

# SYSTEMATIC REVIEW OF HEALTHCARE SERVICES IN PATIENTS WITH CARDIOVASCULAR PROBLEMS

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## ABSTRACT

### INTRODUCTION:

Cardiovascular disease is a type of disease that affects the blood vessels and heart. The global movement from infectious diseases to chronic diseases is a global problem that will result in a decline in the life quality and a rise in the need for services such as rehabilitation services. This research aimed to evaluate healthcare services, defined as the provision, management, and delivery of medical, rehabilitative, and supportive interventions designed to maintain or improve patients' health and quality of life, in patients with cardiovascular disease. This research aimed to evaluate healthcare services, defined as the provision, management, and delivery of medical, rehabilitative, and supportive interventions designed to maintain or improve patients' health and quality of life, in patients with cardiovascular disease.

### METHODS:

40 published articles between 1990 and 2025 were evaluated with key words including "Nursing Services", "Healthcare Services", and "Cardiovascular Problems" in MEDLINE (PubMed and Ovid), Web of Science, and Scopus databases.

### RESULTS:

The frequency of availability of complete medications and equipment related to cardiac patients in ambulances was 81% (ES: 81%, 95% CI; -1.05, 2.66). The patient's family in the field of rehabilitation and post-discharge care, along with the follow-up implementation of educational programs, increases the patient's quality of life and subsequently the quality of care by 91% (ES: 91%, 95% CI, 87%-95%).

### CONCLUSION:

Family-centered education, community awareness, and optimized use of health information systems significantly improve quality of care and life for patients with cardiovascular disease. Family-centered education, community awareness, and optimized use of health information systems significantly improve quality of care and life for patients with cardiovascular disease.

### KEYWORDS

cardiovascular diseases, quality of life, delivery of health care

## INTRODUCTION

Coronary artery disease (CAD) is a type of heart disease in which the arteries in the heart become blocked and are unable to supply enough oxygen-rich blood to the heart and its muscles. Coronary artery disease is the most common heart disease. According to the World Health Organization, cardiovascular diseases, including CAD, are responsible for an estimated 17.9 million deaths annually, representing 32% of all global deaths [1]. Coronary artery disease is often caused by a buildup of plaque in the walls of blood vessels leading to the heart and can lead to heart failure or even a heart attack. In 2019, Li and colleagues investigated the effect of respiratory motion on end-diastolic, systolic, and ejection fraction volumes and respiratory gating correction on them. To examine the ejection fraction and volumes, they divided the respiratory motion cycle into two parts: inspiration and expiration and concluded that expiratory breathing increases the right ventricular ejection fraction and decreases the left ventricular ejection fraction but has no effect on the right ventricular end-systolic volume [2].

Studies have shown that effective management of healthcare services in cardiovascular patients plays an important role in preventing complications, improving quality of life, and reducing the financial burden on healthcare systems[3]. According to the findings of various studies, providing regular health services, continuous monitoring of patients' condition, and using modern diagnostic and therapeutic methods can reduce the complications of cardiovascular diseases. With coordination between medical teams and careful follow-up of patients, the effectiveness of treatment increases and, as a result, it will affect patient satisfaction [4].

Health services for this group of patients include a wide range of measures, from primary prevention and early screening to emergency care, drug and interventional treatments, cardiac rehabilitation, and long-term follow-up. The quality of these services, the extent to which patients access them, and the extent to which care is consistent with clinical guidelines can play a decisive role in improving clinical outcomes, reducing mortality, and enhancing patients' quality of life [3]. However, evidence suggests that widespread inequalities in service delivery persist; This is particularly true in low- and middle-income countries, where access to medicines and secondary care is more limited. Economic, social, and geographical differences also affect patients' access to effective care [6]. Evaluation of health services for cardiovascular patients requires attention to continuity of care, patient adherence to treatment, and the use of multidisciplinary approaches. A systematic review can provide a clear understanding of existing gaps and offer opportunities to improve the quality of care for cardiovascular patients [7,8].

