

INTEGRATED NURSING AND PHYSIOTHERAPY APPROACHES WITH REHABILITATION AND PATIENT-CENTERED CARE IN THE PREVENTION AND MANAGEMENT OF PATIENTS WITH CARDIOVASCULAR DISEASES

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Abstract

Cardiovascular diseases (CVDs) remain a major cause of mortality, morbidity, disability, reduced functional capacity and impaired quality of life worldwide. Contemporary cardiovascular care increasingly recognizes that successful prevention and management cannot depend exclusively on pharmacological treatment or physician-led interventions. Instead, effective cardiovascular care requires coordinated multidisciplinary services that address physiological, functional, behavioral, psychological, educational, and social determinants of health. Nursing and physiotherapy are two essential professional domains within this integrated model. Nurses provide continuous clinical monitoring, risk assessment, medication and symptom management, patient education, self-management support, psychosocial care, lifestyle counseling, discharge planning, and coordination across healthcare settings. Physiotherapists contribute through functional assessment, exercise testing, individualized aerobic and resistance training, mobility restoration, respiratory and physical conditioning, energy conservation, exercise progression, functional goal setting, and long-term physical activity promotion. When these competencies are combined within a patient-centered rehabilitation pathway, cardiovascular rehabilitation can extend from the acute hospital environment into outpatient, community, home-based, and digitally supported settings. Current cardiovascular guidelines recommend multidisciplinary team-based care and cardiac rehabilitation for appropriate patients because such models improve risk-factor management, functional capacity, quality of life, and long-term secondary prevention. This review discusses the complementary contributions of nursing and physiotherapy across cardiovascular disease prevention, acute management, rehabilitation, secondary prevention, chronic disease management, and community reintegration. Particular attention is given to coronary artery disease, myocardial infarction, heart failure, hypertension, post-revascularization states, and patients with reduced functional capacity. The article also explores patient-centered communication, shared decision-making, behavioral modification, medication adherence, exercise prescription, safety monitoring, tele-rehabilitation, health equity, family involvement, and strategies for implementation in resource-limited settings. An integrated nursing–physiotherapy framework may provide a practical pathway for improving continuity, safety, participation, independence, and long-term cardiovascular health.

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Keywords: Cardiovascular Disease, Cardiac Rehabilitation, Nursing, Physiotherapy, Patient-Centered Care, Exercise Therapy, Secondary Prevention, Multidisciplinary Care, Cardiovascular Nursing, Physical Rehabilitation.

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Introduction

Cardiovascular diseases (CVDs) remain among the leading causes of morbidity, disability, and mortality worldwide, encompassing conditions such as coronary artery disease, heart failure, hypertension, stroke, peripheral arterial disease, and other disorders affecting the cardiovascular system. The increasing prevalence of CVDs is closely associated with modifiable risk factors, including physical inactivity, unhealthy dietary patterns, obesity, smoking, hypertension, diabetes mellitus, dyslipidemia, and psychological stress. Contemporary cardiovascular care therefore extends beyond acute medical treatment and requires comprehensive prevention, rehabilitation, health education, lifestyle modification, and long-term disease management. Evidence-based guidelines emphasize individualized risk assessment, shared decision-making, lifestyle intervention, and coordinated multidisciplinary care as important components of cardiovascular disease prevention and management (Visseren et al., 2021, Virani et al., 2023). Nursing professionals play a central role throughout the cardiovascular care continuum. Nurses are frequently involved in early identification of cardiovascular risk factors, monitoring of vital signs and clinical status, medication administration, patient education, symptom assessment, psychological support, discharge planning, and promotion of treatment adherence. Through continuous patient contact, nurses can identify barriers to lifestyle modification and facilitate patient participation in self-management. Nursing interventions may include education regarding medication adherence, dietary modification, smoking cessation, weight management, physical activity, recognition of warning symptoms, and appropriate use of healthcare services. In patients with chronic cardiovascular conditions, ongoing nursing support is particularly important because successful disease management frequently depends on sustained behavioral changes and adherence to long-term therapeutic recommendations (Virani et al., 2023). Physiotherapy complements nursing care by addressing functional limitations, physical inactivity, exercise intolerance, impaired mobility, muscle weakness, and reduced cardiorespiratory fitness. Physiotherapists assess functional capacity and develop individualized exercise programmes

based on the patient's cardiovascular status, symptoms, functional limitations, and rehabilitation goals. Exercise-based cardiac rehabilitation can improve exercise capacity, functional status, quality of life, and cardiovascular risk profiles when appropriately prescribed and monitored (Gore et al., 2023, Edwards et al., 2022). Physiotherapy therefore contributes substantially to both secondary prevention and restoration of physical independence following cardiovascular events or procedures.

