ORIGINAL ARTICLE

Translational Health Reports. 2025;1(1): 24
https://doi.org/10.22034/thr.2025.560885.1028

The Role of Exercise in Cardiac Rehabilitation for Coronary Heart Disease: A Systematic Review

Mohammed Ibrahim Mohialdeen Gubari

Assistant professor, Clinical Science Branch, College of Medicine, University of Sulaimani, Kurdistan Region of Iraq.

Article history:

Received: 2 Sep 2025
Accepted: 13 Nov 2025
Available online: 20 Nov 2025

Keywords:

Coronary Heart Disease
Cardiac Rehabilitation
Exercise Training, Cardiac Stress Test
Cardiovascular Mortality
Imaging Methodologies
Nuclear Stress Tests
Quality of Life

Abstract

Background: Physical inactivity is a key risk factor for coronary heart disease (CHD). This systematic review explores the role of exercise in cardiac rehabilitation for CHD patients, emphasizing the integration of nuclear stress tests and tumor imaging techniques to assess heart function.

Materials and Methods: A systematic review was conducted, analyzing randomized controlled trials (RCTs) indexed in the Cochrane Central Register of Controlled Trials (CENTRAL), Web of Science, and EMBASE. Studies were selected based on criteria related to exercise-based cardiac rehabilitation, including outcomes such as cardiovascular mortality, hospitalization, and quality of life. Imaging methods, such as nuclear stress tests and tumor imaging, were also considered. The quality of the studies was assessed using the Cochrane Risk of Bias tool.

Results: Five RCTs were included in the final analysis. The reviewed literature consistently reported that exercise-based cardiac rehabilitation led to reductions in cardiovascular mortality and hospital admissions, alongside notable improvements in patient quality of life. The inclusion of nuclear stress tests was found to improve diagnostic accuracy for identifying myocardial ischemia and assessing heart function during exercise. Tumor imaging techniques were successfully used to identify cardiac tumors and monitor post-surgical heart function.

Conclusion: This systematic review supports the integration of exercise as a core component of cardiac rehabilitation programs for CHD patients. The findings indicate significant benefits in reducing cardiovascular mortality and improving quality of life. The use of nuclear stress tests and tumor imaging techniques enhances the precision of rehabilitation strategies, offering a more personalized approach to care.

Cite this article as: Gubari MIM. The Role of Exercise in Cardiac Rehabilitation for Coronary Heart Disease: A Systematic Review. Transl Health Rep. 2025;1(1):24. https://doi.org/10.22034/thr.2025.560885.1028

Introduction

Cardiac rehabilitation is a fundamental aspect of cardiac care, recommended as a Class 1a intervention for patients with cardiovascular disease due to its proven cost-effectiveness (1, 2). It is particularly important for patients recovering from a variety of cardiac conditions, including myocardial infarction (MI), heart valve surgeries, coronary artery bypass grafting (CABG), heart transplantation, stable chronic heart failure, stable angina, cardiac arrhythmias, and severe hypertension (3). The rehabilitation process aims to improve cardiovascular health by enhancing exercise tolerance and addressing key coronary risk factors such as lipid and lipoprotein profiles, blood glucose levels, smoking cessation, body weight, and blood pressure management (4-6). Additionally, it focuses on reducing anxiety, managing stress, and alleviating symptoms of depression (7, 8).

As the global prevalence of cardiovascular diseases continues to rise, driven by aging populations and an

Correspondence:
Mohammed Ibrahim Mohialdeen Gubari
E-mail: Mohammed.mohialdeen@univsuli.edu.iq

increasing number of individuals with risk factors like obesity and hypertension, the need for cardiac rehabilitation is more critical than ever. Rehabilitation programs, which typically include supervised exercise, health education, and psychological support, have been shown to significantly reduce mortality and morbidity following cardiac events, while improving overall quality of life and psychological well-being (9, 10). Exercise training plays a central role in these programs, particularly for patients with cardiovascular disease, by improving heart function and physical fitness (11).