Given the importance of providing optimal health services, a systematic literature review is a method that can provide a clear picture of the current status of healthcare service management in cardiovascular patients and identify strengths and weaknesses in this field [5]. In this context, "management of healthcare services" refers to the planning, implementation, and evaluation of strategies and interventions aimed at improving the accessibility, quality, and effectiveness of care for cardiovascular patients. Accordingly, the present study aimed to systematically evaluate the organization and delivery of healthcare services for patients with cardiovascular problems, identify gaps in service provision, and highlight areas for improvement.

## MATERIAL AND METHOD

### INFORMATION SOURCES AND SEARCH STRATEGY:

In the current systematic review and meta-analysis study, 40 articles published between 1990 and 2025 were reviewed using key words such as nursing services, healthcare services, and cardiovascular problems in international databases such as MEDLINE (PubMed and Ovid), Web of Science, and Scopus. The keywords were standardised in Mesh and used for searches. In addition, the reference lists of the selected publications were examined for relevant research.

**Mesh key words:** (("Nursing Services"[Mesh] OR "Nursing Service, Hospital"[Mesh]) AND ( "Delivery of Health Care"[Mesh] OR "Health Services Research"[Mesh] OR "Community Health Services"[Mesh] )) AND ( "Cardiovascular Nursing"[Mesh] OR

"Cardiovascular Infections"[Mesh] OR "Models, Cardiovascular"[Mesh] OR "Cardiovascular Diseases"[Mesh] OR "Heart Disease Risk Factors"[Mesh] OR "Cardiology"[Mesh] ).

## INCLUSION AND EXCLUSION CRITERIA

Studies that addressed the provision or management of healthcare services in patients with cardiovascular disease, that had sufficient data to assess the effectiveness or quality of healthcare services, that had full text access, and that were published in English were included. Letters to the editor, abstracts, conference papers, case reports, articles with incomplete data, and retracted articles were excluded from the selection.

## DATA COLLECTION

The search technique was as follows: initially, a list of titles and abstracts for all papers found in the databases under evaluation was created. This work was completed separately by two experts. Then, items with duplicate titles were deleted. Next, the abstracts of the papers were evaluated to discover eligible studies, and all of the found studies were saved in Clarivate's EndNote X8 program. To ensure methodological rigor and minimize potential bias, a quality assessment of all selected studies was conducted. Recognized appraisal tools appropriate to each study design were applied, including the Cochrane Risk of Bias tool for randomized or interventional studies, the Newcastle-Ottawa Scale for observational studies, and the AMSTAR 2 tool for systematic reviews. Each study was independently evaluated by two reviewers, and any discrepancies were resolved through discussion. The assessment focused on key domains such as study design, sample size, participant selection, measurement of outcomes, and completeness of data reporting.

## DATA ANALYSIS

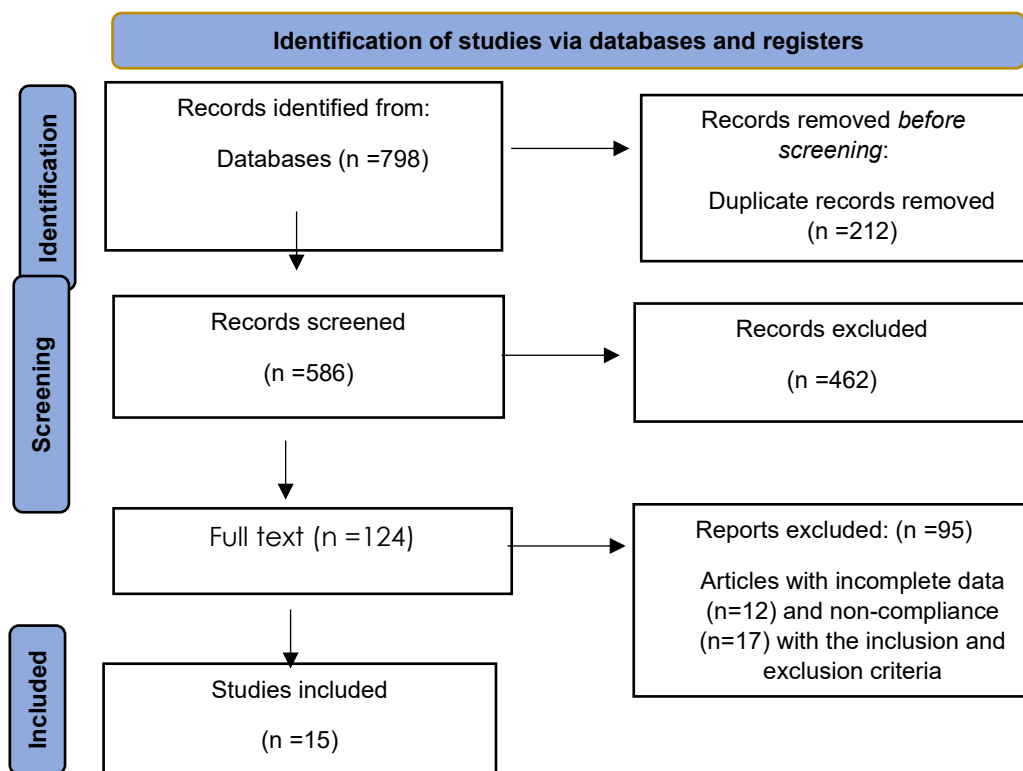
Statistical analyses were performed using StataCorp LLC's Stata. v17 software. Fixed-effect models were used, the  $I^2$  index was calculated to measure heterogeneity of studies, and forest plots were drawn to display the frequency of each study.