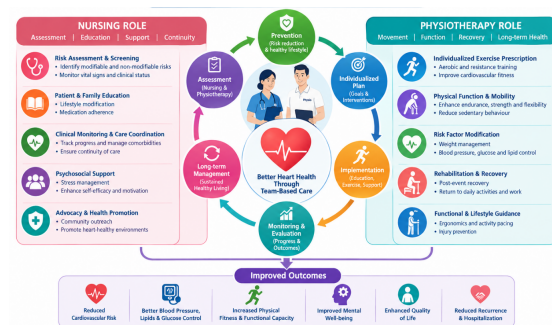


Figure 1. Integrated nursing and physiotherapy approach to cardiovascular disease prevention and management

The figure 1 illustrates how nursing assessment, patient education, medication and lifestyle support, physiotherapy assessment, exercise prescription, functional training, monitoring, and patient-centered decision-making interact to provide comprehensive cardiovascular care. The integration of nursing and physiotherapy becomes particularly important within cardiac rehabilitation. Contemporary cardiac rehabilitation is a multidisciplinary intervention incorporating exercise training, cardiovascular risk-factor modification, health education, psychosocial support, nutritional guidance, and strategies for long-term adherence. Nurses can provide continuous monitoring, education, counseling, and coordination, whereas physiotherapists contribute specialized assessment and individualized exercise prescription. Their combined approach can help patients safely progress from acute illness toward improved functional capacity and independent self-management (Grace et al., 2023, Taylor et al., 2022). The figure 2 represents the progression from cardiovascular risk assessment and acute clinical

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management through early mobilization, structured rehabilitation, lifestyle modification, secondary prevention, home-based care, and long-term self-management. Patient-centered care is another essential component of integrated cardiovascular management. Rather than focusing exclusively on disease-specific outcomes, patient-centered rehabilitation considers individual preferences, functional abilities, psychological needs, socioeconomic circumstances, health literacy, family support, and personal rehabilitation goals. Shared decision-making can improve engagement and encourage patients to take an active role in their recovery and long-term cardiovascular health (Visseren et al., 2021). Integrated nursing and physiotherapy care can therefore provide a more holistic approach by combining clinical monitoring, education, behavioral support, physical rehabilitation, and continuous assessment of patient progress.

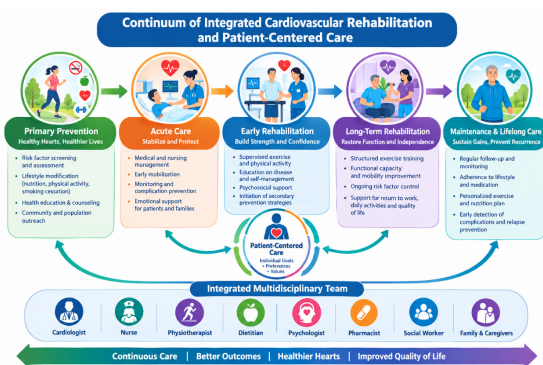


Figure 2. Continuum of integrated cardiovascular rehabilitation and patient-centered care

Cardiovascular Disease as a Multidimensional Health Problem

CVD affects multiple dimensions of human functioning. The cardiovascular system directly influences oxygen delivery, exercise tolerance, tissue perfusion, and physical endurance. Consequently, cardiovascular disease can produce limitations that extend far beyond cardiac symptoms. A patient recovering from myocardial infarction may have adequate cardiac stability but remain unable to return to work because of reduced endurance, fear of exertion, poor confidence, or inappropriate activity avoidance. Similarly, a patient with chronic heart failure may experience dyspnea and fatigue that restrict walking, bathing, shopping, climbing stairs, and participation in family activities. Heart failure illustrates the importance of multidisciplinary rehabilitation particularly well. Exercise training has been investigated in both heart failure with reduced ejection fraction and preserved

ejection fraction, with evidence supporting improvements in functional outcomes and exercise capacity when training is appropriately prescribed. Physiotherapy is therefore relevant not only after acute cardiac events but also in chronic cardiac disease. The nursing contribution is equally important because cardiovascular disease frequently requires complex medication regimens, monitoring of symptoms and adverse effects, dietary changes, fluid management in selected patients, blood pressure monitoring, recognition of deterioration, and reinforcement of treatment adherence. A patient may understand that exercise is beneficial but still fail to participate because of medication side effects, fear, depression, transportation barriers, financial limitations, or inadequate understanding of safe exercise intensity.

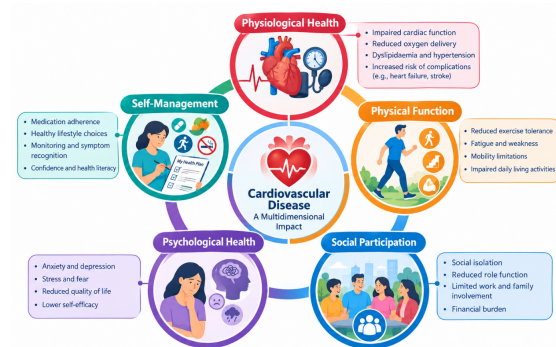


Figure 3. Multidimensional impact of cardiovascular disease

The figure 3 show five interconnected domains: physiological health, physical function, psychological health, social participation, and self-management. Nursing interventions should be linked strongly with monitoring, education, medication and psychosocial support, while physiotherapy interventions should be linked with mobility, exercise, functional capacity, and physical participation. The central overlapping area should be labeled “integrated patient-centered rehabilitation.” This multidimensional perspective is especially important in low- and middle-income countries, where access to cardiac rehabilitation remains limited despite a high cardiovascular disease burden. A 2023 global scientific statement noted that approximately 80% of the cardiovascular disease burden occurs in low- and middle-income settings and highlighted system-level, professional, programme-level, and patient-level barriers to rehabilitation.