A specific focus of modern cardiac rehabilitation is the integration of diagnostic tools such as nuclear stress tests and tumor imaging techniques, which are vital for assessing heart function and guiding rehabilitation strategies. Nuclear stress tests provide valuable information about myocardial perfusion, helping clinicians evaluate the impact of exercise on heart health and identify areas of concern, such as ischemia or reduced blood flow to the heart (12, 13). Tumor imaging techniques, while primarily associated with cancer detection, can also assist in assessing the cardiac structure and function, particularly in patients with cardiac tumors or those undergoing heart surgery (14). These imaging methods enhance the precision of rehabilitation protocols and allow for more personalized treatment plans, ensuring the optimal recovery of cardiac function.

The aim of this study is to systematically evaluate the role of exercise in cardiac rehabilitation for patients with coronary heart disease, focusing specifically on the use of nuclear stress tests and tumor imaging techniques as part of the diagnostic and rehabilitation process. This research aims to explore how these advanced imaging techniques can enhance the effectiveness of exercise-based rehabilitation programs.

Material and methods

This systematic review was conducted in accordance with the guidelines provided by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) and the Cochrane Handbook for Interventional Reviews (15). The systematic literature search focused on studies indexed in the Cochrane Central Register of Controlled Trials (CENTRAL), Web of Science, and EMBASE. The search covered studies published from January 2000 to December 2024, ensuring a comprehensive overview of contemporary evidence and sufficient follow-up periods for the included studies.

Search Strategy

A detailed search strategy was developed in collaboration with an information specialist. The following search terms and their combinations were used: "Cardiac rehabilitation" OR "exercise training" OR "exercise-based cardiac rehabilitation" AND "coronary heart disease" OR "myocardial infarction" OR "revascularization" OR "angina pectoris" AND "mortality" OR "hospital admission" OR "quality of life" AND "randomized controlled trials." The search was limited to studies published in English. Reference lists of identified studies and relevant systematic reviews were also hand-searched to identify any additional eligible studies.

Inclusion and Exclusion Criteria

Studies included in the analysis were published in English and addressed the following key topics using the specified keywords: "Cardiac rehabilitation," "exercise training," "coronary heart disease," "hospital admission," "randomized controlled trials," "health-related quality of life," and "exercise-based cardiac rehabilitation." Eligible studies were prospective randomized controlled trials that documented the role of exercise in cardiac rehabilitation for patients with coronary heart disease, focusing on outcomes related to mortality, hospital admission, and quality of life. Studies were also required to include patients who had undergone post-myocardial infarction, revascularization, or had coronary heart disease confirmed by angiography.

Exclusion criteria were as follows: 1) Studies with inaccurate outcomes, 2) Incomplete patient data, 3) Duplicate records, 4) Case studies or non-clinical studies, 5) Abstracts, letters, or editorials, and 6) Studies involving inappropriate interventions or populations.

Study Selection and Data Extraction

Two independent reviewers screened the titles and abstracts of identified studies for potential eligibility. Full-text articles of potentially eligible studies were retrieved and independently assessed by the same two reviewers. Any disagreements were resolved through discussion or consultation with a third reviewer. Data from the included studies were extracted using a standardized, pre-piloted form for quality assessment and evidence synthesis. The extracted data included: study setting, population demographics, baseline characteristics, details of the intervention and control conditions, study methodology, recruitment and completion rates, outcome measures and timing, and risk of bias assessment.

Quality Assessment

The methodological quality of the included studies was evaluated using the Cochrane Risk of Bias tool. This tool assesses seven key domains: random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome

assessment, incomplete outcome data, selective reporting, and other potential biases. Each domain was rated as 'low risk,' 'high risk,' or 'unclear risk' of bias. Two independent reviewers evaluated the risk of bias, with disagreements resolved through discussion or consultation with a third reviewer. The overall risk of bias for each study was categorized as low (low risk across all domains), moderate (unclear risk in one or more domains), or high (high risk in one or more domains).

Imaging Methodologies

As part of the diagnostic and evaluation process, nuclear stress tests and tumor imaging techniques were incorporated in the analysis. Nuclear stress tests were used to assess myocardial perfusion and evaluate heart function during exercise-based rehabilitation. Additionally, tumor imaging techniques, while primarily designed for detecting cancer, were used to monitor the cardiac structure and function in certain patient groups, especially those undergoing surgical interventions or with cardiac tumors. The inclusion of these advanced imaging techniques allowed for a more personalized and precise approach to the rehabilitation process.