## RESULT

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The software then executed the next processes. In this article management of healthcare services in patients with cardiovascular problems with 798 published articles between 1990 and 2025 were evaluated with key words including "Nursing Services", "Healthcare Services", and "Cardiovascular Problems" in Scopus, Google scholar and PubMed databases was investigated. The preliminary search yielded 798 articles; during the first phase, 212 items were removed owing to duplicate data based on article titles. In the second phase, the abstracts of 586 publications were reviewed to remove studies that did not match the inclusion criteria ( $n = 462$ ). After reviewing the entire texts of 124 papers, 109 were excluded in the third phase due to missing data or noncompliance with the inclusion and exclusion criteria. Finally, the current analysis contained 15 papers (Figure 1).

FIGURE 1. FLOW PRISMA 2020 OF INCLUDED SUBJECTS



### STUDY CHARACTERISTICS

A total of 15 studies were included in this systematic review. The characteristics of the selected studies are summarized in Table 1.

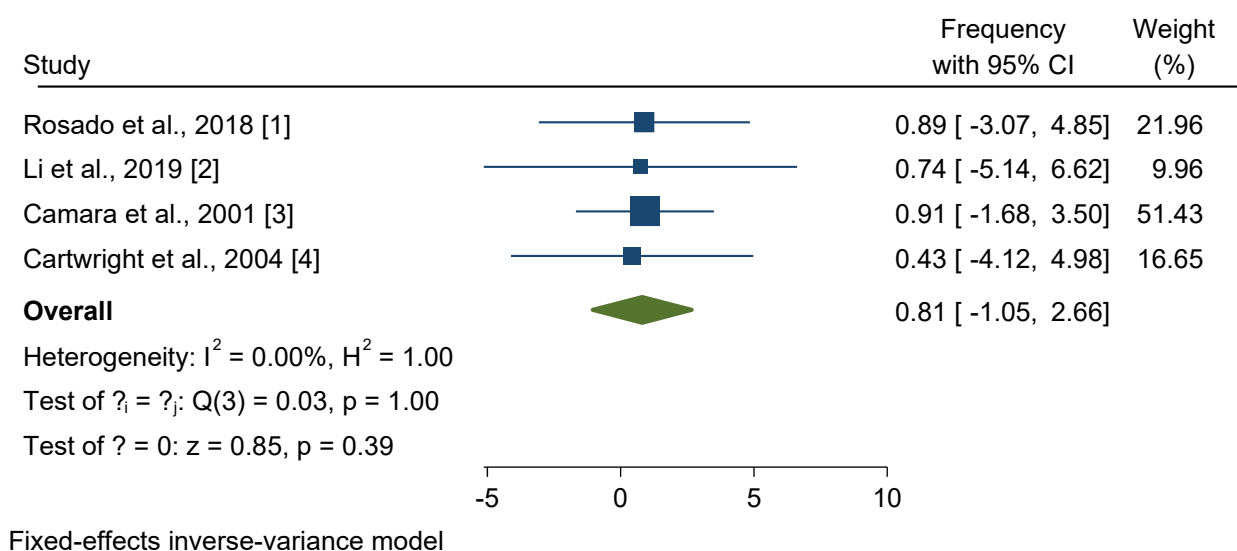
TABLE 1. CHARACTERISTICS OF THE SELECTED STUDIES FOR THIS RESEARCH

Author (Year)	Country / Population	Study Design	Sample Size	Population Characteristics	Healthcare Service / Intervention	Main Findings / Outcomes
Rosado V et al., 2018 [1]	Neonatal population	Systematic review	Not specified	Neonates with central venous catheters	Evaluation of risk factors for catheter-related infections	Identified key risk factors for infections in neonatal population
Li R et al., 2019 [2]	China	Observational	Not specified	Critically ill newborns	Use of peripherally inserted central catheters (PICC)	Reported outcomes and practical experience in NICU
Camara D, 2001 [3]	USA	Review / Clinical practice	Not specified	Neonates in NICU	Minimizing risks with PICC	Strategies to reduce catheter-associated risks
Cartwright D, 2004 [4]	Not specified	Observational	2186 catheters	Neonates	Central venous lines	Analyzed complications and outcomes related to catheter use