Rationale for Integrating Nursing and Physiotherapy

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Traditional healthcare structures can unintentionally separate nursing care from rehabilitation services. Nurses may concentrate on clinical stability and medical care, whereas physiotherapists may be consulted only after a patient develops an obvious mobility or exercise-related problem. Such separation can delay rehabilitation and reduce continuity. An integrated model begins much earlier. Nursing staff can identify cardiovascular risk and functional decline during routine assessment and promptly involve physiotherapy. Physiotherapists can identify exercise intolerance, mobility restrictions, frailty, or fear of movement and communicate these findings to nurses and physicians. Both professionals can reinforce consistent patient education. For example, a patient after percutaneous coronary intervention may receive medication education from nursing staff and exercise education from physiotherapy. If both professionals communicate the same individualized recommendations, the patient receives a coherent message. Conversely, inconsistent instructions can create confusion, particularly concerning activity intensity, lifting restrictions, fatigue, and symptom recognition.

The integration of both disciplines can be summarized as:

Nursing asks: Is the patient clinically stable, informed, psychologically prepared, adherent, and capable of managing the condition?

Physiotherapy asks: What can the patient physically do, what limits performance, and how can safe physical capacity be restored and progressed?

Integrated care asks: How can clinical stability and functional capacity be combined to help this individual achieve meaningful personal goals?

This approach corresponds closely with modern patient-centered cardiovascular care, in which treatment is expected to address the individual rather than simply the disease label. The 2023 integrated-care statement from the Association of Cardiovascular Nursing and Allied Professions emphasizes that cardiovascular systems have historically been fragmented and condition-focused and argues for care organized around the patient.

Nursing Perspective in Cardiovascular Disease Prevention and Management

Cardiovascular Risk Assessment

Nurses are frequently among the first professionals to interact with patients in outpatient clinics, wards,

emergency settings, community programmes, and rehabilitation services. Their repeated contact provides opportunities for cardiovascular risk assessment and early intervention. Nursing assessment can include blood pressure, heart rate, oxygen saturation where indicated, body weight, body mass index, smoking status, diabetes history, medication adherence, dietary patterns, physical activity, sleep, stress, family history, previous cardiovascular events, and health literacy. Such information provides the multidisciplinary team with a practical picture of the patient's risk profile. The ESC prevention framework identifies hypertension, dyslipidemia, smoking, diabetes, and adiposity among major modifiable cardiovascular risk factors. Nurses can therefore play a central role in repeated monitoring and reinforcement of risk-reduction strategies.

Patient Education

Patient education is a fundamental nursing intervention. Cardiovascular patients often receive large amounts of information during hospitalization, a period when anxiety, pain, medication effects, and information overload may impair learning. Effective education should be individualized and interactive. Nurses can use teach-back methods to confirm that patients understand medication schedules, warning symptoms, diet recommendations, smoking cessation strategies, follow-up requirements, and physical activity precautions. Rather than telling patients simply to “exercise,” nurses can reinforce physiotherapy recommendations using practical instructions such as how often the patient should walk, what symptoms require stopping exercise, when to contact healthcare professionals, and how exercise fits into the daily routine.

Medication Adherence and Self-Management

Long-term cardiovascular management often includes multiple medications, creating challenges related to adherence, side effects, cost, dosing complexity, and misunderstanding. Nurses can identify adherence barriers and communicate them to physicians and pharmacists. The World Heart Federation's 2023 secondary-prevention roadmap emphasizes the importance of pharmacological and lifestyle interventions, including antiplatelet therapy where indicated, lipid-lowering therapy, blood-pressure management, physical activity, dietary management, smoking cessation, and cardiac rehabilitation.

Psychosocial Care

Anxiety and depression are common in patients with cardiovascular disease. Fear of recurrence may lead

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patients to avoid physical activity even after they have been medically cleared. Nurses can screen for emotional distress, encourage communication, identify social barriers, and refer patients when psychological intervention is required. This role is particularly relevant because adherence to rehabilitation is influenced not only by physical ability but also by motivation, confidence, social support, perceived benefit, and emotional wellbeing.

Discharge Planning

Effective discharge planning begins before discharge. Nursing and physiotherapy should jointly evaluate whether the patient understands activity recommendations, can safely perform essential activities, has appropriate equipment if required, understands follow-up arrangements, and knows when and how to seek help.

