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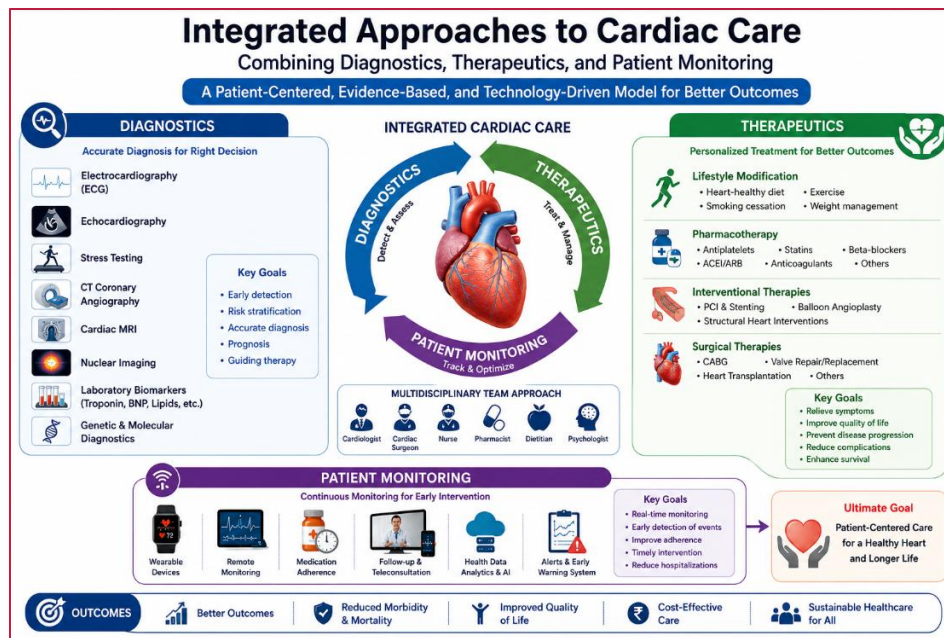
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Overview about the study



ABSTRACT

Cardiovascular diseases (CVDs) remain a major global health challenge, accounting for the highest mortality worldwide. Modern cardiac care has shifted from isolated diagnostic and treatment strategies to an integrated model that combines diagnostics, therapeutics, and patient monitoring. This approach emphasizes patient-centered care, evidence-based decision-making, and technology-driven interventions. By integrating advanced diagnostic tools, personalized therapies, and continuous monitoring systems, healthcare providers can improve disease detection, optimize treatment, and reduce morbidity and mortality. This review discusses the components, significance, challenges, and future prospects of integrated cardiac care.

KEYWORDS: Cardiovascular disease, Integrated cardiac care, Therapeutic strategies, Cardiac rehabilitation, Heart Team, Multidisciplinary healthcare.

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INTRODUCTION

Cardiovascular diseases are the leading cause of death worldwide, accounting for an estimated 19.8 million deaths in 2022, which represents about 32% of all global deaths. Among these, around 85% were caused by heart attacks and strokes. Of the 18 million premature deaths (before age 70) due to non-communicable diseases in 2021, at least 38% were attributed to cardiovascular diseases (WHO, 2026). Most cardiovascular diseases are preventable through reducing behavioural and environmental risk factors such as tobacco use, unhealthy diet, obesity, physical inactivity, harmful alcohol consumption, and air pollution (Mendis & Graham, 2024). Early detection is essential to enable timely management through counseling and medication (Dewidar et al., 2025). Cardiovascular disease is a group of disease such as coronary artery disease, heart failure, arrhythmias, and hypertension require comprehensive management due to their complex pathophysiology (Lopez et al., 2023). Traditional care models often separated diagnosis, treatment, and follow-up (Susanti et al., 2025). However, current healthcare systems increasingly adopt integrated approaches, where multidisciplinary teams coordinate patient care across all stages. This improves early detection, ensures timely therapeutic intervention, and supports long-term monitoring (Gherman et al., 2025). Integrated cardiac care is especially relevant in managing chronic conditions that require continuous assessment and individualized treatment strategies (Machado et al., 2025). Before the complete care of heart, we need to know about the heart and signalling pathway (Longden & Lederer, 2024) shown in the Figure 1.

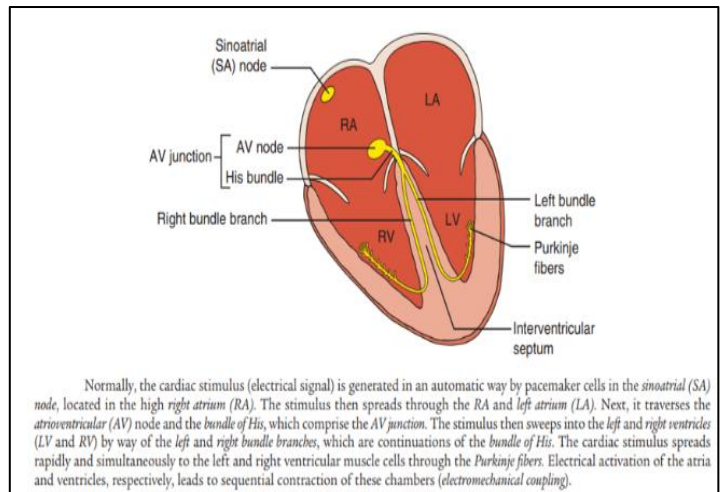
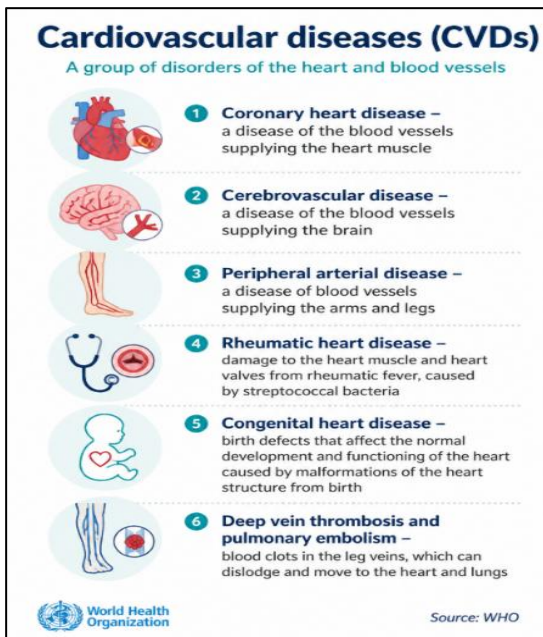


Figure 1: Electrical signalling in the Heart (Goldberger, 2018)

Risk factors and care during cardiovascular disease

The main behaviours that raise the risk of heart disease and stroke are eating unhealthy, not being physically active, using tobacco, and alcohol drinking. Air pollution is also an important environmental risk (Masoudkabar *et al.*, 2023).