Chathas MK et al., 1990 [5]	USA	Observational	Not specified	Neonates in NICU	Percutaneous central venous catheterization	Experience over three years in NICU with outcome data
Colacchio K et al., 2012 [6]	USA	Observational	Not specified	Neonates in NICU	Central and non-central venous catheters	Reported complications associated with catheter types
Abeer AY, Asmaa MNK, 2025 [7]	Not specified	Review / Experimental	Not specified	N/A	Schiff base vitamin B derivatives & metal complexes	Biological and medical applications reviewed
Aras rt al.,, 2025 [9]	Not specified	Experimental	Not specified	N/A	Comarine azo chalcones derivatives	Cancer inhibition activity assessed
Arian B et al., 2025 [10]	Not specified	Review	N/A	N/A	Quantum dots in biomedical engineering	General review of applications in medical technology
Arika et al., 2025 [11]	Not specified	Experimental	Not specified	N/A	Phytoestrogen compounds from <i>Vigna unguiculata</i>	LC-MS/MS analysis of compounds
Dionisius et al., 2025 [12]	Not specified	Experimental	Not specified	N/A	Aquaporin-4 plasma expression	Effect of NaCl and Mannitol on tumor craniotomy outcomes
Jilani et al., 2021 [14]	Global	Review	N/A	Cardiovascular patients	Social determinants of health	Impact on cardiovascular outcomes and healthcare equity
Wenger et al., 2022 [15]	USA	Advisory / Review	N/A	Women with cardiovascular disease	Access and delivery of healthcare	Recommendations to improve equitable care
Javed et al., 2022 [16]	USA	Review	N/A	Racial/ethnic groups	Social determinants of health	Identified disparities in cardiovascular outcomes
Lockhart et al., 2021 [17]	Not specified	Review	N/A	Cardiovascular patients	General cardiovascular disease management	Overview of cardiovascular system diseases and management

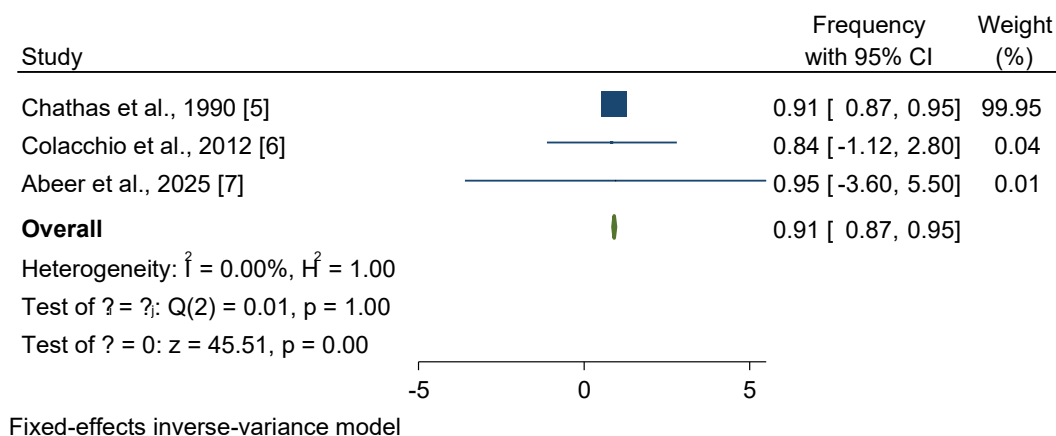
The frequency of availability of complete medications and equipment related to cardiac patients in ambulances was 81% (ES: 81%, 95% CI; -1.05, 2.66) (Figure 2). According to included studies, the availability of drugs and complete equipment related to heart patients is very vital for the referring ambulance. A heart attack is a sudden and unexpected complication that happens to a person, and its symptoms start in a few minutes.