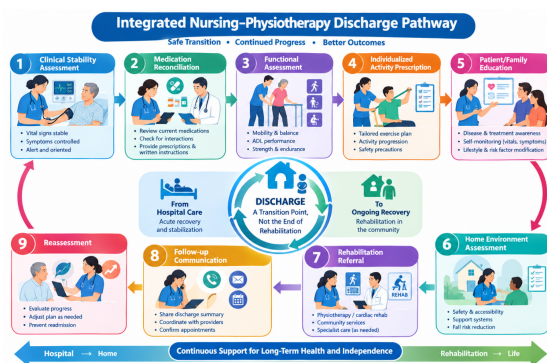


Figure 4. Integrated nursing–physiotherapy discharge pathway

Physiotherapy Perspective in Cardiovascular Disease

Functional Assessment

Physiotherapy provides objective information regarding what patients can actually do. Depending on clinical status, assessment may include walking capacity, functional mobility, balance, muscular strength, flexibility, respiratory status, exercise tolerance, perceived exertion, heart-rate response, blood-pressure response, and activity limitations. The six-minute walk test, incremental shuttle walk test, sit-to-stand testing, timed functional tasks, and cardiopulmonary exercise testing may be used according to the patient's condition and available resources. Physiotherapy assessment should never be interpreted as a simple measurement of “fitness.” It should identify barriers to participation and establish measurable rehabilitation goals.

Exercise Prescription

Exercise is one of the central components of cardiac rehabilitation. Current chronic coronary syndrome guidance recommends individually prescribed aerobic and resistance exercise, using principles such as frequency, intensity, time, and type. Aerobic training may include walking, cycling, treadmill exercise, or other appropriate activities. Resistance training can address muscular weakness and functional independence. Flexibility, balance, breathing strategies, mobility, and functional training may be incorporated according to individual need. Exercise prescription should be individualized rather than based solely on diagnosis. Two patients with myocardial infarction may have markedly different exercise capacities because of age, comorbidities, baseline fitness, ventricular function, frailty, obesity, musculoskeletal disease, anxiety, and previous activity levels.

Early Mobilization

Early mobilization can help prevent the consequences of prolonged bed rest, including muscle weakness, reduced functional capacity, orthostatic intolerance, and loss of independence. However, mobilization must be based on clinical stability and coordinated with the medical and nursing team. Nurses can provide information regarding overnight symptoms, blood pressure trends, medication changes, oxygen requirements, and clinical events, while physiotherapists determine appropriate mobility and exercise progression. Evidence regarding early exercise in acute heart failure has been evaluated in systematic reviews, emphasizing the importance of appropriate patient selection and structured rehabilitation rather than indiscriminate exercise.

Heart Failure Rehabilitation

Heart failure patients often present with severe exercise intolerance and muscle deconditioning. Exercise training may improve functional capacity and quality of life when appropriately prescribed. A systematic review and meta-analysis of exercise training in heart failure with preserved and reduced ejection fraction supports the role of structured exercise in this population. Similarly, comprehensive outpatient cardiac rehabilitation has demonstrated benefits for exercise capacity, functional status, and quality of life in people with heart failure.

Physiotherapy and Respiratory Function

Dyspnea is an important limitation in many cardiovascular patients. Physiotherapists may contribute through breathing control, thoracic mobility, respiratory muscle training when

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indicated, energy conservation, pacing, and graded activity. These interventions should complement, not replace and appropriate medical evaluation of worsening dyspnea, which can represent cardiac decompensation or another acute condition.

Complementary Nursing and Physiotherapy Roles

The greatest value of integration occurs when professional roles complement each other.

Table 1. Complementary nursing and physiotherapy responsibilities in cardiovascular rehabilitation

Clinical domain	Nursing contribution	Physiotherapy contribution	Integrated outcome
Initial assessment	Symptoms, vital signs, medications, risk factors	Functional and mobility assessment	Comprehensive baseline
Education	Disease, medication, lifestyle, warning signs	Exercise, activity, pacing and safety	Consistent patient education
Exercise	Monitoring and symptom surveillance	Prescription, supervision and progression	Safe exercise participation
Medication	Adherence, adverse effects, education	Monitoring exercise response in relation to symptoms	Better treatment integration

Functional recovery	Encourage self-care	Mobility, strength and endurance training	Greater independence
Psychosocial support	Screening, counseling, referral	Confidence-building through graded activity	Improved participation
Discharge	Care coordination and follow-up	Home exercise and functional planning	Continuity of rehabilitation
Long-term care	Self-management and risk-factor support	Physical activity maintenance	Secondary prevention

The integrated model therefore does not mean that nurses perform physiotherapy or physiotherapists replace nursing. Instead, it means that both professions communicate, reinforce each other's interventions, and share responsibility for patient-centered outcomes.

Patient-Centered Cardiovascular Rehabilitation

Patient-centered care requires moving away from the assumption that the same rehabilitation programme is suitable for everyone. Individual goals should influence treatment planning. For one patient, the primary goal may be returning to employment. For another, it may be walking independently to the local market. For an older adult, the most important objective may be safely climbing household stairs. For a younger patient, returning to recreational sports may be the priority. Shared decision-making allows professionals to incorporate patient preferences, health literacy, social circumstances, family responsibilities, occupation, financial resources, and cultural context. The 2023 chronic coronary disease guideline emphasizes shared decision-making and patient-centered multidisciplinary care, with continuous communication among patients, caregivers, and

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healthcare professionals. Patient-centered rehabilitation also improves the relevance of outcome measurement. Traditional clinical outcomes such as blood pressure, heart rate, and exercise capacity remain important, but patient-reported outcomes, functional independence, confidence, quality of life, and ability to return to desired activities should also be considered.