These behaviours can lead to higher blood pressure, high blood sugar, high blood fats, and overweight or obesity. These are measurable at basic health clinics and mean a person is more likely to have a heart attack, stroke, heart failure, or other problems (Almutairi *et al.*, 2025). Stopping tobacco use, eating less salt, eating more fruits and vegetables, being active regularly, and avoiding harmful drinking all lower the risk of heart disease (Buttar *et al.*, 2005; Samuel *et al.*, 2024). Public policies that make healthy choices easier and cheaper, and that improve air quality, help people keep these healthy habits (Kelly & Fussell, 2015). Poverty, stress, and family history also increase risk of heart disease. For people who have high blood pressure, diabetes, or high blood fats, can be treated by the medicines and reduce the chance of heart attacks and strokes but need to more intended about poverty, stress and family history (Seedat, 2007; Chaturvedi *et al.*, 2024; Rosengren *et al.*, 2019).



Symptoms of heart attacks and strokes

Often people have no warning signs of diseases in their blood vessels, so a heart attack or stroke can be the first sign. Common symptoms of a heart attack include pain or discomfort in the center of the chest or pain or discomfort in the arms, left shoulder, elbow, jaw, or back (Abdo Ahmed *et al.*, 2020; Khan *et al.*, 2020). A person may also have trouble breathing or feel short of breath; feel sick or vomit; feel light-headed or faint; break out in a cold sweat; or look pale (Bousbiat, 2024; Horne *et al.*, 2000).



DIAGNOSTIC APPROACHES IN CARDIAC CARE

Accurate diagnosis is the foundation of effective cardiac treatment. Common diagnostic tools include Electrocardiography (ECG), echocardiography, stress testing, computed tomography (CT) coronary angiography, cardiac MRI, and laboratory biomarkers. These tools help detect structural and functional abnormalities, assess disease severity, and guide therapeutic decisions.

Electrocardiography (ECG or EKG)

Electrocardiography (ECG or EKG) is a technique used to record the electrical activity of the heart through sensors placed on the body surface (Ashley et al., 2004). It produces an electrocardiogram, which shows the heart's electrical signals over time (Rnmo, & Laguna, 2006). The ECG helps analyse the cardiac cycle, the sequence of events from one heartbeat to the next (Georgieva-Tsaneva et al., 2024). This cycle has two main phases: systole, when the heart contracts to pump blood to the body, and in diastole, heart relaxes and fills with blood. Blood pressure readings reflect these phases, with systolic pressure being higher than diastolic. The heartbeat marks the transition between these phases (Pollock, & Makaryus, 2022; Hirsch et al., 2024).

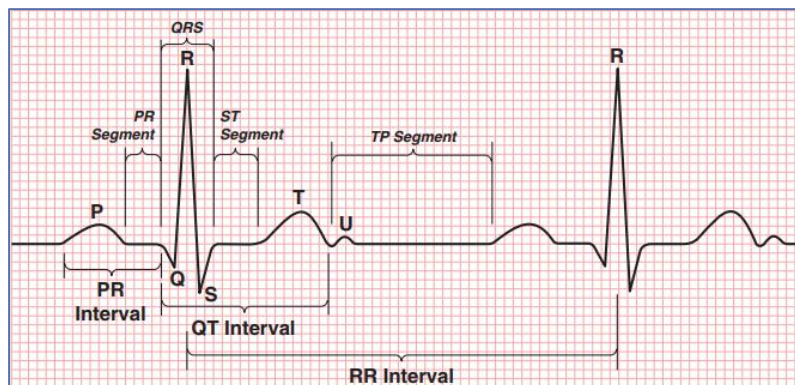


Figure 2: Summary of major components of the ECG graph. These can be grouped into 5 waveforms (P, QRS, ST, T, and U), 4 intervals (RR, PR, QRS, and QT) and 3 segments (PR, ST, and TP). Note that the ST can be considered as both a waveform and a segment. The RR interval is the same as the QRS–QRS interval. The TP segment is used as the isoelectric baseline, against which deviations in the PR segment (e.g., in acute pericarditis) and ST segment (e.g., in ischemia) are measured. 7th ed. St. Louis, CV Mosby, 2006.)

Echocardiogram: An echocardiogram is a diagnostic test that uses ultrasound, or harmless sound waves, to provide important information about the heart quickly and effectively (Omerovic, & Jain, 2020). It is commonly used to examine the size, shape, and functioning of the heart and its valves. The sound waves create moving images of the heart, allowing doctors to observe how the heart chambers and valves are working (Ghorbani et al., 2020). This imaging technique can also detect areas of the heart muscle that have weakened due to reduced blood supply or damage caused by a heart attack (Lai et al., 2006). Different types of echocardiogram are used to examine the heart in different ways.

- A **transthoracic echocardiogram (TTE)** is the most common and simple type, where a doctor moves a small device over the chest to create images of the heart (Grant et al., 2021).
- A **3-D echo** provides three-dimensional images and is useful for studying heart valves and the left ventricle (Wu et al., 2017).