FIGURE 2. FOREST PLOT ON THE AVAILABILITY OF DRUGS AND COMPLETE EQUIPMENT RELATED TO HEART PATIENTS



A person/patient's family in the field of rehabilitation and post-discharge care, along with the follow-up implementation of educational programs, increases the patient's quality of life and subsequently the quality of care by 91% (ES: 91%, 95% CI, 87%-95%). Accordingly, the implementation of the family-centered education model makes a statistically significant difference in the quality of life of patients after coronary artery bypass surgery and is associated with an increase in the quality of life of patients ( $P < 0.01$ ) (Figure 3).

FIGURE 3. FOREST PLOT SHOWING THE EFFECT OF FAMILY-CENTERED EDUCATION ON PATIENTS' QUALITY OF LIFE

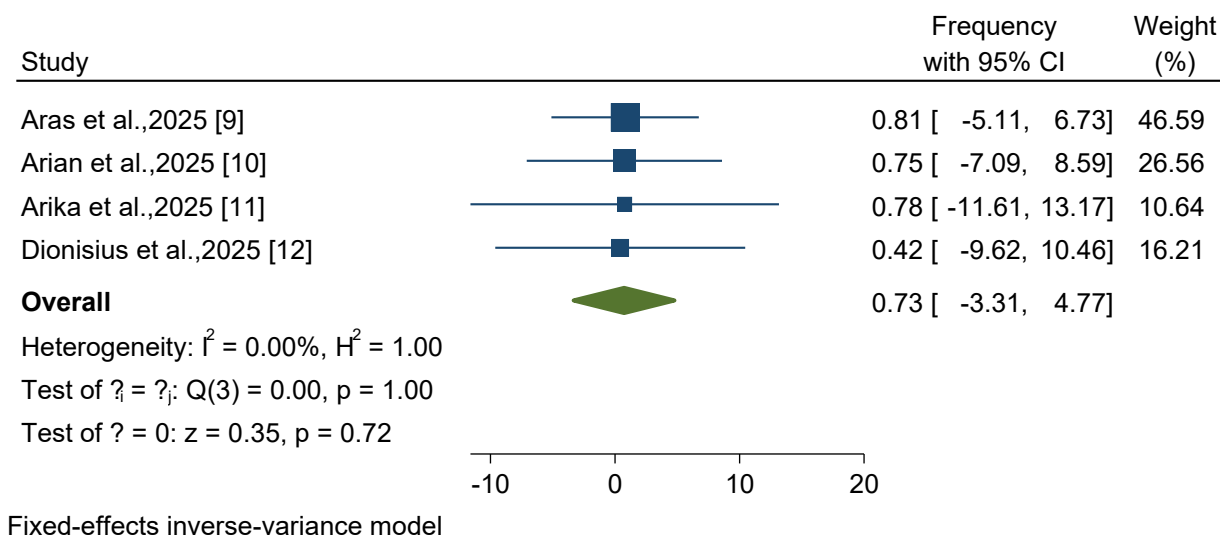


Anxiety and fear of playing the patient's role in the society causes depression, isolation and decrease in the patient's performance [8]. The presence of family members who have high understanding and tolerance to receive the necessary information about the treatment methods and the patient's recovery process is of great help in the recovery process of the patients for emotional support. Receiving social support from the family has a significant impact on recovery and the course of the disease. Informal support, as well as the impression and efficacy of family and friends as sources of support, can help patients recover faster. The supportive umbrella of family and friends, as well as significant persons in the patients' lives, can assist the person in dealing with and adjusting to the patient's problems and repercussions.

