The Effectiveness of Nursing-Led Educational Cardiac Rehabilitation Programs on Medication Adherence, Lifestyle Modification, Quality of Life, and Hospital Readmission Rates among Cardiac Patients: A Systematic Review

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ABSTRACT:

Background: Cardiovascular disease (CVD) remains a major cause of mortality and healthcare burden worldwide and represents an important public health concern in Saudi Arabia. Although advances in acute cardiac care have improved survival, many patients continue to experience difficulties in maintaining medication adherence and recommended lifestyle changes after hospital discharge. Nurse-led cardiac rehabilitation (CR) programs provide structured education, behavioural support, follow-up, and care coordination that may facilitate secondary prevention and improve patient-centred outcomes.

Purpose: This systematic review aimed to synthesise recent evidence regarding the effectiveness of nursing-led educational cardiac rehabilitation programs in improving medication adherence, lifestyle modification, health-related quality of life (QoL), and hospital readmission rates among adult cardiac patients, with particular consideration of the implications for the Saudi healthcare context.

Methods: A systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) framework. Electronic searches were conducted in PubMed, CINAHL, and EBSCO for studies published between January 2020 and April 2025. Eligible studies included randomised controlled trials, quasi-experimental studies, cohort studies, qualitative studies, and mixed-methods research involving adults with cardiac conditions and evaluating nurse-led educational or rehabilitation interventions. Methodological quality was assessed using Joanna Briggs Institute (JBI) critical appraisal tools. Due to heterogeneity in study designs, interventions,

outcome measures, and follow-up periods, findings were synthesised narratively.

Results: The review included 20 studies representing a range of nurse-led cardiac rehabilitation models, including hospital-based, home-based, community-based, telehealth, eHealth, and culturally adapted interventions. Eight studies addressed medication adherence, six examined lifestyle modification, ten evaluated health-related quality of life, and five reported hospital readmission outcomes. Overall, the evidence indicated favourable effects of nurse-led cardiac rehabilitation on medication adherence, lifestyle behaviours, and quality of life, while several studies also suggested potential reductions in hospital readmissions.

Conclusion: Nurse-led educational cardiac rehabilitation appears to be a promising patient-centred approach for supporting secondary prevention among cardiac patients. The reviewed evidence highlights the potential contribution of personalised education, continuous follow-up, behavioural support, digital technologies, and cultural adaptation to improved patient outcomes. However, differences in study design, intervention characteristics, outcome measurement, and follow-up duration limit direct comparison across studies. Further high-quality research, particularly in Saudi Arabia and other underrepresented settings, is needed to evaluate the long-term effectiveness, cost-effectiveness, and implementation of culturally appropriate nurse-led cardiac rehabilitation models.

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Keywords: nurse-led cardiac rehabilitation; cardiac rehabilitation; medication adherence; lifestyle modification; quality of life; hospital readmission; cardiac patients; nursing education

Introduction

Cardiovascular disease (CVD) remains a leading cause of mortality and morbidity worldwide and imposes a substantial burden on healthcare systems. Following hospital discharge, cardiac patients often face challenges in maintaining medication adherence and sustaining recommended lifestyle changes, including physical activity, diet, smoking cessation, and weight management. Structured education and follow-up are therefore important components of secondary prevention [1,4,5].

Cardiac rehabilitation (CR) is an established approach to secondary prevention that combines exercise, risk-factor management, patient education, psychosocial support, and self-management. Nurses play a central role in delivering education, behavioural counselling, monitoring, care coordination, and follow-up. Evidence indicates that nurse-led CR can improve medication adherence, lifestyle behaviours, and quality of life among cardiac patients [1–4,16]. Nurse-coordinated referral and specialist nurse-led services may also enhance continuity of care and support rehabilitation participation [6,15,19].

Recent developments in eHealth, mHealth, and telehealth have expanded the delivery of nurse-led CR beyond traditional rehabilitation centres. Digital and home-based models may improve accessibility while providing continued education, behavioural support, and follow-up [7,11,13,14]. These interventions may also contribute to improved self-management and quality of life [7–10,18].

In Saudi Arabia, culturally adapted nurse-led CR may be particularly relevant because patient engagement can be influenced by cultural practices,

family involvement, accessibility, and healthcare service availability. A Saudi pilot study reported promising findings regarding culturally adapted nurse-led CR, highlighting the potential value of interventions tailored to local needs [20].

Despite growing evidence, studies vary considerably in intervention design, delivery setting, outcome measures, and follow-up duration [1–20]. Therefore, this systematic review synthesises research published between 2020 and April 2025 on nurse-led educational cardiac rehabilitation among adult cardiac patients, focusing on medication adherence, lifestyle modification, health-related quality of life, and hospital readmission, with consideration of implications for culturally appropriate CR services in Saudi Arabia.

Review Question and PICOT Framework

The PICOT framework was used to structure the review question and define the population, intervention, comparison, outcomes, and timeframe of interest.