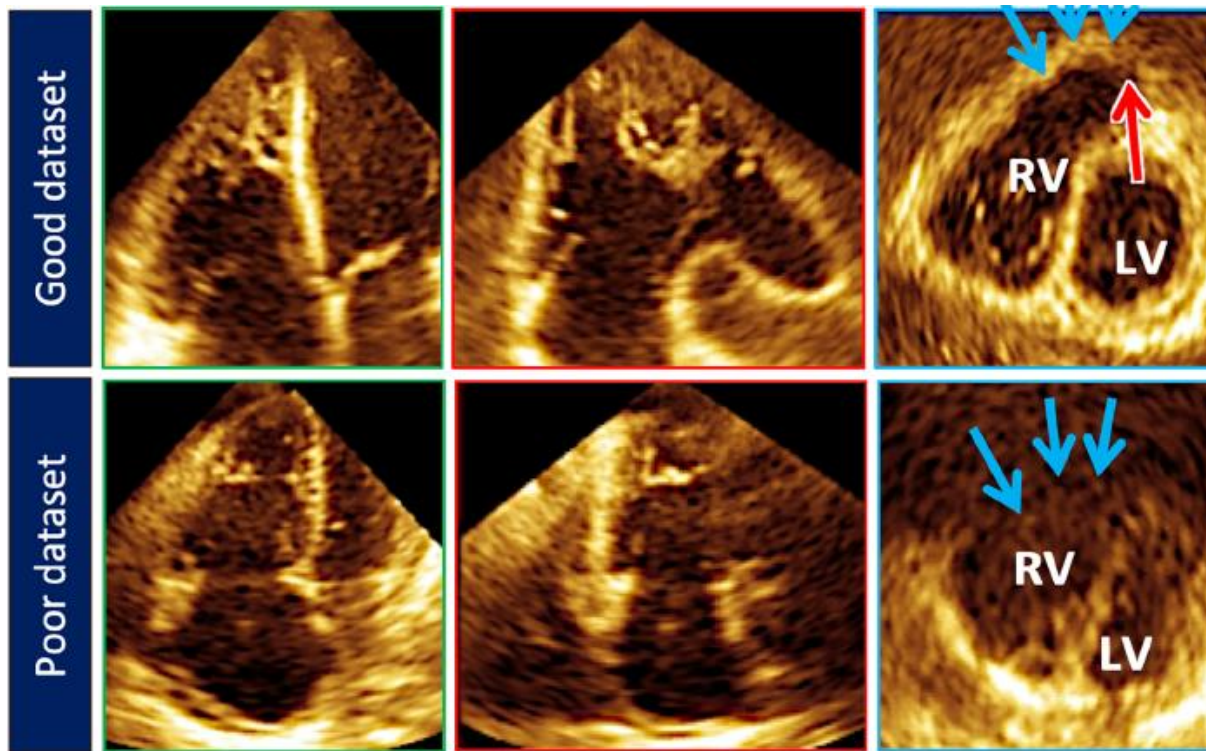


Figure 3: Top row illustrates cut planes through the optimal 3D right ventricular dataset. Note that the free-wall and right ventricular outflow tract borders (blue arrows) are well demarcated. Sometimes the pulmonary valve (red arrow) can be seen). Bottom row depicts a less than optimal 3D right ventricular dataset. The right ventricular outflow tract borders (blue arrows) are poorly seen. (Source: [Randazzo et al., 2023](#))

- c. An **intracardiac echocardiogram (ICE)** takes images from inside the heart and is mainly used during catheter-based procedures ([Hijazi et al., 2009](#); [Bruce & Friedman, 2001](#)).
- d. An **M-mode echocardiogram** gives a simple tracing-like image and helps measure heart size and wall thickness ([Feigenbaum, 2010](#)).
- e. A **stress echocardiogram** checks heart function before and after exercise or after medicine that increases heart activity ([Kosaraju et al., 2017](#)).
- f. A **transesophageal echocardiogram (TEE)** uses a probe passed through the mouth into the esophagus to get clearer images, especially when standard imaging is difficult ([Zhang et al., 2024](#)).
- g. A **Doppler echocardiogram** measures blood flow through the heart and helps detect valve or wall problems ([Anavekar et al., 2009](#)).

Computed tomography (CT) coronary angiography:

CTCA is a non-invasive imaging test used to examine the coronary arteries, which supply blood to the heart muscle. It is a specialized type of Computed tomography that uses X-rays and computer technology to create detailed images of the heart and its blood vessels ([Ramjattan et al., 2017](#)). During the procedure, a contrast dye is injected into a vein, which makes the coronary arteries visible on the scan. This allows doctors to detect narrowing, blockages, plaque buildup, or other abnormalities in the arteries. CT coronary angiography is commonly used to evaluate patients with chest pain, suspected coronary artery disease, or to assess heart-related conditions without requiring invasive catheterization ([Rossi et al. 2014](#); [Camacho-Mondragon et al., 2025](#)).

Cardiac MRI (Magnetic Resonance Imaging of the heart):

Cardiac MRI is a non-invasive imaging technique used to produce detailed images of the heart and surrounding blood vessels using a strong magnetic field, radio waves, and computer processing. It provides accurate information about the structure and function of the heart, including the chambers, valves, heart muscle, and major vessels, without using ionizing radiation ([Saeed](#)

[et al., 2015](#)). This imaging method is widely used to diagnose various cardiovascular conditions such as Cardiomyopathy, congenital heart defects, heart muscle inflammation, and tissue damage after Myocardial Infarction ([Popa et al., 2024](#)). During the procedure, the patient lies inside an MRI scanner, and in some cases a contrast agent is administered to improve image quality ([Ibrahim et al., 2023](#)). Cardiac MRI is highly valuable because it offers precise assessment of heart anatomy, blood flow, and tissue health, making it an important tool for diagnosis, treatment planning, and follow-up of heart diseases ([De Maria et al., 2017](#)).

Laboratory Biomarkers

Cardiac troponins (cTnI and cTnT) are considered the gold standard biomarkers because of their high specificity and sensitivity to heart muscle injury (Leite et al., 2022). These proteins are released into the bloodstream when cardiac cells are damaged and are widely used in clinical diagnosis. Other traditional biomarkers include creatine kinase-MB (CK-MB), myoglobin, and B-type natriuretic peptide (BNP), which help in assessing myocardial injury and cardiac stress. The review also highlights emerging biomarkers such as heart-type fatty acid-binding protein (H-FABP), matrix metalloproteinases (MMPs), and circulating microRNAs (miRNAs), which show promise for earlier and more accurate detection of acute cardiac events. These biomarkers are particularly valuable because some of them appear in blood within the first few hours of infarction, enabling rapid diagnosis (Kumari et al., 2026; Pourali, & Omidi, 2022).