## THE MAIN PARTS OF HOSPITAL INFORMATION SYSTEMS (HIS)

The division of HIS into two general categories (patient care system and management information system) is conceptual. The information system that supports administrative, human resources, and facility activities is conventionally classified as a management information system, which has an effectiveness of 73% (Figure 4).

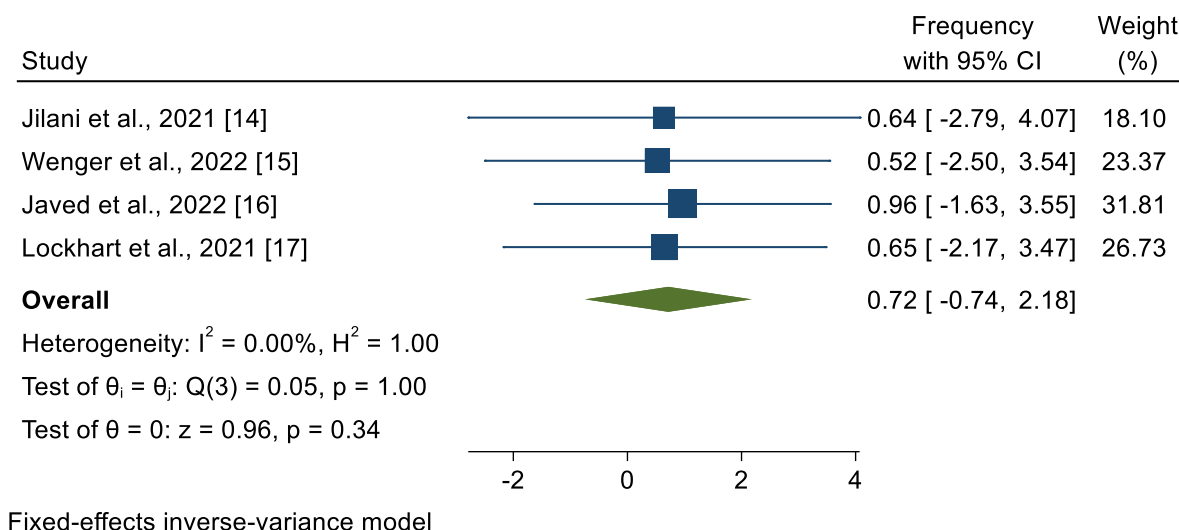
FIGURE 4. FOREST PLOT SHOWED EFFECTIVENESS OF HIS



## PARTICIPATION IN OTHER HEALTH INFORMATION SYSTEMS

The hospital information system should be able to share patient information with other healthcare institutions to provide continuity of care through health information exchange or data warehouses or other tools [13]. Providing information for health promotion, disease prevention, and early detection efforts, as well as for planning, resource allocation, and epidemiology at various university, regional, or national levels, health databases contribute up to 72% (ES: 0.72; 95% CI) (Figure 5).

FIGURE 5. FOREST PLOT SHOWED LEVEL OF PARTICIPATION IN OTHER HEALTH INFORMATION SYSTEMS



## DISCUSSION

The expectations and demands of patients, their caregivers and health professionals have increased over the past decade. Andryanto et al. (2025) reported that public awareness of health service provision increased following the release of key documents, such as the Patients' Charter and the Citizens' Charter (1993), both of which were made publicly accessible [18]. On the one hand, these charters increased the expectations of patients and their caregivers by providing more information about consumer rights [19]. On the other hand, the responsibility of the patients in using these rights was paid too much attention, which increased the demand for services and care in the busy organizations of that day [20]. Between 1990 and 2005, we saw a great emphasis on increasing the participation of patients and the community in planning, providing services and evaluating the quality of care provided to patients [21].

In the present study, the availability of complete medications and equipment for cardiac patients in ambulances was 81%. Family involvement in rehabilitation and post-discharge care, together with educational follow-up programs, improved patients' quality of life and care quality by 91%. Management information systems supporting administrative, human resources, and facility activities showed 73% effectiveness. Additionally, health databases, used for health promotion, disease prevention, early detection, planning, and resource allocation, contributed up to 72%.