- **Population (P):** Adults aged 18 years or older diagnosed with a cardiac condition, particularly acute coronary syndrome, myocardial infarction, coronary heart disease, or heart failure.
- **Intervention (I):** Nurse-led educational cardiac rehabilitation programs delivered in hospital, home, community, or digital/telehealth settings. Eligible interventions included structured patient education, behavioural counselling, follow-up, self-management support, or rehabilitation activities in which nurses had a clearly defined leadership or delivery role.
- **Comparison (C):** Usual care, standard discharge care, or cardiac care without an organised nurse-led cardiac rehabilitation component.
- **Outcomes (O):** The primary outcomes were medication adherence, lifestyle modification, health-related quality of life, and hospital readmission or rehospitalisation.
- **Time (T):** Outcomes assessed during the post-discharge follow-up period reported by each eligible study, with particular consideration of short- and intermediate-term outcomes during the first 3–12 months following discharge.

Based on this framework, the review question was:

In adults with cardiac conditions, what is the effectiveness of nurse-led educational cardiac rehabilitation programs compared with usual or standard care in improving medication adherence, lifestyle modification, health-related quality of life, and hospital readmission outcomes during the post-discharge period?

The review therefore aimed to synthesise and critically evaluate primary research published between January 2020 and April 2025 and to identify implications for nursing practice, cardiac rehabilitation service development, and future research, particularly within the Saudi Arabian healthcare context.

Methods

A systematic review design was used to synthesise primary evidence on the effectiveness of nurse-led educational cardiac rehabilitation among adults with cardiovascular conditions. The review followed the PRISMA 2020 framework and focused on medication adherence, lifestyle modification, health-related quality of life, and hospital readmission. A systematic search was conducted in PubMed, CINAHL, and EBSCO for English-language studies published between January 2020 and April 2025, using keywords related to nurse-led cardiac rehabilitation, cardiac conditions, and the four outcomes. Eligible studies included adult cardiac patients receiving hospital-, home-, community-, or digitally delivered nurse-led rehabilitation or educational interventions, while secondary publications, paediatric studies, and studies without a clearly identified nurse-led intervention or relevant outcomes were excluded. The search identified 512 records; after removing 42 duplicates, 470 records were screened, 68 full texts were assessed, and 20 studies were included in the final narrative synthesis. Data were extracted on study characteristics, participants, intervention components, outcomes, and main findings. Methodological quality was assessed using appropriate Joanna Briggs Institute (JBI) critical appraisal tools according to study design. Due to substantial heterogeneity in study designs, interventions, outcome measures, and follow-up periods, a meta-analysis was not considered appropriate; therefore, findings were synthesised narratively across the four main outcomes, with particular attention to education, behavioural support,

follow-up, nurse coordination, telehealth, digital technologies, and cultural adaptation.

Results

Characteristics of the Included Studies

Twenty studies met the eligibility criteria and were included in the final synthesis. The studies represented a range of methodological approaches, including randomised controlled trials, quasi-experimental studies, observational cohort studies, qualitative studies, and mixed-methods research. This diversity enabled the review to examine both measurable intervention outcomes and the experiences of patients and healthcare professionals involved in nurse-led cardiac rehabilitation.

The studies were conducted across several geographical and healthcare contexts, including the United States, Canada, European countries, Asian countries, Ghana, and Saudi Arabia. The interventions varied considerably in their delivery models and included hospital-based rehabilitation, home-based rehabilitation, community-based programs, nurse-led specialist clinics, nurse navigator programs, tele-coaching, eHealth interventions, and culturally adapted rehabilitation [6–9,11,13–20].

The included studies also differed in sample size and participant characteristics. Some quantitative studies involved relatively large patient samples, whereas qualitative studies generally included smaller samples to obtain detailed information regarding patient or nurse experiences. This variation was considered during the narrative synthesis because differences in study design and sample characteristics affect the interpretation and generalisability of findings.

Medication Adherence

Medication adherence was examined in eight of the included studies. The available evidence generally indicated a favourable association between nurse-led educational or follow-up interventions and adherence to prescribed cardiac medications. Nurse-led interventions commonly incorporated medication education, individualised counselling, reinforcement of treatment instructions, follow-up communication, and support for managing concerns about medication use [1,3,5,11,16].

Smith and Lee [1] examined a nurse-led cardiac rehabilitation intervention among post-myocardial infarction patients and reported improved medication adherence following structured discharge education and follow-up. Similarly, Vanitha et al. [3] reported improvements in medication adherence among post-myocardial infarction patients participating in nurse-led cardiac rehabilitation sessions. These findings suggest that continued nursing contact may be more effective in supporting adherence than relying exclusively on education delivered at the time of discharge.

The importance of nursing support is also reflected in studies examining telehealth and digitally supported interventions. Garcia et al. [16] evaluated nurse tele-coaching following myocardial infarction and reported favourable effects on adherence and lifestyle-related outcomes. Chen et al. [11] similarly investigated a digitally supported multidimensional nurse-led cardiac rehabilitation intervention and reported improvements involving medication adherence and other health-related outcomes.

Evidence from Saudi Arabia provides additional context for understanding medication adherence among cardiac patients. Al-Harbi et al. [5] examined medication adherence among patients with heart failure in Saudi Arabia and highlighted the importance of structured post-discharge support in relation to adherence behaviour. However, because the study used a cross-sectional design, its findings should be interpreted as evidence concerning adherence patterns rather than direct evidence of the causal effectiveness of a nurse-led rehabilitation intervention.

Taken together, the findings suggest that nurse-led interventions may support medication adherence through repeated education, individualised counselling, reinforcement, and continued communication after discharge. Nevertheless, differences in intervention content and adherence measurement across studies limit the extent to which the magnitude of improvement can be directly compared.