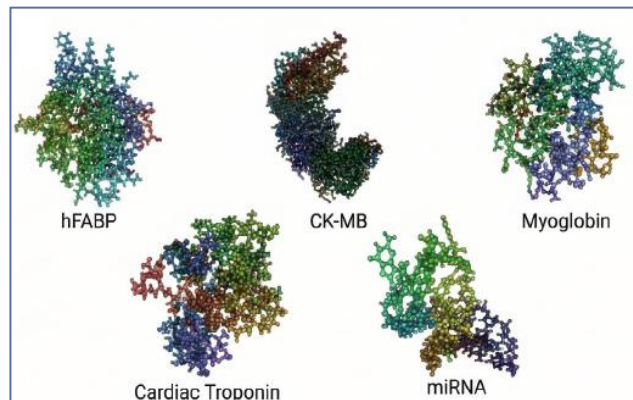


Figure 4: Biomarkers released during injury used for CVDs detection ([Kumari et al., 2026](#))

Advanced imaging techniques provide detailed insights into myocardial function, coronary circulation, and vascular integrity. Biomarkers such as troponin, BNP, and lipid profiles assist in early diagnosis and prognosis (Netala et al., 2025). Genetic and molecular diagnostics are also emerging as important tools for identifying inherited cardiac disorders and risk factors (Stafford et al., 2022). Artificial intelligence enhances diagnostic precision by interpreting large datasets and reducing human error (Fahim et al., 2025).

All above are the diagnosis techniques by which heart disease identification occur. But after identification if critical condition seen by the doctors that unable to treat by the medicine then surgical operations are required to treat CVDs. Treatment of cardiovascular diseases often involves a range of surgical procedures and medical devices depending on the severity of the condition.

THERAPEUTIC STRATEGIES

Therapeutic interventions in integrated cardiac care involve lifestyle modification, pharmacotherapy, interventional procedures, and surgical management. Lifestyle changes such as exercise, smoking cessation, weight management, and heart-healthy diets are essential preventive strategies ([Nguyen, & Michelis, 2025](#)).

Patients with Cardiovascular Disease should have access to appropriate healthcare technologies and essential medications for effective treatment and prevention of complications ([Wirtz et al., 2016](#)). Basic medicines commonly used in managing cardiovascular conditions include Aspirin (acetylsalicylic acid) to reduce blood clot formation, beta-blockers to control heart rate and blood pressure, calcium channel blockers to improve blood flow, angiotensin-converting enzyme inhibitors to relax blood vessels, diuretics to remove excess fluid, and Statins to lower cholesterol levels ([Asirvatham et al., 1998](#); [Viana et al., 2014](#); [Berger et al., 2003](#)). These medicines help manage symptoms, reduce risk factors, and prevent progression of heart

disease. In addition, acute cardiovascular events such as Myocardial Infarction or Stroke require immediate medical attention and prompt management to minimize organ damage, improve survival, and reduce long-term complications ([WHO, 2026](#)).

Common surgical interventions include **coronary artery bypass surgery**, which restores blood flow to the heart by bypassing blocked arteries ([Mullany, 2003](#)); **balloon angioplasty**, where a small balloon is inserted through an artery and inflated to open narrowed or blocked blood vessels ([Dündar et al., 2004](#)); **heart valve repair or replacement** to correct damaged valves ([Byrne et al., 2017](#)); and in severe cases, **heart transplantation** or **artificial heart implantation** for patients with advanced heart failure ([Beyersdorf, 2009](#)). In addition to surgical treatments, several medical devices play a crucial role in managing cardiovascular disorders, including Pacemaker to regulate abnormal heart rhythms, prosthetic valves to replace damaged natural valves, and specialized patches used to close congenital holes or defects in the heart ([Netala et al., 2024](#); [Tabassum et al., 2025](#)). The key to cardiovascular disease reduction lies in the inclusion of cardiovascular disease management interventions in universal health coverage packages, although in a high number of countries health systems require significant investment and reorientation to effectively manage CVDs ([Mendis et al., 2022](#)).

Evidence from 18 countries has shown that hypertension programmes can be implemented efficiently and cost-effectively at the primary care level which will ultimately result in reduced coronary heart disease and stroke. Patients with cardiovascular disease should have access to appropriate technology and medication. Basic medicines that should be available such as aspirin, beta-blockers, calcium channel blockers, angiotensin-converting enzyme inhibitors, diuretics, and statins ([Garcia et al., 2026](#); [Lin et al., 2025](#)). An acute event such as a heart attack or stroke should be promptly managed.

PATIENT MONITORING AND FOLLOW-UP

To reduce the risk of recurrent CVDs, patients should follow evidence-based secondary prevention strategies as part of long-term cardiac care ([Sigamani, & Gupta, 2022](#)). Adherence to prescribed medications is essential, as drugs such as antiplatelet agents, beta-blockers, statins, and antihypertensive medications play a significant role in lowering the risk of future cardiac events ([Kronish, & Ye, 2013](#)). Regular follow-up visits with healthcare professionals are equally important for monitoring recovery, evaluating cardiac function, and adjusting treatment plans when needed ([Shan et al., 2023](#)). Participation in a structured cardiac rehabilitation program is strongly recommended, as these medically supervised programs support recovery through exercise training, patient education, and lifestyle modification ([Tessler et al., 2025](#)). In addition, effective control of modifiable risk factors including smoking cessation, maintaining a heart-healthy diet, engaging in regular physical activity, and managing blood pressure, cholesterol, and blood glucose levels is crucial for preventing further cardiovascular complications ([Ghodeswar et al., 2023](#); [Rippe et al., 2019](#)). Psychosocial support is also an important aspect of recovery, as many patient's experience anxiety, stress, or depression after a heart attack; support from family members, caregivers, and peer groups can improve emotional well-being and coping capacity ([Acoba, 2024](#); [Agarwal et al., 2025](#)).