Integrated Management Across the Cardiovascular Disease Continuum

Primary Prevention

Primary prevention begins before cardiovascular disease develops. Nurses can support screening, education, smoking cessation, blood-pressure awareness, dietary modification, medication adherence in high-risk individuals, and health literacy. Physiotherapists can promote physical activity and structured exercise among people with obesity, hypertension, diabetes, sedentary behavior, and other cardiovascular risk factors. Exercise is particularly valuable because physical inactivity is both a behavioral risk factor and a contributor to reduced functional capacity.

Acute Coronary Syndrome and Myocardial Infarction

After acute coronary syndrome, priorities include medical stabilization, monitoring, education, early functional assessment, psychological support, and transition into secondary prevention. Nurses monitor symptoms, rhythm where indicated, hemodynamic status, medication response, and patient understanding. Physiotherapists determine when and how activity can safely progress. After stabilization, referral to cardiac rehabilitation should occur early. Current guidelines recommend comprehensive cardiac rehabilitation after appropriate coronary events and procedures because it improves recovery and secondary prevention.

Post-Revascularization Care

Patients undergoing PCI or CABG may have concerns regarding mobility, wound-related restrictions, fatigue, fear of exertion, and return to normal activity. Nursing care includes wound observation, medication education, symptom surveillance, and discharge planning. Physiotherapy addresses mobility, walking progression, breathing and coughing strategies where appropriate, functional activity, and later exercise conditioning.

Hypertension

Hypertension management extends beyond medication. Physical activity, weight management, dietary modification, stress management, and long-term adherence are essential. Physiotherapy can help develop individualized physical-activity programmes, whereas nurses can reinforce blood-pressure monitoring, medication adherence, dietary recommendations, and recognition of concerning symptoms.

Heart Failure

Heart failure requires particularly strong integration because patients often experience recurrent symptoms and fluctuating functional capacity. Nurses can monitor weight changes, edema, dyspnea, fatigue, medication adherence, diet and fluid-related instructions where applicable, and signs of deterioration. Physiotherapists can assess functional capacity and prescribe graded exercise according to clinical status. The figure 5 should depict symptom monitoring, medication/self-management education, nutritional guidance, functional assessment, aerobic exercise, resistance exercise, breathing strategies, psychosocial support, home activity, telemonitoring, and regular reassessment as interconnected components. Evidence indicates that exercise training can improve important outcomes in heart failure, while comprehensive outpatient rehabilitation may improve functional status, exercise capacity, and quality of life.

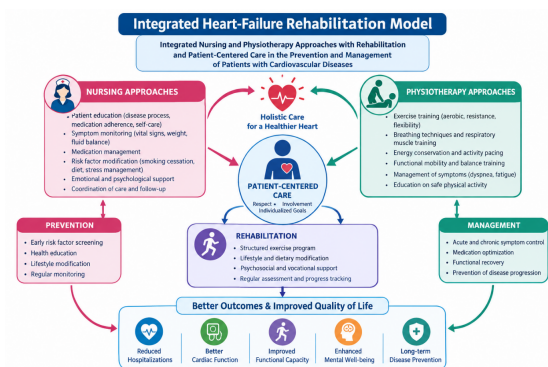


Figure 5. Integrated heart-failure rehabilitation model

Exercise Safety and Clinical Monitoring

Exercise in cardiovascular rehabilitation should be therapeutic but appropriately monitored. Safety depends on clinical assessment, appropriate patient selection, individualized intensity, symptom surveillance, and clear stopping criteria. Nursing professionals may monitor symptoms, vital signs, medication effects, and clinical changes before and during rehabilitation. Physiotherapists monitor

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exercise response, perceived exertion, movement quality, functional performance, and progression. The integration is especially valuable because cardiovascular symptoms may appear during exercise. A patient may report unusual chest discomfort, marked breathlessness, dizziness, palpitations, excessive fatigue, or unusual weakness. The physiotherapist can immediately modify or stop the activity, while the nurse contributes to clinical assessment and escalation according to institutional protocols. Safety should not be interpreted as excessive restriction. Overprotection can reinforce inactivity and fear. The goal is controlled exposure to physical activity within an individualized therapeutic range.