Lifestyle Modification

Lifestyle modification was examined across six of the included studies. The lifestyle outcomes addressed physical activity, dietary behaviour, smoking cessation, weight management, and other

behaviours associated with cardiovascular risk reduction. The interventions generally relied on patient education combined with goal setting, individualised behavioural support, follow-up, and reinforcement.

Arjunan and Trichur [2] examined nurse-led cardiac rehabilitation among patients with heart failure and reported improvements in quality of life and biophysiological parameters alongside lifestyle-related outcomes. Premkumar et al. [4] similarly investigated nurse-led cardiac rehabilitation following coronary intervention and reported improvements in behavioural and physiological parameters. These findings indicate that nurse-led rehabilitation can address both behavioural practices and measurable cardiovascular risk-related indicators.

Vanitha et al. [3] reported improvements in lifestyle modification among post-myocardial infarction patients receiving nurse-led cardiac rehabilitation. The intervention demonstrates the potential value of structured nursing sessions in helping patients translate information provided during hospital care into practical behaviours after discharge.

The use of tele-coaching may also facilitate sustained lifestyle modification. Garcia et al. [16] reported favourable outcomes following nurse tele-coaching after myocardial infarction, including improvements in lifestyle-related adherence. Similarly, Osei-Akoto et al. [17] examined community nurse-led cardiac rehabilitation in a low-resource setting and reported improvements in adherence and quality of life, suggesting that community-based nursing models may provide a feasible approach to supporting behavioural change where access to conventional rehabilitation services is limited.

Overall, the evidence suggests that lifestyle modification is more likely to be supported when patient education is accompanied by repeated contact, individualised goals, practical guidance, and follow-up. The findings also indicate that the delivery setting can be adapted according to patient needs, with home-based, community-based, and digitally supported models providing alternatives to conventional centre-based rehabilitation [3,11,16,17].

Health-Related Quality of Life

Health-related quality of life was one of the most frequently examined outcomes in the included studies. Ten studies addressed QoL using quantitative or qualitative approaches, and the overall findings suggested favourable effects associated with nurse-led cardiac rehabilitation and related models of nursing support [2,3,7–11,13,17,18].

Arjunan and Trichur [2] reported improvements in quality of life among patients with heart failure following nurse-led cardiac rehabilitation. Vanitha et al. [3] also identified improvements in QoL alongside changes in adherence and lifestyle behaviours. These findings support the view that cardiac rehabilitation may influence patient recovery beyond physiological indicators by helping patients regain confidence and participate more effectively in self-management.

Qualitative studies provide further insight into the potential mechanisms through which nurse-led rehabilitation may influence QoL. Su et al. [7] explored patient experiences of nurse-led eHealth cardiac rehabilitation and highlighted the value of behavioural support and social support. Yang et al. [9] examined nurses' strategies for enhancing cardiac self-management at home and emphasised the importance of personalised education and continued follow-up. These findings suggest that continuity of nursing contact may contribute to patients' sense of support and ability to manage their condition outside the hospital.

Women-centred rehabilitation models have also demonstrated the importance of tailoring interventions to patient needs. Carson et al. [8] and Rodriguez et al. [18] examined women-centred nurse-led cardiac rehabilitation and reported favourable findings concerning engagement, acceptability, empowerment, and QoL-related outcomes. These studies indicate that tailoring the content and delivery of rehabilitation to specific patient groups may improve engagement with rehabilitation services.

Lennon et al. [10] examined perspectives and experiences related to cardiac rehabilitation following stroke and demonstrated the value of personalised support in facilitating engagement and emotional well-being. Although the population and clinical context differ from conventional cardiac rehabilitation populations, the findings provide additional qualitative evidence concerning the importance of patient-centred support.

The evidence therefore indicates that QoL may be influenced through multiple components of nurse-led rehabilitation, including education, emotional support, behavioural coaching, social support, and continuity of care. However, the use of different QoL instruments and study designs means that the findings should be interpreted as a general pattern of benefit rather than as a single pooled estimate of effect.

Hospital Readmission

Five studies reported outcomes related to hospital readmission or rehospitalisation. These studies examined different models of nurse coordination, home-based rehabilitation, specialist nursing care, and rehabilitation referral and support [6,13–15,19]. The findings generally suggested that continuity of care and structured follow-up may contribute to reductions in hospital utilisation.

Boggess et al. [6] examined nurse-coordinated cardiac rehabilitation referral and education and demonstrated the potential value of nursing coordination in improving rehabilitation processes. Similarly, Singh et al. [19] evaluated a nurse navigator program designed to support cardiac rehabilitation referral and education and reported improvements in rehabilitation enrolment and completion alongside favourable readmission-related outcomes.

Kim et al. [15] examined specialist nurse-led clinics for patients with coronary heart disease and reported improvements in adherence, rehospitalisation, and patient satisfaction. These findings suggest that specialist nursing services may provide an additional mechanism for maintaining continuity between hospital-based treatment and longer-term cardiac management.

Home-based and digitally supported cardiac rehabilitation may also have implications for hospital utilisation. The evidence reported in the reviewed studies suggests that home-based models supported by mHealth and nurse tele-support can provide outcomes comparable with conventional centre-based rehabilitation while improving accessibility [13,14]. Such models may be particularly relevant for patients who experience geographical, transportation, or service-access barriers.