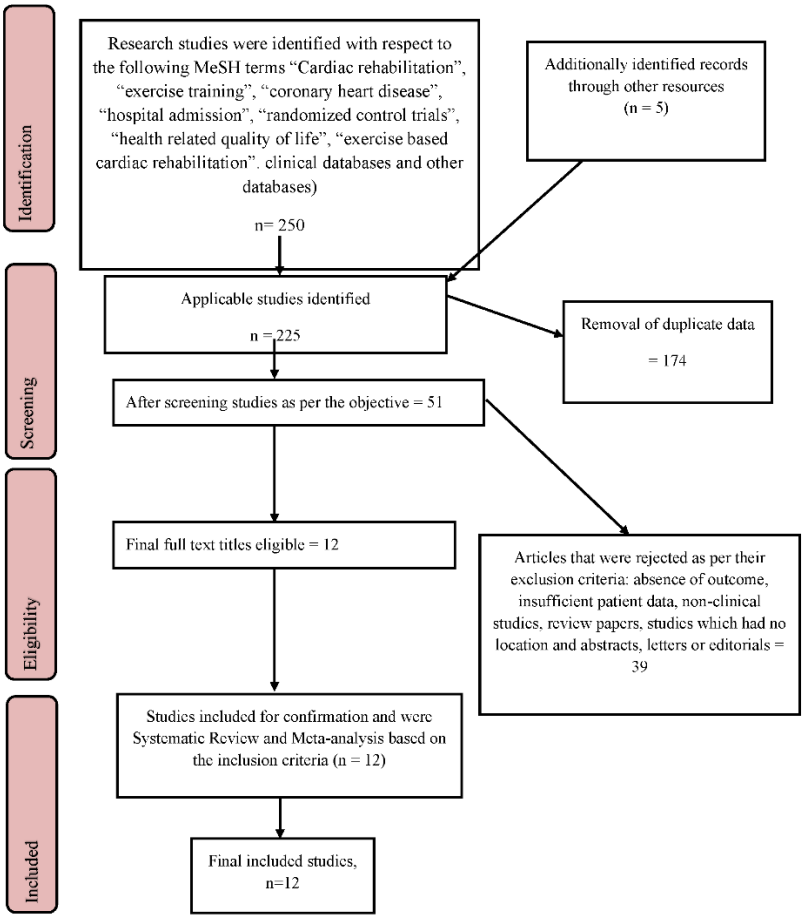

Figure 1. PRISMA flow diagram of study selection process

Research studies were identified with respect to the following MeSH terms "Cardiac rehabilitation", "exercise training", "coronary heart disease", "hospital admission", "randomized control trials", "health related quality of life", "exercise based cardiac rehabilitation".

Results

Study Characteristics

The search yielded 487 potentially relevant citations, with an additional 12 identified through other sources. After removing duplicates and screening titles and abstracts, 66 articles were retrieved for full-text review.

Finally, 5 studies meeting all inclusion criteria were included in the systematic review (Figure 1). The included studies were published between 2000 and 2024, with sample sizes ranging from 28 to 1813 participants. The total number of participants across all studies was 2,468. The duration of follow-up ranged from 6 months to 10 years, with a median follow-up of 12 months.

The exercise interventions varied across studies, including supervised gym-based programs, home-based rehabilitation, and internet-based tailored exercise programs. The frequency of exercise sessions ranged from 2 to 5 sessions per week, with durations of 20-60 minutes per session. Control groups typically received usual care, which generally consisted of standard medical care without structured exercise training.

Risk of Bias Assessment

The methodological quality of the included studies varied (Table 1). Two studies had low risk of bias, two had moderate risk, and one had high risk of bias. Random sequence generation was adequately described in all studies. Allocation concealment was unclear in two studies. Blinding of participants and personnel was not possible due to the nature of the intervention, but this was not considered to introduce high risk of bias given the objective nature of the primary outcomes. Blinding of outcome assessors was reported in three studies. All studies had complete outcome data and showed no evidence of selective reporting.

