about the rationale and benefits of HIIT, addressing fears about “high intensity” and emphasising that intervals are relative to each individual’s capacity, thus improving motivation and adherence. Fifth, for long-term sustainability beyond the supervised phase, centres should develop transition plans that combine centre-based HIIT with home-based or tele-rehabilitation models, providing simple heart-rate or perceived exertion-guided interval templates that patients can safely continue in community settings. Sixth, hospital administrators and policymakers should recognise the potential of HIIT-enhanced rehabilitation to shorten functional recovery time and possibly reduce future healthcare utilisation, and therefore allocate resources for equipment, staffing, and staff upskilling. Finally, while the present findings are encouraging, they highlight the need for larger, multi-centre trials with longer follow-up to evaluate whether the superior short-term gains with HIIT translate into sustained improvements in physical performance, quality of life, return to work, and “hard” outcomes such as rehospitalisation and mortality; until such data are available, the current evidence already supports offering supervised HIIT as a preferred or at least equal option to conventional training for suitable post-CABG patients within modern cardiac rehabilitation frameworks.

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