Although the findings concerning readmission are encouraging, they should be interpreted cautiously because not all studies used randomised designs and the interventions differed considerably. Therefore, the current evidence supports the potential of nurse-led rehabilitation and care coordination to reduce avoidable hospital utilisation but does not establish a uniform effect size across different healthcare settings.

Cross-Cutting Findings

Several common characteristics were identified across the included studies. First, nurse-led cardiac rehabilitation was delivered through a wide range of models rather than through a single standardised intervention. These models included conventional hospital-based education, home-based rehabilitation, community programs, specialist nurse clinics, nurse navigator services, and digital or telehealth interventions [6,7,11,13,15–17,19].

Second, individualised education and continued follow-up were recurrent components across the evidence base. Rather than relying exclusively on one-time discharge education, several interventions maintained contact with patients through telephone calls, tele-coaching, home visits, digital platforms, or scheduled nursing sessions [1,3,7,11,16]. This repeated interaction may help reinforce treatment recommendations and identify difficulties before they result in poor adherence or deterioration.

Third, technology-supported models represented an increasingly important component of contemporary cardiac rehabilitation. eHealth and telehealth approaches can extend nursing support beyond the hospital and rehabilitation centre and may improve accessibility for patients who cannot regularly attend face-to-face services [7,11,13]. These models are potentially relevant to healthcare systems in which geographic distribution of services creates barriers to participation.

Cultural adaptation was another important theme. The Saudi Arabian pilot study by Al-Shehri et al. [20] highlights the potential importance of adapting cardiac rehabilitation to local language, family involvement, and culturally relevant health behaviours. This is particularly relevant when lifestyle modification involves dietary practices, physical activity patterns, and family-based support.

The findings also indicate the value of patient-centred approaches. Women-centred interventions examined by Carson et al. [8] and Rodriguez et al. [18] suggest that tailoring rehabilitation to the needs and preferences of specific populations may improve engagement and acceptability. Overall, the evidence supports a flexible model of nurse-led cardiac rehabilitation in which core rehabilitation principles are maintained while delivery methods are adapted to patient characteristics and healthcare context.

Discussion

Synthesis of the Main Findings

This systematic review synthesised evidence from 20 studies investigating different forms of nurse-led educational cardiac rehabilitation among adult cardiac patients. The findings indicate an overall favourable pattern across the four outcomes of interest: medication adherence, lifestyle modification, health-related quality of life, and hospital readmission. However, the evidence was heterogeneous, and the strength of conclusions differed according to study design and outcome.

Medication adherence emerged as an important outcome across the reviewed literature. Studies examining structured nursing education, rehabilitation sessions, and tele-coaching generally reported favourable adherence outcomes [1,3,11,16]. The findings suggest that nurses may contribute to adherence by providing repeated explanations, addressing patient concerns, reinforcing treatment instructions, and maintaining follow-up after discharge. These functions are particularly relevant because medication adherence requires sustained behaviour rather than a single educational encounter.

The findings regarding lifestyle modification were also generally positive. Nurse-led interventions were associated with improvements in physical activity, dietary behaviours, smoking-related behaviours, and other risk-factor management outcomes [2–4,16,17]. The consistency of these findings across different delivery settings suggests that the educational role of nurses may be strengthened when combined with goal setting and repeated behavioural support.

Quality of life represented another important outcome. Quantitative and qualitative evidence indicated that nurse-led rehabilitation may improve physical, emotional, and psychosocial aspects of patients' recovery [2,3,7–10,18]. The qualitative studies are particularly valuable because they provide insight into why patients may experience these benefits. Personalised support, social interaction, emotional reassurance, and increased confidence in self-management appear to contribute to the perceived value of nurse-led rehabilitation [7,9,10].

The evidence concerning hospital readmission was promising but less consistent than the evidence concerning adherence and QoL. Several studies reported favourable readmission or rehospitalisation outcomes in association with nurse coordination, specialist nurse care, home-based rehabilitation, and nurse navigation [6,13–15,19]. However, the methodological diversity of these studies means that causal conclusions should be made cautiously.

Implications for Nursing Practice

The findings have important implications for nursing practice because they demonstrate the potential for nurses to contribute across several stages of the cardiac rehabilitation pathway. Rather than limiting nursing involvement to inpatient education, healthcare organisations may consider extending nursing responsibilities to structured post-discharge education, behavioural counselling, medication support, rehabilitation coordination, and follow-up.

The reviewed evidence also supports the integration of technology into nurse-led rehabilitation. Telehealth, eHealth, and mHealth can facilitate continued communication with patients who may experience barriers to attending conventional rehabilitation services [7,11,13,16]. Such approaches may be particularly valuable in geographically dispersed populations and may allow nurses to identify emerging problems and reinforce self-management behaviours.

Nurse navigator and coordination models may provide another practical mechanism for improving continuity of care. Evidence from nurse-coordinated referral and nurse navigator interventions

indicates that nursing involvement can facilitate rehabilitation enrolment and completion [6,19]. Such models may therefore help address gaps between hospital discharge, rehabilitation referral, and participation.

Implications for Saudi Arabia

The findings have particular relevance for Saudi Arabia because the available local evidence indicates the potential value of culturally adapted nurse-led rehabilitation. Al-Shehri et al. [20] demonstrated the feasibility of adapting nurse-led cardiac rehabilitation to the Saudi context, including consideration of language, family involvement, and culturally relevant behaviours.