Table 2. Integrated safety-monitoring framework during cardiovascular rehabilitation

Assessment stage	Nursing focus	Physiotherapy focus	Action
Before exercise	Symptoms, medications, vital signs, recent events	Functional readiness and exercise plan	Proceed, modify or defer
During exercise	Symptoms and physiological response	Intensity, movement, exertion and tolerance	Progress, maintain or stop
Immediately after	Recovery symptoms and vital signs	Recovery time and perceived exertion	Document response
Between sessions	New symptoms and adherence	Activity tolerance and home exercise	Modify programme
Follow-up	Clinical stability	Functional progress	Reassess goals

Behavioral Change and Long-Term Adherence

One of the major challenges of cardiovascular rehabilitation is maintaining behavior after the supervised programme ends. A patient may complete several weeks of exercise under professional supervision but discontinue walking once formal rehabilitation finishes. Nurses and physiotherapists can jointly address this problem by developing sustainable routines before programme completion. Behavioral strategies can include goal setting, self-monitoring, activity diaries, step tracking, family involvement, motivational interviewing principles, reinforcement, problem solving, and periodic follow-up. The patient's barriers should be identified rather than assuming non-adherence represents lack of motivation. Barriers may include transportation, financial limitations, work schedules, caregiving responsibilities, pain, fatigue, fear, depression, low health literacy, poor digital access, or limited rehabilitation facilities.

Home-Based and Tele-Rehabilitation

Home-based rehabilitation has become increasingly important because center-based programmes are not accessible to all patients. Contemporary guidelines recognize home-based and remote cardiac rehabilitation as alternatives for selected patients who cannot attend conventional facilities. Evidence from systematic reviews indicates that home-based cardiac rehabilitation can improve functional capacity and physical activity compared with usual care and may provide outcomes comparable to center-based rehabilitation for selected patients. A Cochrane review similarly found broadly similar short-term benefits between home- and center-based cardiac rehabilitation for several outcomes. Figure 6 illustrates the Home-based and digital cardiovascular rehabilitation pathway, Digital tools such as mobile applications, wearable activity monitors, video consultations, and remote communication can be incorporated when appropriate. Tele-rehabilitation may be particularly valuable in rural and underserved populations. However, digital rehabilitation should not create a new inequality. Patients without smartphones, internet access, digital literacy, or reliable electricity may require telephone-based or community-based alternatives.

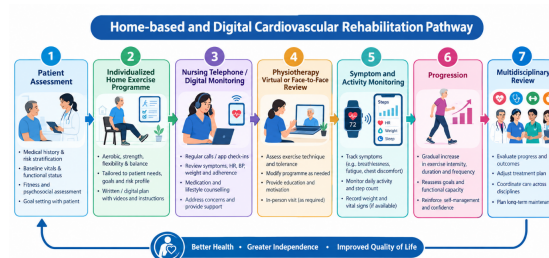


Figure 6. Home-based and digital cardiovascular rehabilitation pathway

Cardiovascular Rehabilitation in Low- and Middle-Income Countries

The need for integrated nursing and physiotherapy services is particularly strong in low- and middle-income countries. Despite high cardiovascular disease burden, cardiac rehabilitation services may be limited by inadequate referral, insufficient trained personnel, infrastructure limitations, financial barriers, transportation difficulties, and low public awareness. A 2023 global scientific statement emphasized that rehabilitation access remains highly unequal and identified actionable strategies for improving delivery in lower-resource settings. Indian evidence also highlights implementation challenges. A qualitative study involving healthcare professionals working in cardiovascular and rehabilitation services in India identified insufficient referrals, inadequate infrastructure, differences in clinical practice, limited rehabilitation competencies, insufficient task-sharing, and underutilization of available human resources as important challenges. This creates an important opportunity for nursing and physiotherapy integration. In settings where specialist rehabilitation centers are scarce, nurses and physiotherapists can work collaboratively within hospitals, community health centers, outpatient clinics, and primary-care-linked programmes.

A resource-sensitive model can include:

1. Standardized cardiovascular risk assessment,
2. Basic functional testing,
3. Nurse-led education,
4. Physiotherapist-led exercise prescription,
5. Structured home walking programmes,
6. Telephone follow-up,
7. Family education,
8. Group education sessions,
9. Community-based rehabilitation,
10. Referral pathways for high-risk patients.

Family-Centered Care

Family involvement can substantially influence cardiovascular rehabilitation. Family members often control or influence food choices, transportation, medication routines, emotional support, and physical activity opportunities. Nurses can educate family members regarding medications, symptom recognition, lifestyle modification, and emergency responses. Physiotherapists can teach family members how to encourage safe physical activity without becoming overly protective. Family-

centered care should nevertheless preserve patient autonomy. The patient should remain the central decision-maker whenever possible.

Interprofessional Communication

Integration requires more than placing different professionals in the same department. It requires structured communication.

Useful mechanisms include:

- Shared rehabilitation assessment forms,
- Multidisciplinary case conferences,
- Common functional and clinical goals,
- Standardized referral pathways,
- Joint discharge planning,
- Shared outcome measures,
- Electronic documentation,
- Scheduled follow-up communication,
- Escalation protocols for deterioration.

Table 3. Proposed integrated nursing–physiotherapy cardiovascular rehabilitation pathway

Phase	Nursing responsibilities	Physiotherapy responsibilities	Shared objectives
Hospital admission	Clinical assessment, monitoring, education	Functional screening	Identify rehabilitation needs
Stabilization	Symptom monitoring and medication education	Early mobility assessment	Prevent deconditioning
Pre-discharge	Self-management and warning-sign education	Exercise/activity prescription	Safe transition home

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Early outpatient	Risk-factor education	Structured exercise programme	Restore function
Intermediate rehabilitation	Adherence and behavioral support	Progressive aerobic/resistance training	Improve capacity
Long-term phase	Chronic self-management	Physical-activity maintenance	Prevent recurrence
Home/digital care	Remote symptom/adherence monitoring	Remote exercise monitoring	Maintain continuity

The 2023 AHA/ACC chronic coronary disease guideline supports multidisciplinary team-based care because coordinated care can improve self-efficacy, quality of life, and risk-factor management.