Continuous patient monitoring further strengthens integrated cardiac care by enabling timely assessment of the patient's condition beyond hospital settings ([Juez-Garcia et al., 2025](#)). Modern wearable devices, remote monitoring systems, and teleconsultation platforms allow real-time tracking of vital physiological parameters such as heart rate, blood pressure, and oxygen saturation ([Li et al., 2025](#)). These technologies improve treatment adherence, facilitate early detection of complications, and help reduce hospital readmissions ([Kurul et al., 2025](#)). Furthermore, wearable systems integrated with cloud-based analytics and artificial intelligence can identify abnormal patterns and alert clinicians for early intervention ([Shajari et al., 2023](#)). Telemedicine has also emerged as an important tool for extending specialized cardiac care to rural and underserved populations, thereby improving accessibility and supporting more efficient long-term management of cardiovascular disease ([Tolu-Akinnawo et al., 2024](#); [Parthasarathi et al., 2024](#)).

MULTIDISCIPLINARY TEAM APPROACH

Integrated cardiac care requires collaboration among multiple healthcare professionals, including cardiologists, cardiac surgeons, nurses, pharmacists, dietitians, and psychologists. This multidisciplinary model ensures holistic patient management by addressing medical, nutritional, psychological, and rehabilitative needs (Liu, & Li, 2026; Bakhshayesh *et al.*, 2025).

The Heart Team (HT) approach, recommended for the management of cardiovascular diseases, highlights the importance of multidisciplinary collaboration among healthcare professionals. This integrated model brings together specialists from different fields to support comprehensive clinical decision-making (Arjomandi Rad *et al.*, 2025). Although the HT approach has shown

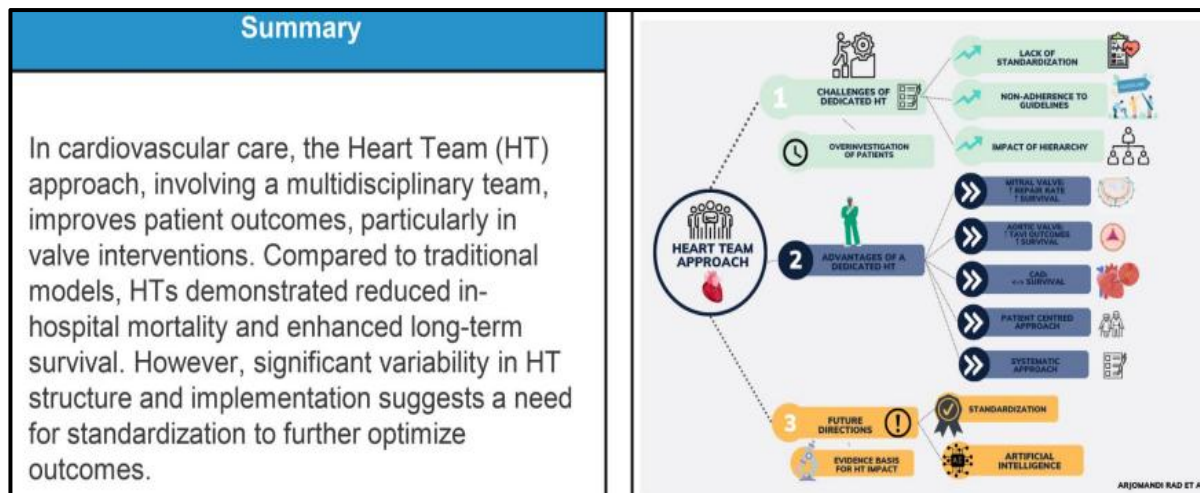


Figure 5: Multidisciplinary Heart Team (Arjomandi Rad *et al.*, 2025)

significant potential in improving patient care, evidence regarding its overall effectiveness and implementation remains limited and variable across settings. Current studies indicate that the Heart Team model contributes to better patient outcomes, particularly in complex cardiovascular interventions, including the management of mitral and aortic valve diseases as well as coronary artery disease (Akram *et al.*, 2025; Arjomandi Rad *et al.*, 2025). Collaborative care enhances communication, reduces treatment delays, and improves patient satisfaction. It also supports shared decision-making and personalized care planning.

CONCLUSION

A contemporary and all-encompassing strategy for the prevention, diagnosis, treatment, and long-term management of cardiovascular illnesses is integrated cardiac care. This model enhances the effectiveness and quality of cardiovascular healthcare by integrating cutting-edge diagnostic methods, evidence-based treatment approaches, ongoing patient monitoring, and interdisciplinary cooperation. Early identification and prompt intervention have been greatly improved by the use of technologies like ECG, echocardiography, CT coronary angiography, cardiac MRI, laboratory biomarkers, wearable technology, and telemedicine.

Furthermore, patient-centered follow-up techniques, including as medication adherence, lifestyle modification, cardiac rehabilitation, and psychological support, are essential for lowering recurrent cardiac events and enhancing overall results. By combining the knowledge of multiple medical specialists, the multidisciplinary Heart Team method enhances decision-making in challenging circumstances. Integrated cardiac care has great prospects to lower cardiovascular morbidity and mortality while guaranteeing accessible, effective, and individualised care for patients, despite ongoing implementation problems, particularly in areas with limited resources.

REFERENCES

1. Abdo Ahmed, A. A., Mohammed Al-Shami, A., Jamshed, S., Fata Nahas, A. R., & Mohamed Ibrahim, M. I. (2020). Public awareness of and action towards heart attack symptoms: an exploratory study. *International journal of environmental research and public health*, 17(23), 8982.