The international evidence suggests that Saudi healthcare organisations could consider combining culturally adapted education with accessible delivery models such as home-based follow-up and telehealth. Such an approach could potentially address barriers related to geographic accessibility and continuity of care while maintaining the central role of nurses in patient education and behavioural support.

However, the relatively limited number of Saudi studies means that international evidence should not be assumed to have the same effect in the Saudi population. Further local research is needed to determine the feasibility, acceptability, effectiveness, and cost-effectiveness of nurse-led cardiac rehabilitation within Saudi healthcare institutions.

Implications for Future Research

Future research should address the methodological heterogeneity identified in the current evidence base. Greater consistency in the measurement of medication adherence, lifestyle behaviours, quality of life, and hospital readmission would improve the comparability of studies and facilitate future quantitative synthesis.

Longer follow-up periods are also needed. Many cardiac rehabilitation interventions focus on the first several months following discharge, while the sustainability of behavioural changes and medication adherence requires longer observation. Future studies should therefore examine whether improvements are maintained over 12 months or longer.

Further research should also investigate the economic implications of nurse-led cardiac rehabilitation. Evidence regarding cost-effectiveness, healthcare utilisation, and potential reductions in avoidable hospital admissions could support decisions concerning the integration and expansion of nurse-led rehabilitation services.

Finally, implementation research is required to identify the organisational, professional, technological, and patient-level factors that facilitate or hinder the adoption of nurse-led cardiac rehabilitation. This is particularly important in Saudi Arabia and other settings where structured cardiac rehabilitation services may be less accessible or less consistently utilised.

Limitations of the Review

Several limitations should be considered when interpreting the findings of this systematic review. The included studies differed substantially in methodological design, intervention characteristics, outcome measures, and follow-up duration. This heterogeneity prevented statistical meta-analysis and meant that the findings were synthesised narratively rather than through pooled effect estimates.

The evidence base also included qualitative, observational, quasi-experimental, and mixed-methods studies in addition to randomised controlled trials. Although these studies provide valuable information concerning patient experience, implementation, and real-world practice, their methodological characteristics limit direct comparison with randomised evidence.

The geographical distribution of the evidence represents another limitation. Although studies were identified from several regions, the number of studies directly examining nurse-led cardiac rehabilitation in Saudi Arabia was limited. Consequently, the findings should not be interpreted as definitive evidence of effectiveness within the Saudi healthcare system.

The review was also restricted to English-language publications and three electronic databases. Relevant studies published in other languages or indexed in other databases may therefore have been missed. In addition, variation in outcome measurement may have introduced difficulties when comparing findings across studies.

Finally, publication bias cannot be excluded. Studies reporting positive or statistically significant findings may be more likely to be published than studies reporting limited or null effects. Future reviews incorporating a larger and more homogeneous evidence base may allow formal assessment of publication bias and quantitative meta-analysis.

Conclusion

Nurse-led educational cardiac rehabilitation represents a promising approach to supporting secondary prevention and long-term self-management among adult cardiac patients. The evidence synthesised in this review indicates favourable patterns in medication adherence, lifestyle modification, health-related quality of life, and, to a lesser extent, hospital readmission outcomes.

The findings suggest that the potential effectiveness of nurse-led cardiac rehabilitation is related not only to the provision of information but also to the continuity and individualisation of nursing support. Personalised education, behavioural counselling, repeated follow-up, medication support, digital communication, care coordination, and culturally appropriate interventions were recurring characteristics across the reviewed evidence

For Saudi Arabia, culturally adapted nurse-led cardiac rehabilitation may provide an opportunity to strengthen continuity of cardiac care and improve patient engagement with secondary prevention. However, the limited local evidence means that further Saudi-based research is required before definitive conclusions can be drawn regarding effectiveness and cost-effectiveness. Future research should prioritise rigorous controlled designs, longer follow-up periods, standardised outcome measures, economic evaluation, and implementation research to establish sustainable nurse-led cardiac rehabilitation models within routine cardiac care.

Table 1. Characteristics of the Included Studies

Study	Year	Study design	Population/setting	Nurse-led intervention	Main outcomes
Smith & Lee [1]	2021	Interventional study	Post-myocardial infarction patients	Nurse-led cardiac rehabilitation	Medication adherence
Arjunan & Trichur [2]	2020	Interventional study	Patients with heart failure	Nurse-led cardiac rehabilitation	Quality of life and biophysiological parameters
Vanitha et al. [3]	2024	Interventional study	Post-myocardial infarction clients	Nurse-led cardiac rehabilitation sessions	Adherence, lifestyle and rehabilitation outcomes
Premkumar et al. [4]	2022	Interventional study	Patients following coronary intervention	Nurse-led cardiac rehabilitation	Behavioural and physiological parameters
Al-Harbi et al. [5]	2021	Cross-sectional study	Patients with heart failure	No intervention; assessment of adherence	Medication adherence
Boggess et al. [6]	2024	Implementation/coordination study	Cardiac rehabilitation patients	Nurse-coordinated referral and education	Rehabilitation referral and education outcomes
Su et al. [7]	2025	Qualitative study	Patients experiencing nurse-led eHealth CR	Nurse-led eHealth cardiac rehabilitation	Patient experience and acceptability