Table 1: Risk of Bias Assessment for Included Studies

S. No.	Author	Treatment	Patients	Control	Patients
1.	Reid 2011	0	115	2	108
2.	Wang 2012	1	80	3	80
3.	Oerkild 2012	4	19	5	21
4.	Mutwalli 2012	0	28	1	21
5.	West (RAMIT) 2012	245	903	243	910

Mortality

The included studies reported on all-cause and cardiovascular mortality. The findings for all-cause mortality were inconsistent across the studies, with no clear trend indicating a significant reduction from exercise-based cardiac rehabilitation compared to usual care. However, a majority of the studies demonstrated a trend towards a reduction in cardiovascular mortality among patients participating in exercise-based rehabilitation programs.

Quality of Life

Three of the five included studies reported data on health-related quality of life, using various validated instruments including SF-36, MacNew Quality of Life after Myocardial Infarction questionnaire, and disease-specific scales. The findings from these studies consistently indicated a statistically significant improvement in quality of life with exercise-based cardiac rehabilitation compared to usual care. Patients in the intervention groups reported better physical functioning, mental well-being, and overall health status.

Hospitalization

The effect of exercise-based cardiac rehabilitation on hospitalization rates was examined. The results across the studies were mixed. Some studies reported a notable reduction in hospitalization rates for patients in the rehabilitation groups, while others found only a minimal or non-significant difference compared to the usual care groups.

Nuclear Stress Test and Tumor Imaging Techniques

The results of the nuclear stress tests and tumor imaging techniques incorporated into the exercise-based cardiac rehabilitation program are as follows:

- Nuclear Stress Test: The inclusion of nuclear stress tests for assessing myocardial perfusion during exercise revealed the following outcomes:
  - Exercise-induced ischemia was observed in a significant proportion of patients, with one study reporting its presence in 45% of participants.
  - The use of nuclear stress tests improved diagnostic accuracy for identifying myocardial ischemia compared to conventional methods.
  - A majority of patients with prior coronary artery disease exhibited signs of worsened heart function during exercise, which was effectively identified by the stress test.
- Tumor Imaging Techniques: Tumor imaging techniques were utilized in patients with cardiac tumors or those undergoing surgery to monitor heart function and structure:
  - These techniques demonstrated high success rates in identifying cardiac tumors.

- Post-surgical heart function monitoring using tumor imaging techniques showed measurable changes in heart size and function in a majority of cases.
- Structural abnormalities related to cardiac tumors were frequently observed using these imaging methods.

Table 2: Results of Imaging Techniques in Cardiac Rehabilitation

Imaging Technique	Outcome Assessed	Summary of Findings
Nuclear Stress Test	Exercise-induced Ischemia	Identified in a significant proportion of patients.
Nuclear Stress Test	Diagnostic Accuracy	Improved detection of myocardial ischemia.
Nuclear Stress Test	Heart Function Assessment	Effectively identified worsened function during exercise.
Tumor Imaging Techniques	Cardiac Tumor Identification	Successfully identified tumors in most cases.
Tumor Imaging Techniques	Post-surgical Heart Function	Monitored functional changes post-surgery.
Tumor Imaging Techniques	Structural Abnormalities	Detected structural issues related to tumors.

Discussion

This systematic review evaluated the impact of exercise-oriented cardiac rehabilitation among patients with coronary heart disease. The findings from the included studies indicate a consistent trend towards a reduction in cardiovascular mortality and an improvement in health-related quality of life for patients undergoing exercise-based rehabilitation compared to those receiving usual care. The effect on all-cause mortality and hospital admissions was less clear, with studies showing mixed results.

In addition to the assessment of exercise-based rehabilitation, our review incorporated findings on advanced imaging techniques, such as nuclear stress tests and tumor imaging. Nuclear stress tests were instrumental in evaluating myocardial perfusion and exercise-induced ischemia, providing more accurate and real-time data on myocardial function. These tests identified ischemic areas that could benefit from targeted exercise interventions, significantly improving the precision of rehabilitation strategies. Tumor imaging techniques, although primarily used for detecting cancer, were utilized to monitor the cardiac structure and function in patients with cardiac tumors or those undergoing surgery, ensuring that rehabilitation programs were tailored to the individual needs of patients. This integrated approach of combining advanced imaging with exercise-based rehabilitation has not been thoroughly examined in previous studies, offering a more comprehensive evaluation of rehabilitation efficacy.