2. Acoba, E. F. (2024). Social support and mental health: the mediating role of perceived stress. *Frontiers in psychology*, 15, 1330720.
3. Agarwal, S., Wagner, M. K., & Mion, M. (2025). Psychological and behavioral dimensions in cardiac arrest survivors and their families: a state-of-the-art review. *Neurotherapeutics*, 22(1), e00509.
4. Akram, M. F., Burgess, A. L., Stickland, D., Willekes, C. L., McNamara, R. F., & McNamara, D. A. (2025). Designing and Implementing a Heart Team: Institutional Experiences Over the Past 10 Years. *Journal of the Society for Cardiovascular Angiography & Interventions*, 103918.
5. Almutairi, M., Almutairi, A. A., & Alodhialah, A. M. (2025). The Influence of Lifestyle Modifications on Cardiovascular Outcomes in Older Adults: Findings from a Cross-Sectional Study. *Life*, 15(1), 87.
6. Anavekar, N. S., & Oh, J. K. (2009). Doppler echocardiography: a contemporary review. *Journal of cardiology*, 54(3), 347-358.
7. Arjomandi Rad, A., Streukens, S., Vainer, J., Athanasiou, T., Maessen, J., & Sardari Nia, P. (2025). The current state of the multidisciplinary heart team approach: a systematic review. *European Journal of Cardio-Thoracic Surgery*, 67(1), ezae461.
8. Ashley, E. A., Ashley, E., & Niebauer, J. (2004). *Cardiology explained*.
9. Asirvatham, S., Sebastian, C., & Thadani, U. (1998). Choosing the most appropriate treatment for stable angina: Safety considerations. *Drug Safety*, 19(1), 23-44.
10. Bakhshayesh, S., Gholoobi, A., Moulaei, K., Khoshrounejad, F., Mazaheri Habibi, M. R., Ebnehoseini, Z., & Eslami, S. (2025). From hospital to home: a comprehensive platform supporting cardiac rehabilitation post-revascularization. *BMC Medical Informatics and Decision Making*, 25(1), 225.
11. Berger, A. K., Duval, S., & Krumholz, H. M. (2003). Aspirin, beta-blocker, and angiotensin-converting enzyme inhibitor therapy in patients with end-stage renal disease and an acute myocardial infarction. *Journal of the American College of Cardiology*, 42(2), 201-208.
12. Beyersdorf, F. (2009). Heart transplant and artificial heart systems. *Deutsches Arzteblatt International*, 106(28-29), 469.
13. Bousbiat, I. (2024). The Digital Heartbeat: A Qualitative Descriptive Study on Women's Views of Xi-Care in Preventive Cardiovascular Diseases in Primary Care.
14. Bruce, C. J., & Friedman, P. A. (2001). Intracardiac echocardiography. *European Journal of Echocardiography*, 2(4), 234-244.
15. Buttar, H. S., Li, T., & Ravi, N. (2005). Prevention of cardiovascular diseases: Role of exercise, dietary interventions, obesity and smoking cessation. *Experimental & clinical cardiology*, 10(4), 229.
16. Byrne, R. A., Stone, G. W., Ormiston, J., & Kastrati, A. (2017). Coronary balloon angioplasty, stents, and scaffolds. *The Lancet*, 390(10096), 781-792.
17. Camacho-Mondragon, C. G., Ibarrola-Peña, J. C., Lira-Lozano, D., Jerjes-Sanchez, C., De la Pena-Almaguer, E., & Paredes-Vazquez, J. G. (2025). Clinical Applications of Cardiac Computed Tomography: A Focused Review for the Clinical Cardiologists. *Journal of Cardiovascular Development and Disease*, 12(10), 375.

18. Chaturvedi, A., Zhu, A., Gadela, N. V., Prabhakaran, D., & Jafar, T. H. (2024). Social determinants of health and disparities in hypertension and cardiovascular diseases. *Hypertension*, 81(3), 387-399.
19. De Maria, E., Aldrovandi, A., Borghi, A., Modonesi, L., & Cappelli, S. (2017). Cardiac magnetic resonance imaging: Which information is useful for the arrhythmologist?. *World journal of cardiology*, 9(10), 773.
20. Dewidar, O., Abdi, A., Sabri, H., Dawit, H., Philip, S., Barbeau, V., & MacLeod, K. K. (2025). Interventions to Enhance Early Recognition and Management of Mental Health Symptoms in Patients with Cardiovascular Disease: A Rapid Scoping Review. *CJC Open*.
21. Dündar, Y., Hill, R. A., Bakhai, A., Dickson, R., & Walley, T. (2004). Angioplasty and stents in coronary artery disease: a systematic review and meta-analysis. *Scandinavian Cardiovascular Journal*, 38(4), 200-210.
22. Fahim, Y. A., Hasani, I. W., Kabba, S., & Ragab, W. M. (2025). Artificial intelligence in healthcare and medicine: clinical applications, therapeutic advances, and future perspectives. *European Journal of Medical Research*, 30(1), 848.
23. Feigenbaum, H. (2010). Role of M-mode technique in today's echocardiography. *Journal of the American Society of Echocardiography*, 23(3), 240-257.
24. Garcia, W., Amosior, O., Choudhury, S. R., Sambo, E., Osi, K., Beshah, S. A., & Moran, A. E. (2026). Budget Impact and Investment Case for HEARTS Hypertension Control Programs in 4 Low-and Middle-Income Countries. *JACC: Advances*, 5(1), 102412.
25. Georgieva-Tsaneva, G., Gospodinova, E., & Cheshmedzhiev, K. (2024). Examination of cardiac activity with ECG monitoring using heart rate variability methods. *Diagnostics*, 14(9), 926.
26. Gherman, A., Andrei, D., Popoiu, C. M., Stoicescu, E. R., Levai, M. C., Stoian, I. I., & Bloancă, V. (2025). Multidisciplinary telemedicine in healthcare during and after the COVID-19 pandemic: a narrative review. *Life*, 15(5), 783.
27. Ghodeswar, G. K., Dube, A., Khobragade, D., & Dube, A. H. (2023). Impact of lifestyle modifications on cardiovascular health: a narrative review. *Cureus*, 15(7).
28. Ghorbani, A., Ouyang, D., Abid, A., He, B., Chen, J. H., Harrington, R. A., & Zou, J. Y. (2020). Deep learning interpretation of echocardiograms. *NPJ digital medicine*, 3(1), 10.
29. Grant, M. D., Mann, R. D., Kristenson, S. D., Buck, R. M., Mendoza, J. D., Reese, J. M., & Roberge, E. A. (2021). Transthoracic echocardiography: beginner's guide with emphasis on blind spots as identified with CT and MRI. *Radiographics*, 41(4), 1022-1042.
30. Hijazi, Z. M., Shivkumar, K., & Sahn, D. J. (2009). Intracardiac echocardiography during interventional and electrophysiological cardiac catheterization. *Circulation*, 119(4), 587-596.
31. Hirsch, K. G., Abella, B. S., Amorim, E., Bader, M. K., Barletta, J. F., Berg, K., ... & American Heart Association, Neurocritical Care Society. (2024). Critical care management of patients after cardiac arrest: a scientific statement from the American Heart Association and Neurocritical Care Society. *Neurocritical care*, 40(1), 1-37.
32. Horne, R., James, D., Petrie, K., Weinman, J., & Vincent, R. (2000). Patients' interpretation of symptoms as a cause of delay in reaching hospital during acute myocardial infarction. *Heart*, 83(4), 388-393.
33. Ibrahim, M. A., Hazhirkarzar, B., & Dublin, A. B. (2023). Gadolinium magnetic resonance imaging. In *StatPearls* [internet]. StatPearls Publishing.