Carson et al. [8]	2024	Mixed-methods study	Women participating in cardiac rehabilitation	Women-centred nurse-led CR	Engagement and rehabilitation outcomes
Yang et al. [9]	2025	Qualitative study	Cardiac patients receiving home support	Nurse strategies for home self-management	Self-management and patient support
Lennon et al. [10]	2022	Qualitative study	Patients with experience of cardiac rehabilitation after stroke	Cardiac rehabilitation support	Patient perspectives and experiences
Chen et al. [11]	2025	Quasi-experimental study	Cardiac patients	Digital multidimensional nurse-led CR	Rehabilitation and patient outcomes
Hansen et al. [12]	2025	Protocol study	Cardiac rehabilitation population	Nurse-led CR focusing on physical capacity and wellbeing	Planned physical and wellbeing outcomes
The Lancet Digital Health [13]	2025	Randomised pooled trials	Cardiac rehabilitation patients	Home-based CR with mHealth and nurse tele-support	Rehabilitation and clinical outcomes
JAMA Network Open [14]	2023	Observational cohort study	Cardiac rehabilitation patients	Home-based versus centre-based CR	Rehabilitation and clinical outcomes
Kim et al. [15]	2024	Controlled follow-up study	Coronary heart disease patients	Specialist nurse-led clinics	Adherence, rehospitalisation and satisfaction
Garcia et al. [16]	2024	Randomised controlled trial	Post-myocardial infarction patients	Nurse tele-coaching	Adherence and lifestyle
Osei-Akoto et al. [17]	2024	Quasi-experimental study	Patients in a low-resource setting	Community nurse-led CR	Lifestyle, adherence and QoL
Rodriguez et al. [18]	2024	Mixed-methods study	Women participating in CR	Women-centred nurse-led CR	Engagement and patient outcomes
Singh et al. [19]	2023	Pre-post implementation study	Cardiac rehabilitation patients	Nurse navigator referral and education	Referral, education and rehabilitation participation
Al-Shehri et al. [20]	2024	Pilot study	Cardiac patients in Saudi Arabia	Culturally adapted nurse-led CR	Feasibility and patient outcomes

Description of the Included Studies

The 20 studies included in the review represented a heterogeneous body of evidence concerning nurse-led cardiac rehabilitation. The studies differed in methodological design, participant characteristics, healthcare setting, intervention delivery, and outcomes assessed. The evidence included intervention studies, randomised and quasi-experimental designs, observational research, qualitative investigations, mixed-methods studies, implementation research, and a protocol study [1–20].

The interventions varied from conventional nurse-led cardiac rehabilitation sessions to specialist

nurse clinics, nurse navigation, community rehabilitation, home-based rehabilitation, tele-coaching, eHealth, and mHealth-supported interventions [3,6,7,11,13,15–19]. This variation reflects the increasing diversification of cardiac rehabilitation delivery and demonstrates that nursing involvement can extend beyond traditional face-to-face rehabilitation services.

The included evidence also covered different cardiac populations, including patients following myocardial infarction, patients with heart failure, individuals with coronary heart disease, and patients undergoing rehabilitation following coronary intervention [1–5,15,16]. Several studies focused on specific populations, including women and patients in low-resource settings, while one study specifically examined a culturally adapted intervention in Saudi Arabia [8,17,18,20].

The diversity of interventions and populations provides a broad perspective on the potential role of nurses in cardiac rehabilitation. Nevertheless, it also creates methodological heterogeneity that must be considered when interpreting the overall findings. In particular, findings from qualitative and cross-sectional studies should not be interpreted as equivalent to findings from randomised controlled trials.

Table 2. Methodological Characteristics and Quality Appraisal

Study	Design	Appraisal approach	Interpretation
Smith & Lee [1]	Interventional	JBI appropriate quantitative appraisal	Quantitative evidence
Arjunan & Trichur [2]	Interventional	JBI quantitative appraisal	Quantitative evidence
Vanitha et al. [3]	Interventional	JBI quantitative appraisal	Quantitative evidence
Premkumar et al. [4]	Interventional	JBI quantitative appraisal	Quantitative evidence
Al-Harbi et al. [5]	Cross-sectional	JBI analytical cross-sectional tool	Observational evidence
Boggess et al. [6]	Implementation/coordination	JBI appropriate appraisal	Implementation evidence
Su et al. [7]	Qualitative	JBI qualitative appraisal	Qualitative evidence
Carson et al. [8]	Mixed methods	JBI appropriate appraisal	Mixed-methods evidence
Yang et al. [9]	Qualitative	JBI qualitative appraisal	Qualitative evidence
Lennon et al. [10]	Qualitative	JBI qualitative appraisal	Qualitative evidence
Chen et al. [11]	Quasi-experimental	JBI quasi-experimental tool	Quasi-experimental evidence
Hansen et al. [12]	Protocol	Protocol assessment	Not an effectiveness outcome study
The Lancet Digital Health [13]	Randomised pooled trials	JBI RCT appraisal	Stronger comparative evidence

JAMA Network Open [14]	Observational cohort	JBI cohort appraisal	Observational evidence
Kim et al. [15]	Controlled follow-up	JBI quantitative appraisal	Comparative evidence
Garcia et al. [16]	Randomised controlled trial	JBI RCT appraisal	Stronger comparative evidence
Osei-Akoto et al. [17]	Quasi-experimental	JBI quasi-experimental tool	Quasi-experimental evidence
Rodriguez et al. [18]	Mixed methods	JBI appropriate appraisal	Mixed-methods evidence
Singh et al. [19]	Pre-post implementation	JBI quasi-experimental/implementation appraisal	Implementation evidence
Al-Shehri et al. [20]	Pilot study	JBI appropriate quantitative appraisal	Preliminary evidence

Quality Appraisal Findings

The methodological appraisal demonstrated considerable variation across the evidence base. The randomised studies, particularly the trial reported by Garcia et al. [16] and the pooled randomised evidence reported by The Lancet Digital Health [13], provide comparatively stronger evidence for assessing intervention effectiveness because randomisation can reduce the influence of baseline differences between intervention and comparison groups.