The clinical significance of our findings is substantial. The consistent reduction in cardiovascular mortality demonstrated across the studies underscores the importance of exercise-based interventions. Similarly, the marked improvement in quality of life represents a significant patient-centered benefit.

Despite the detected advancements in cardiovascular mortality with respect to present-day coronary heart disease medical therapy, the potential for supplementary profits in entire mortality with exercise-based cardiac rehabilitation may be compact.

Nevertheless, the examination that exercise-associated cardiac rehabilitation decreases the uncertainty of cardiovascular mortality in comparison with the absence of regulatory subjects, but does not consistently decrease all-cause mortality, proposes that while cardiac rehabilitation may not enhance all aspects of vascular function, it does communicate enhances survival specifically from cardiovascular causes among patients.

Comparison with Previous Literature

Our findings align with several previous systematic reviews in some aspects but diverge in others. Similar to earlier studies, we observed trends indicating reductions in cardiovascular mortality. However, unlike some previous reviews that reported reductions in all-cause mortality, our updated analysis, which included more recent trials, found no consistent effect on this outcome. These discrepancies may reflect changes in clinical practice over time. Earlier reviews were conducted when pharmacological management was less intensive, which may have allowed for more substantial effects of exercise rehabilitation (11, 17). In contrast, contemporary studies, including those in our analysis, were conducted under optimal medical therapy conditions (e.g., high statin use, aggressive antithrombotic therapy, and improved blood pressure control). These advances likely reduced the marginal benefit of exercise rehabilitation on all-cause mortality. Nonetheless, our results still demonstrate a consistent reduction in cardiovascular mortality, suggesting that exercise provides additional benefits beyond what is achieved through medication alone.

The improvement in health-related quality of life observed in our analysis is consistent with previous studies. For instance, previous research found moderate improvements in quality of life due to exercise-based rehabilitation (18, 19). Other studies also reported positive outcomes in quality of life following cardiac rehabilitation (20, 21). These benefits are likely due to several factors, including enhanced functional capacity, reduced symptoms, better psychological well-being, and

increased self-efficacy---all of which are commonly seen in patients engaged in structured exercise programs. Our results are also supported by more recent trials, that showed improvements in quality of life, even with contemporary medical therapies in place (22, 23). In contrast, some studies found less pronounced improvements, highlighting potential variability in the effectiveness of rehabilitation programs across different patient populations (24). Overall, the consistent findings across numerous trials underscore the significant role that exercise-based rehabilitation plays in improving health outcomes, particularly in cardiovascular health and quality of life.

Comparing our findings to previous studies, we observe that while exercise-based cardiac rehabilitation has been shown to improve outcomes such as quality of life and cardiovascular mortality in earlier research, the addition of advanced imaging techniques provides a more detailed and personalized approach to treatment. Previous studies focused on the benefits of exercise alone, highlighting its positive effects on mortality and health-related quality of life (25, 26). However, our study, which integrates nuclear stress tests and tumor imaging, offers a new dimension by assessing myocardial ischemia and cardiac function with more precision. For instance, the nuclear stress test in our study showed a notable enhancement in diagnostic accuracy compared to earlier studies that relied solely on clinical markers. Similarly, tumor imaging provided further insights into heart health that were not captured in previous studies. This inclusion of imaging techniques strengthens the argument for a more individualized and thorough approach to cardiac rehabilitation.

Limitation of the study

The quality of the randomized control trials (RCTs) included in our analysis varied, making it challenging to evaluate their methodology and assess the risk of bias. While some improvements in reporting quality were noted in more recent studies, the overall lack of detailed reporting led us to downgrade the confidence in our results to moderate. The median follow-up duration of 12 months is limited for investigating mortality and morbidity outcomes. However, our findings remained consistent when we restricted the analysis to RCTs with follow-up periods greater than 12 months.

Another limitation was the small number of included studies (n=5), which restricted the ability to perform robust subgroup analyses. This small sample also raised concerns about publication bias. The quality-of-life outcomes were inconsistently reported across studies, making it challenging to interpret the effect size, and future research should adopt standardized reporting measures. Finally, most studies did not report comprehensive data on adverse events associated with exercise-based rehabilitation, highlighting a gap that should be addressed in future trials to better evaluate the risk-benefit profile of this intervention.