34. Juez-Garcia, I., Benítez, I. D., Torres, G., González, J., Utrillo, L., Pérez, A., & de Batlle, J. (2025). Continuous vital sign monitoring for predicting hospital length of stay: a feasibility study in chronic obstructive pulmonary disease and chronic heart failure patients. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, 33(1), 150.
35. Kelly, F. J., & Fussell, J. C. (2015). Air pollution and public health: emerging hazards and improved understanding of risk. *Environmental geochemistry and health*, 37(4), 631-649.
36. Khan, N., Akbar, A., Fahad, S., Faisal, S., & Naushad, M. (2020). Analysis of heart treatment and its impact on socioeconomic conditions on the world Community. Available at SSRN 3727588.
37. Kosaraju, A., Muppidi, V., & Makaryus, A. N. (2017). Stress Echocardiography.
38. Kronish, I. M., & Ye, S. (2013). Adherence to cardiovascular medications: lessons learned and future directions. *Progress in cardiovascular diseases*, 55(6), 590-600.
39. Kumari, V., Sharma, A., Rizvi, S. O., Subha, G., Bhardwaj, P., & Kumar, S. (2026). Advances in Biosensors for Detection of Myocardial Infarction: A Comprehensive Review. *Analysis & Sensing*, 6(3), e70081.
40. Kurul, F., Aydoğan, D., Janat, S., Kirlangic, I. A., Kaya, H. O., & Topkaya, S. N. (2025). Wearable Sensors for Health Monitoring: Current Applications, Trends, and Future Directions. *Biosensors and Bioelectronics*: X, 100727.
41. Lai, W. W., Geva, T., Shirali, G. S., Frommelt, P. C., Humes, R. A., Brook, M. M., & Rychik, J. (2006). Guidelines and standards for performance of a pediatric echocardiogram: a report from the Task Force of the Pediatric Council of the American Society of Echocardiography. *Journal of the American Society of Echocardiography*, 19(12), 1413-1430.
42. Leite, L., Matos, P., Leon-Justel, A., Espirito-Santo, C., Rodriguez-Padial, L., Rodrigues, F., & Redon, J. (2022). High sensitivity troponins: a potential biomarkers of cardiovascular risk for primary prevention. *Frontiers In Cardiovascular Medicine*, 9, 1054959.
43. Li, B., Huang, Y., Mao, W., Liu, J., & Ma, Q. (2025). Applications and Prospects of Digital Health Technologies in Cardiovascular Nursing: Smart Devices, Remote Monitoring, and Personalized Care. *Journal of Multidisciplinary Healthcare*, 6275-6286.
44. Lin, S., Lin, L., Peng, W., Liu, X., Li, X., Lu, J., & Wu, S. (2025). Cost-effectiveness of cardiovascular risk assessment and management among adults with hypertension in China: A modelling study. *American Journal of Preventive Cardiology*, 22, 101007.
45. Liu, Q., & Li, Z. (2026). Multidisciplinary Collaborative Nursing Management Improves Health Behaviors and Psychological Status in Patients with Diabetes Mellitus and Coronary Heart Disease. *Journal of Multidisciplinary Healthcare*, 1-13.
46. Longden, T. A., & Lederer, W. J. (2024). Electro-metabolic signaling. *Journal of General Physiology*, 156(2), e202313451.
47. Lopez, E. O., Ballard, B. D., & Jan, A. (2023). Cardiovascular disease. In StatPearls [Internet]. StatPearls Publishing.
48. Machado, A. M., Leite, F., & Pereira, M. G. (2025, February). Integrated care in atrial fibrillation: a multidisciplinary approach to improve clinical outcomes and quality of life. In *Healthcare* (Vol. 13, No. 3, p. 325). MDPI.
49. Masoudkabar, F., Mohammadifard, N., Mani, A., Ignaszewski, A., Davis, M. K., Vaseghi, G., & Sarrafzadegan, N. (2023). Shared Lifestyle-Related Risk Factors of Cardiovascular Disease and Cancer: Evidence for Joint Prevention. *The Scientific World Journal*, 2023(1), 2404806.