The quasi-experimental studies reported by Chen et al. [11] and Osei-Akoto et al. [17] provide useful evidence regarding changes associated with nurse-led rehabilitation in practical healthcare environments. However, because these designs do not necessarily provide the same level of control over confounding as randomised trials, observed improvements cannot always be attributed exclusively to the intervention.

The observational evidence, including the study by Al-Harbi et al. [5] and the cohort study reported by JAMA Network Open [14], contributes important information about adherence and rehabilitation outcomes but should be interpreted as associative rather than causal evidence. Similarly, qualitative studies [7,9,10] provide valuable insight into patient experiences and perceptions but are not designed to quantify intervention effectiveness.

The mixed-methods studies by Carson et al. [8] and Rodriguez et al. [18] provide complementary information by combining quantitative outcomes with qualitative understanding of patient experiences. Such evidence is particularly useful when examining patient engagement and acceptability because successful rehabilitation depends not only on measurable clinical outcomes but also on whether patients can and are willing to engage with the intervention.

The protocol study by Hansen et al. [12] requires separate consideration because it describes a planned nurse-led cardiac rehabilitation program rather than reporting completed intervention outcomes. Consequently, it should not be used as direct evidence of effectiveness in the Results synthesis. Its inclusion in the original evidence set should therefore be clearly distinguished from completed primary outcome studies.

Synthesis of Evidence by Outcome

Medication Adherence

The evidence concerning medication adherence indicates that nursing involvement may contribute to improved adherence among cardiac patients, particularly when education is combined with continued follow-up. Smith and Lee [1] reported favourable medication adherence outcomes following nurse-led cardiac rehabilitation among post-myocardial infarction patients. Vanitha et al. [3]

similarly examined nurse-led rehabilitation among post-myocardial infarction patients and reported improvements in outcomes associated with rehabilitation participation.

The role of nurses may be particularly important because medication adherence often involves several behavioural and informational challenges. Patients may have difficulty understanding medication schedules, managing multiple prescriptions, or maintaining treatment routines after leaving the hospital. Structured nursing education and follow-up provide opportunities to reinforce instructions and identify barriers to adherence [1,3].

Telehealth-based interventions provide another mechanism through which adherence support can be maintained. Garcia et al. [16] examined nurse tele-coaching following myocardial infarction and reported improvements in adherence and lifestyle outcomes. Chen et al. [11] also investigated a digital multidimensional nurse-led rehabilitation intervention, supporting the potential role of technology in maintaining nursing contact beyond traditional rehabilitation settings.

However, Al-Harbi et al. [5] should be interpreted differently because the study used a cross-sectional design. Although it provides information regarding medication adherence among patients with heart failure, it does not establish that a nurse-led rehabilitation intervention caused changes in adherence. This distinction is important when synthesising the evidence and prevents observational evidence from being treated as equivalent to intervention evidence.

Lifestyle Modification

The reviewed studies indicate that nurse-led cardiac rehabilitation may support lifestyle modification by combining education with behavioural reinforcement and follow-up. Premkumar et al. [4] examined behavioural and physiological parameters following coronary intervention, while Vanitha et al. [3] investigated the impact of nurse-led cardiac rehabilitation among post-myocardial infarction patients.

The potential effectiveness of nurse-led lifestyle interventions may arise from the continuity of patient contact. Nurses can assist patients in translating general recommendations concerning diet, physical activity, smoking, and other cardiovascular risk behaviours into achievable individual goals. Continued follow-up can then be used to monitor progress and address difficulties as they emerge [3,4,16].

Community-based rehabilitation may be particularly relevant where access to conventional rehabilitation centres is limited. Osei-Akoto et al. [17] investigated community nurse-led cardiac rehabilitation in a low-resource setting and demonstrated the potential feasibility of delivering rehabilitation through community nursing services. Such models may provide an alternative means of reaching patients who would otherwise have limited access to structured cardiac rehabilitation.

Quality of Life

Quality of life was frequently examined across the included evidence. Arjunan and Trichur [2] reported improvements in quality of life and biophysiological parameters among patients with heart failure participating in nurse-led cardiac rehabilitation. Vanitha et al. [3] also reported favourable rehabilitation outcomes among post-myocardial infarction patients.

The qualitative evidence adds an important dimension to these findings. Su et al. [7] examined patient experiences of nurse-led eHealth cardiac rehabilitation, while Yang et al. [9] investigated nursing strategies for supporting cardiac self-management at home. Together, these studies highlight the importance of accessibility, ongoing support, patient confidence, and self-management in shaping patients' experiences of rehabilitation.

Women-centred approaches also demonstrate the potential importance of tailoring cardiac rehabilitation to the characteristics and needs of specific patient populations. Carson et al. [8] and Rodriguez et al. [18] examined women-centred nurse-led rehabilitation and provided evidence concerning patient engagement and experiences. These findings suggest that rehabilitation may be more acceptable when its content and delivery are responsive to patients' circumstances.