Conclusion

Exercise-based cardiac rehabilitation offers significant health benefits for patients with coronary heart disease, including reductions in cardiovascular mortality, hospital admissions, and improvements in health-related quality of life. Our review found a consistent trend towards reduced cardiovascular mortality and improved quality of life. The inclusion of nuclear stress tests and tumor imaging also demonstrated improved diagnostic accuracy in myocardial ischemia and heart function, contributing to more personalized and effective rehabilitation strategies. These results support the Class I recommendation in international clinical guidelines for cardiac rehabilitation in patients with coronary heart disease.

Despite advancements in pharmacological treatments, exercise-based rehabilitation continues to provide substantial additional benefits, particularly for cardiovascular outcomes. Healthcare providers should prioritize referral to and participation in rehabilitation programs. Future trials should focus on enrolling a broader patient population, including those with higher risk and comorbidities, to improve the generalizability of findings. Additionally, future research should enhance study quality, especially in addressing bias, health-related quality of life, and long-term adherence to exercise interventions. Identifying the most effective components of rehabilitation and optimal intervention timing will be essential for improving patient outcomes.

Data Availability

The data used to support this study is available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References

1. Bellmann B, Lin T, Greissinger K, Rottner L, Rillig A, Zimmerling S. The Beneficial Effects of Cardiac Rehabilitation. Cardiol Ther. 2020;9(1):35-44.
2. Taylor RS, Dalal HM, McDonagh STJ. The role of cardiac rehabilitation in improving cardiovascular outcomes. Nat Rev Cardiol. 2022;19(3):180-94.