Outcome Measurement

Integrated rehabilitation should be evaluated through multidimensional outcomes.

- **Clinical Outcomes**
Relevant measures include blood pressure, resting heart rate, lipid profile, glycemic measures where appropriate, hospitalization, cardiovascular events, and medication adherence.
- **Functional Outcomes**
Functional outcomes include walking distance, exercise capacity, muscular strength, mobility, activities of daily living, and physical activity.
- **Patient-Reported Outcomes**
Quality of life, fatigue, confidence, anxiety, depression, self-efficacy, symptom burden, and satisfaction are important.
- **Participation Outcomes**
Return to employment, participation in family activities, independence, community mobility, and recreational activity may represent meaningful patient-centered outcomes.

Role of Nurses and Physiotherapists Across Different CVD Conditions

The contribution of each profession varies according to disease presentation, but their collaboration remains relevant across most cardiovascular conditions. In coronary artery disease, nursing care emphasizes symptom monitoring, medication adherence, risk-factor education, and secondary prevention, while physiotherapy emphasizes exercise capacity and physical activity. In heart failure, nursing focuses strongly on self-management, symptom recognition, medication and fluid-related education, and early identification of deterioration. Physiotherapy focuses on exercise tolerance, deconditioning, mobility, strength, and graded exercise. In hypertension, nurses reinforce monitoring and adherence while physiotherapists develop individualized physical-activity strategies. In peripheral arterial disease, physiotherapists have a major role in walking programmes and functional improvement, while nurses reinforce risk-factor management and symptom education. Following cardiac surgery, nursing care includes wound and clinical monitoring, medication education, and discharge preparation, whereas physiotherapy contributes to mobilization, respiratory management where indicated, and restoration of physical capacity. Thus, integration should remain condition-specific while maintaining common principles of patient-centered care.

Barriers to Integrated Nursing–Physiotherapy Care

Several barriers may prevent effective integration.

- **Professional Silos:** Different professional teams may work independently with limited communication. This can result in duplicated assessments or conflicting recommendations.
- **Inadequate Staffing:** Limited numbers of nurses and physiotherapists may make comprehensive rehabilitation difficult.
- **Lack of Referral Systems:** Patients may not be referred to rehabilitation despite being eligible.
- **Limited Training:** Some healthcare professionals may have limited training in cardiovascular rehabilitation principles.
- **Financial Barriers:** Patients may be unable to afford transportation, rehabilitation fees, or digital technologies.
- **Geographic Barriers:** Rural patients may live far from specialized rehabilitation centers.
- **Patient-Level Barriers:** Fear, fatigue, depression, low health literacy, family

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obligations, and lack of confidence can reduce participation. The global literature consistently demonstrates that underutilization of cardiac rehabilitation remains a major problem, particularly in low- and middle-income countries.

Strategies for Improving Integration

Several practical strategies can strengthen nursing–physiotherapy collaboration. First, every eligible cardiovascular patient should undergo rehabilitation screening before discharge. Second, nurses and physiotherapists should participate in joint goal-setting. Third, standardized referral pathways should be implemented. Fourth, common documentation should include both clinical and functional outcomes. Fifth, patient education should be coordinated so that messages regarding activity, medications, symptoms, diet, and lifestyle are consistent. Training programmes should also emphasize interprofessional competencies. Nurses should understand basic exercise principles and warning signs relevant to exercise, while physiotherapists should understand cardiovascular medications, symptom patterns, and clinical escalation procedures. Task-sharing can be especially useful in resource-limited environments. The aim is not to blur professional boundaries but to ensure that each professional understands the other's role sufficiently to recognize when collaboration is required.

Future Directions

The future of cardiovascular rehabilitation is likely to involve greater personalization, digital monitoring, hybrid rehabilitation, community-based programmes, and patient-generated health data. Wearable technology can potentially provide information regarding physical activity, heart rate, and exercise patterns. Mobile applications can support reminders, education, and self-monitoring. Tele-rehabilitation can connect patients with physiotherapists and nurses without requiring frequent hospital visits. However, technology should remain a tool rather than the central focus of care. Human communication, clinical judgment, empathy, and individualized decision-making remain essential. The emergence of dedicated contemporary cardiac-rehabilitation guidance further demonstrates that rehabilitation is increasingly being recognized as a distinct and important component of cardiovascular care. The ESC's current guideline programme identifies 2026 cardiac rehabilitation guidance as a major contemporary development. Future research should examine integrated nurse–physiotherapist models specifically rather than studying nursing and

physiotherapy interventions in isolation. Research should also assess cost-effectiveness, rural implementation, digital inclusion, long-term adherence, patient-reported outcomes, and culturally adapted rehabilitation programmes.