Hospital Readmission

Hospital readmission was examined in a smaller proportion of the included evidence than medication adherence or quality of life. Studies

examining nurse coordination, specialist nursing services, home-based rehabilitation, and nurse navigation suggest that improved continuity of care may contribute to more effective post-discharge management [6,13–15,19].

Kim et al. [15] investigated specialist nurse-led clinics for patients with coronary heart disease and reported outcomes involving adherence, rehospitalisation, and patient satisfaction. Similarly, Singh et al. [19] examined a nurse navigator model designed to improve cardiac rehabilitation referral and education. These models emphasise the role of nurses in connecting patients with appropriate services and maintaining continuity across different stages of care.

Home-based and digitally supported rehabilitation may also offer advantages for patients who face barriers to centre-based participation. The evidence concerning mHealth and nurse tele-support suggests that home-based rehabilitation can provide an accessible alternative to conventional models [13,14]. Nevertheless, the available evidence is heterogeneous, and further controlled studies are required before firm conclusions can be made concerning the magnitude of reductions in hospital readmission.

PRISMA Flow Diagram

Ethical Considerations

Because this study is a systematic review of previously published research and does not involve direct recruitment of human participants or collection of identifiable primary data, individual participant ethical approval was not required. The review nevertheless followed principles of transparent reporting and appropriate attribution of the original research included in the synthesis.

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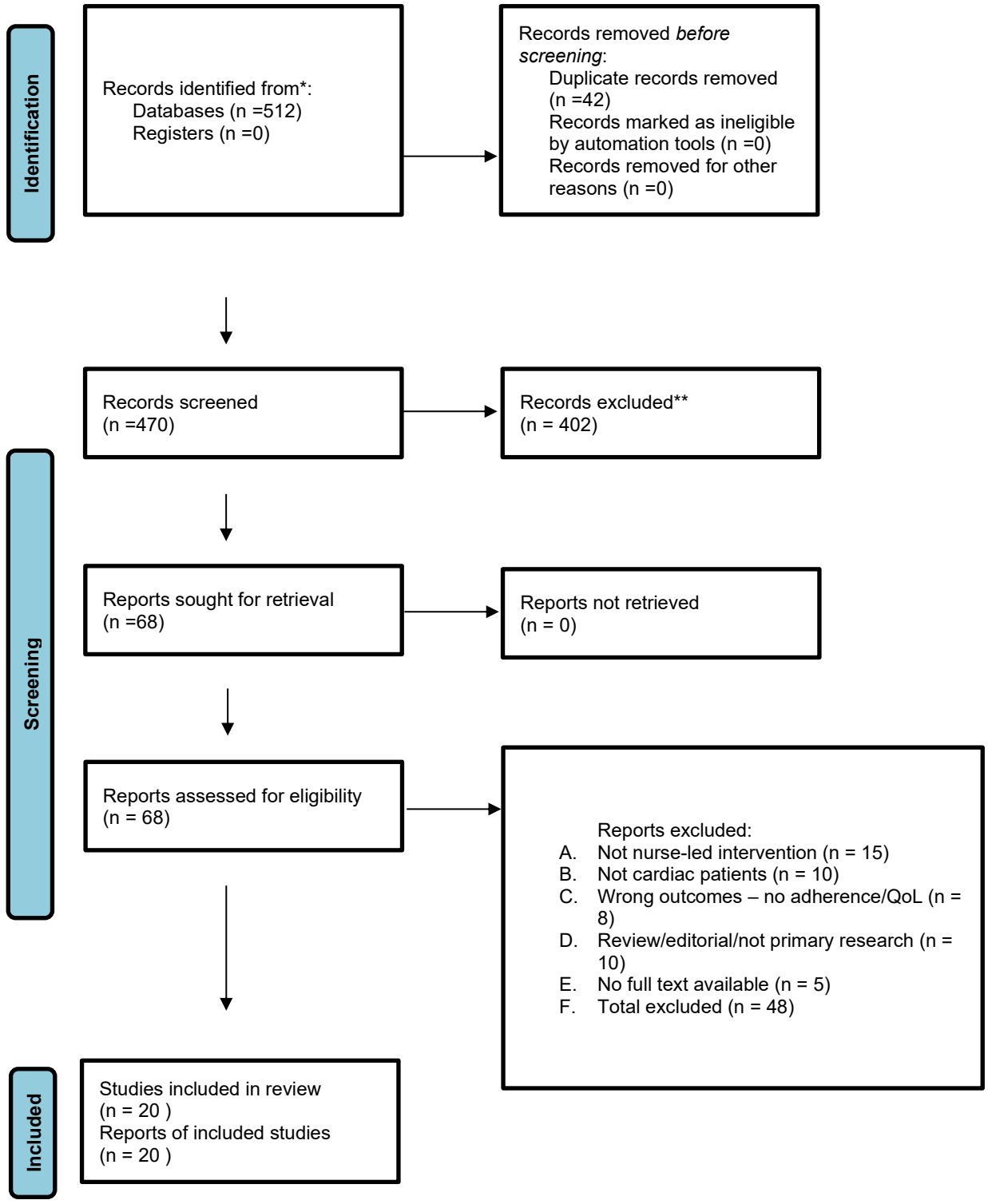
Appendix A: PRISMA Flow Diagram