50. Mendis, S., Graham, I., & Narula, J. (2022). Addressing the global burden of cardiovascular diseases; need for scalable and sustainable frameworks. *Global Heart*, 17(1), 48.
51. Mullany, C. J. (2003). Coronary artery bypass surgery. *Circulation*, 107(3), e21-e22.
52. Netala, V. R., Hou, T., Wang, Y., Zhang, Z., & Teertam, S. K. (2025). Cardiovascular biomarkers: tools for precision diagnosis and prognosis. *International journal of molecular sciences*, 26(7), 3218.
53. Netala, V. R., Teertam, S. K., Li, H., & Zhang, Z. (2024). A comprehensive review of cardiovascular disease management: cardiac biomarkers, imaging modalities, pharmacotherapy, surgical interventions, and herbal remedies. *Cells*, 13(17), 1471.
54. Nguyen, N., & Michelis, K. C. (2025). Pharmacotherapy, lifestyle modification, and cardiac rehabilitation after myocardial infarction or percutaneous intervention. *US Cardiology Review*, 19, e01.
55. Omerovic, S., & Jain, A. (2020). Echocardiogram.
56. Parthasarathi, A., George, T., Kalimuth, M. B., Jayasimha, S., Ullah, M. K., Patil, R., ... & Mahesh, P. A. (2024). Exploring the potential of telemedicine for improved primary healthcare in India: a comprehensive review. *The Lancet Regional Health-Southeast Asia*, 27.
57. Pollock, J. D., & Makaryus, A. N. (2022). Physiology, cardiac cycle. In StatPearls [Internet]. StatPearls Publishing.
58. Popa, O. A., Amzulescu, M., Bugeac, C., Tomescu, L., Slavu, I. M., Gheorghita, V., & Tulin, A. (2024). Cardiovascular magnetic resonance imaging in myocardial disease. *Cureus*, 16(4), e58688.
59. Pourali, A., & Omid, Y. (2022). Diagnosis of acute myocardial infarction: highlighting cardiac troponins as vital biomarkers. *BioImpacts: BI*, 13(2), 85.
60. Ramjattan, N. A., Lala, V., Kousa, O., & Makaryus, A. N. (2017). Coronary CT angiography.
61. Randazzo, M., Maffessanti, F., Kotta, A., Grapsa, J., Lang, R. M., & Addetia, K. (2023). Added value of 3D echocardiography in the diagnosis and prognostication of patients with right ventricular dysfunction. *Frontiers in cardiovascular medicine*, 10, 1263864.
62. Rippe, J. M., & Angelopoulos, T. J. (2019). Lifestyle strategies for risk factor reduction, prevention and treatment of cardiovascular disease. *Lifestyle medicine*, third edition, 19-36.
63. Rnmo, L. S., & Laguna, P. (2006). Electrocardiogram (ECG) signal processing. In *Wiley Encyclopedia Biomed. Eng.* (pp. 1-16).
64. Rosengren, A., Smyth, A., Rangarajan, S., Ramasundarahettige, C., Bangdiwala, S. I., AlHabib, K. F., & Yusuf, S. (2019). Socioeconomic status and risk of cardiovascular disease in 20 low-income, middle-income, and high-income countries: the Prospective Urban Rural Epidemiologic (PURE) study. *The Lancet Global Health*, 7(6), e748-e760.
65. Rossi, A., Papadopoulou, S. L., Pugliese, F., Russo, B., Dharampal, A. S., Dedic, A., & De Feyter, P. J. (2014). Quantitative computed tomographic coronary angiography: does it predict functionally significant coronary stenoses?. *Circulation: Cardiovascular Imaging*, 7(1), 43-51.
66. Saeed, M., Van, T. A., Krug, R., Hetts, S. W., & Wilson, M. W. (2015). Cardiac MR imaging: current status and future direction. *Cardiovascular diagnosis and therapy*, 5(4), 290.
67. Samuel, P. O., Edo, G. I., Emakpor, O. L., Oloni, G. O., Ezekiel, G. O., Essaghah, A. E. A., ... & Agbo, J. J. (2024).

- Lifestyle modifications for preventing and managing cardiovascular diseases. *Sport Sciences for Health*, 20(1), 23-36.
68. Seedat, Y. K. (2007). Impact of poverty on hypertension and cardiovascular disease in sub-Saharan Africa. *Cardiovascular journal of Africa*, 18(5), 316-320.
 69. Shajari, S., Kuruvinashetti, K., Komeili, A., & Sundararaj, U. (2023). The emergence of AI-based wearable sensors for digital health technology: a review. *Sensors*, 23(23), 9498.
 70. Shan, Y., Chen, J., Zhou, S., & Wen, G. (2023). Nursing interventions and care strategies for patients with coronary heart disease: A comprehensive review. *Galen Medical Journal*, 12, e2994.
 71. Sigamani, A., & Gupta, R. (2022). Revisiting secondary prevention in coronary heart disease. *Indian heart journal*, 74(6), 431-440.
 72. Stafford, F., Krishnan, N., Richardson, E., Butters, A., Hespe, S., Burns, C., & Ingles, J. (2022). The role of genetic testing in diagnosis and care of inherited cardiac conditions in a specialised multidisciplinary clinic. *Genome Medicine*, 14(1), 145.
 73. Susanti, R. D., Halimah, E., Komariah, M., Maisyarah, I. T., Togatorop, V. E., & Megatami, N. (2025). Traditional Remedies for Cardiovascular Diseases in Asia: A Scoping Review of Mind-Body and Herbal Interventions. *Journal of Multidisciplinary Healthcare*, 5249-5262.
 74. Tabassum, A., Phillips, K. G., Hage, F., & Hage, A. (2025). Prosthetic heart valves: more than half a century of innovation—an overview. *Journal of Clinical Medicine*, 14(10), 3499.
 75. Tessler, J., Ahmed, I., & Bordoni, B. (2025). Cardiac rehabilitation. In *StatPearls* [Internet]. StatPearls Publishing.
 76. Tolu-Akinnawo, O., Ezekwueme, F., & Awoyemi, T. (2024). Telemedicine in cardiology: enhancing access to care and improving patient outcomes. *Cureus*, 16(6).
 77. Viana, M., Laszczynska, O., Mendes, S., Friões, F., Lourenço, P., Bettencourt, P., & Azevedo, A. (2014). Medication adherence to specific drug classes in chronic heart failure. *Journal of Managed Care Pharmacy*, 20(10), 1018-1026.
 78. WHO, (2026). Cardiovascular diseases (CVDs). [https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-\(cvds\)](https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds))
 79. Wirtz, V. J., Kaplan, W. A., Kwan, G. F., & Laing, R. O. (2016). Access to medications for cardiovascular diseases in low-and middle-income countries. *Circulation*, 133(21), 2076-2085.
 80. Wu, V. C. C., & Takeuchi, M. (2017). Three-dimensional echocardiography: current status and real-life applications. *Acta Cardiologica Sinica*, 33(2), 107.
 81. Zhang, L., Xie, Y., Ren, Z., & Xie, M. (2024). Transesophageal echocardiography related complications. *Frontiers in Cardiovascular Medicine*, 11, 1410594.