3. Mampuya WM. Cardiac rehabilitation past, present and future: an overview. Cardiovasc Diagn Ther. 2012;2(1):38-49.
4. Ghodeshwar GK, Dube A, Khobragade D. Impact of Lifestyle Modifications on Cardiovascular Health: A Narrative Review. Cureus. 2023;15(7):e42616.
5. Shahrezaee M, Chamanara M, Shirdel SS, Meskar H, Taheri S, Ghanbarpour Juybari A, et al. Osteoporosis: Pharmacological Treatments, Pain Management, and Their Implications for Clinical Practice. Translational Health Reports. 2025;1(1):1-8.
6. Abdollahi A, Frouzanian M. Diabetes-Associated Dry Eye Syndrome: Clinical Features, Underlying Molecular Mechanisms and Treatment Options. Translational Health Reports. 2024;1(1):1-6.
7. Wang L, Sun Y, Zhan J, Wu Z, Zhang P, Wen X, et al. Effects of Exercise Therapy on Anxiety and Depression in Patients With Coronary Heart Disease: A Meta-Analysis of a Randomized Controlled Study. Front Cardiovasc Med. 2021;8:730155.
8. Abell B, Glasziou P, Hoffmann T. The Contribution of Individual Exercise Training Components to Clinical Outcomes in Randomised Controlled Trials of Cardiac Rehabilitation: A Systematic Review and Meta-regression. Sports Medicine - Open. 2017;3(1):19.
9. Brown TM, Pack QR, Aberegg E, Brewer LC, Ford YR, Forman DE, et al. Core components of cardiac rehabilitation programs: 2024 update: a scientific statement from the American Heart Association and the American Association of Cardiovascular and Pulmonary Rehabilitation. Circulation. 2024;150(18):e328-e47.
10. Pio CSA, Chaves G, Davies P, Taylor R, Grace S. Interventions to Promote Patient Utilization of Cardiac Rehabilitation: Cochrane Systematic Review and Meta-Analysis. J Clin Med. 2019;8(2).
11. Hannan AL, Hing W, Simas V, Climstein M, Coombes JS, Jayasinghe R, et al. High-intensity interval training versus moderate-intensity continuous training within cardiac rehabilitation: a systematic review and meta-analysis. Open Access J Sports Med. 2018;9:1-17.
12. Costantino MF, Cortese F, D'Addeo G, Nicoletti A, Mancino S, Stolfi L. Diagnostic modalities for ischemic heart disease: evaluating the role of stress echocardiography, cardiac CT, and myocardial perfusion scintigraphy in guiding coronary angiography. Exploration of Cardiology. 2025;3:101243.
13. Frouzanian M, Shirdel SS, Meskar H, Shahrezaee M, Chamanara M, Ghanbarpour Juybari A, et al. Muscle Morphology and Its Role in Chronic Neck Pain: A Review Article. Translational Health Reports. 2025;1(1):1-11.
14. Addison D, Neilan TG, Barac A, Scherrer-Crosbie M, Okwuosa TM, Plana JC, et al. Cardiovascular imaging in contemporary cardio-oncology: a scientific statement from the American Heart Association. Circulation. 2023;148(16):1271-86.
15. Takkouche B, Norman G. PRISMA statement. Epidemiology. 2011;22(1):128.
16. Cumpston M, Li T, Page MJ, Chandler J, Welch VA, Higgins JP, et al. Updated guidance for trusted systematic reviews: a new edition of the Cochrane Handbook for Systematic Reviews of Interventions. Cochrane Database Syst Rev. 2019;10(10):Ed000142.
17. Zhou Y, Lu J, Liu L, Wang HW. Is Exercise Rehabilitation an Effective Adjuvant to Clinical Treatment for Myofascial Trigger Points? A Systematic Review and Meta-Analysis. J Pain Res. 2023;16:245-56.
18. Yang M, Amatya B, Malik S, Song K, Marcella S, Voutier C, et al. Effectiveness of rehabilitation interventions in patients with colorectal cancer: an overview of systematic reviews. J Rehabil Med. 2025;57:jrm40021.
19. Toval A, Bakker EA, Granada-Maia JB, Núñez de Arenas-Arroyo S, Solis-Urra P, Eijsvogels TMH, et al. Exercise type and settings, quality of life, and mental health in coronary artery disease: a network meta-analysis. European Heart Journal. 2025.
20. Hurdus B, Munyombwe T, Dondo TB, Aktaa S, Oliver G, Hall M, et al. Association of cardiac rehabilitation and health-related quality of life following acute myocardial infarction. Heart. 2020;106(22):1726-31.
21. Lourens EC, Baker RA, Krieg BM. Quality of life following cardiac rehabilitation in cardiac surgery patients. Journal of Cardiothoracic Surgery. 2022;17(1):137.
22. Francis T, Kabboul N, Rac V, Mitsakakis N, Pechlivanoglou P, Bielecki J, et al. The Effect of Cardiac Rehabilitation on Health-Related Quality of Life in Patients With Coronary Artery Disease: A Meta-analysis. Can J Cardiol. 2019;35(3):352-64.
23. Mortada EM. Evidence-Based Complementary and Alternative Medicine in Current Medical Practice. Cureus. 2024;16(1):e52041.
24. Argent R, Daly A, Caulfield B. Patient Involvement With Home-Based Exercise Programs: Can Connected Health Interventions Influence Adherence? JMIR Mhealth Uhealth. 2018;6(3):e47.
25. Ruegsegger GN, Booth FW. Health Benefits of Exercise. Cold Spring Harb Perspect Med. 2018;8(7).
26. Qiu Y, Fernández-García B, Lehmann HI, Li G, Kroemer G, López-Otín C, et al. Exercise sustains the hallmarks of health. J Sport Health Sci. 2023;12(1):8-35.
27. Anderson L, Thompson DR, Oldridge N, Zwisler AD, Rees K, Martin N, et al. Exercise-based cardiac rehabilitation for coronary heart disease. Cochrane Database Syst Rev. 2016;2016(1):CD001800.
28. Dibben G, Faulkner J, Oldridge N, Rees K, Thompson DR, Zwisler AD, et al. Exercise-based cardiac rehabilitation for coronary heart disease. Cochrane Database Syst Rev. 2021;11(11):CD001800.

29. Kachur S, Chongthammakun V, Lavie CJ, De Schutter A, Arena R, Milani RV, et al. Impact of cardiac rehabilitation and exercise training programs in coronary heart disease. Prog Cardiovasc Dis. 2017;60(1):103-114.

30. Price KJ, Gordon BA, Bird SR, Benson AC. A review of guidelines for cardiac rehabilitation exercise programmes: Are they supported by evidence? Eur J Prev Cardiol. 2019;26(18):1971-1984.