Implications for Nursing Practice

Nurses should be considered active rehabilitation professionals rather than providers of care limited to acute clinical monitoring. Cardiovascular nursing practice should incorporate risk assessment, education, self-management support, motivational communication, medication adherence, psychosocial assessment, discharge planning, and long-term follow-up. Nurses can also serve as important coordinators between patients and other members of the cardiovascular rehabilitation team. Their frequent contact with patients creates opportunities to detect problems early and reinforce rehabilitation goals.

A nurse should be able to answer practical questions such as:

- What symptoms should the patient report?
- Is the patient taking medications correctly?
- Does the patient understand the purpose of treatment?
- Is the patient physically active?
- What prevents exercise participation?
- Does the patient understand the prescribed activity level?
- Is anxiety preventing rehabilitation?
- Does the patient have adequate family support?

Implications for Physiotherapy Practice

Physiotherapists should be integrated into cardiovascular care from the earliest clinically appropriate stage rather than being consulted only after mobility problems appear. Physiotherapy practice should incorporate comprehensive functional assessment, exercise prescription, progression, safety monitoring, behavioral support, and long-term physical-activity promotion. Physiotherapists should also communicate functional findings to nurses and physicians. For example, a decline in exercise tolerance may represent deconditioning, but it may also signal worsening cardiac status. Interprofessional communication therefore becomes essential.

Implications for Education and Training

Undergraduate and postgraduate education should include interprofessional cardiovascular

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rehabilitation training. Nursing and physiotherapy students can benefit from joint learning activities involving cardiovascular risk assessment, exercise safety, patient education, clinical communication, emergency recognition, and rehabilitation planning. Simulation-based learning can be particularly useful. Students can jointly manage scenarios involving post-myocardial-infarction patients, heart failure exacerbation, hypertension, postoperative cardiac rehabilitation, or exercise-related symptom deterioration. Such training may reduce professional silos and improve understanding of complementary roles.

Discussion

The evidence increasingly supports the idea that cardiovascular rehabilitation should be comprehensive rather than exercise-only. The AHA/ACC chronic coronary disease guideline defines cardiac rehabilitation as a multidisciplinary, evidence-based approach that combines lifestyle, behavioral, and medical interventions. Within this model, nursing and physiotherapy provide complementary expertise. Nursing brings continuity, education, clinical monitoring, medication and self-management support, and psychosocial care. Physiotherapy brings functional measurement, exercise science, mobility restoration, and progressive physical conditioning. Exercise is particularly important because cardiovascular disease often creates a cycle of inactivity and deconditioning. A patient experiences symptoms, becomes afraid of exertion, reduces activity, loses fitness, experiences greater fatigue during routine activities, and consequently becomes even less active. Physiotherapy can help interrupt this cycle through graded, monitored activity. Nursing can reinforce confidence, education, adherence, and symptom monitoring. The patient-centered component is equally important. A rehabilitation programme can be physiologically effective but unsuccessful if patients do not participate or cannot incorporate it into their lives. Contemporary guidelines therefore emphasize shared decision-making and patient-centered care. The expansion of home-based rehabilitation also provides opportunities for integrated nursing and physiotherapy services. Evidence suggests that appropriately designed home-based programmes can provide outcomes comparable to center-based rehabilitation in selected populations. Nevertheless, implementation must account for safety, health literacy, digital access, social support, and the ability to recognize deterioration. A hybrid model combining face-to-face assessment with remote follow-up may therefore be particularly useful.

Conclusion

Cardiovascular disease requires a long-term model of care that extends beyond diagnosis, pharmacological treatment, and acute hospitalization. Rehabilitation and secondary prevention are essential components of modern cardiovascular management because survival alone does not guarantee functional independence, quality of life, or successful return to meaningful activities. Nursing and physiotherapy represent two highly complementary professional disciplines within this framework. Nurses contribute continuous clinical assessment, patient education, medication and self-management support, psychosocial care, risk-factor management, discharge coordination, and long-term follow-up. Physiotherapists contribute functional assessment, exercise prescription, mobility restoration, strength and endurance training, activity progression, and physical-activity maintenance. The most effective approach is therefore not nursing care plus physiotherapy care delivered independently, but an integrated model in which both professions communicate around shared patient-centered goals. Such collaboration can support patients across the entire cardiovascular continuum—from prevention and acute hospitalization to early mobilization, outpatient cardiac rehabilitation, home-based rehabilitation, chronic disease management, and lifelong secondary prevention. Contemporary cardiovascular guidelines strongly support multidisciplinary team-based care, cardiac rehabilitation, individualized exercise, and shared decision-making. For low- and middle-income countries, where rehabilitation resources remain limited, integrated nurse–physiotherapist models may provide a practical strategy for expanding access and improving continuity. Ultimately, the objective of cardiovascular rehabilitation should not simply be to make a patient's heart function better or to increase walking distance. The broader goal is to help the individual regain confidence, independence, physical capacity, knowledge, self-management ability, and participation in everyday life. Integrated nursing and physiotherapy care provides a strong foundation for achieving this goal.

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