The present findings are consistent with a study conducted in low-income countries, where access to emergency services, complete equipment, and medication is far below global standards [18]. A study reported that families play a significant role in improving patients' quality of life after discharge [19], and similar results were observed in the present study. Also, in most studies, the effectiveness and efficiency of management information systems and health databases were much higher than in the present study, and the reason for this is that the present meta-analysis used studies from all parts of the world [21,22]. One of the strengths of the present study compared to other studies was its simultaneous consideration of different dimensions of health services.

Despite its contributions, this meta-analysis has several limitations. First, the included studies showed substantial heterogeneity in design, populations, and healthcare settings, which may have influenced the pooled estimates. Second, most of the available evidence was observational in nature, limiting causal interpretation of the associations identified. Third, data from low- and middle-income countries were underrepresented in some domains, particularly regarding health information systems and structured family-centered programs. Future studies should employ longitudinal and interventional designs to clarify causal pathways and evaluate the long-term impact of integrated healthcare service models on cardiovascular outcomes. Additionally, context-specific research is needed to determine how these service components can be optimally adapted across different health systems and resource settings.

## CONCLUSION

According to the present meta-analysis, fully equipping ambulances during patient transport, family-centred education, and general community awareness by health service systems would be significantly effective in reducing cardiovascular problems. It is suggested that health care systems carry out family-centred education and general community awareness to care for cardiovascular patients, and that fully equipping ambulances during patient transport would reduce mortality.

## References

1. Rosado V, Camargos PA, Anchieta LM, Bouzada MC, Oliveira GMd, Clemente WT, et al. Risk factors for central venous catheter-related infections in a neonatal population-systematic review. *Jornal de pediatria*. 2018; 94:3-14.
2. Li R, Cao X, Shi T, Xiong L. Application of peripherally inserted central catheters in critically ill newborns experience from a neonatal intensive care unit. *Medicine*. 2019; 98(32).
3. . Brown H, Lucas JJ, Gauci S, et al. A systematic review of healthcare experiences of women and men living with coronary heart disease. *npj Women's Health*. 2024;2:40.

4. Alzahrani F, Alhusayni RA, Khairi NB, Bahauddin AA, Tamur S. Hospital pharmacy professionals and cardiovascular care: a cross-sectional study assessing knowledge, attitudes, and practices in Saudi Arabia. *Healthcare*. 2024;12(6):630.
5. Chathas MK, Paton JB, Fisher DE. Percutaneous central venous catheterization: three years' experience in a neonatal intensive care unit. *American Journal of Diseases of Children*. 1990; 144(11):1246-50.
6. Colacchio K, Deng Y, Northrup V, Bizzarro M. Complications associated with central and non-central venous catheters in a neonatal intensive care unit. *Journal of Perinatology*. 2012; 32(12):941-6.
7. Abeer AY, Asmaa MNK. Synthesis of Schiff Base Vitamin B Derivative and Its Transition Metal Complexes for Biological and Medical Applications, *Advanced Journal of Chemistry, Section A*. 2025; 8(3): 545-559, DOI: <https://doi.org/10.48309/ajca.2025.470779.1621>
8. Brandt L, Liu S, Heim C, Heinz A. The effects of social isolation stress and discrimination on mental health. *Transl Psychiatry*. 2022; 12(1):398. doi: 10.1038/s41398-022-02178-4.
9. Aras AYA-F, Faez AA-R. Synthesis and Characterization of Some New Comarine Azo Chalcones Derivatives to Study Their Cancer Inhibition Activity, *Advanced Journal of Chemistry, Section A*. 2025, 8(7): 1139-1149. DOI: <https://doi.org/10.48309/ajca.2025.470664.1620>
10. Arian B, Rojin H, Salar HN, Azadeh A, Abdellatif MS, Ashkani O. Role of Quantum Dots in the Advancement of Biomedical Engineering: A General Review, *Advanced Journal of Chemistry, Section A*. 2025; 8(8): 1385-1397, DOI: <https://doi.org/10.48309/ajca.2025.499976.1769>
11. Arika, Indah Setyarini., Wisnu, Barlianto., Dian, Nugrahenny., Sri, Winarsih., Analysis of Phytoestrogen Compounds from *Vigna Unguiculata* Using LC-MS/MS Approach, *Advanced Journal of Chemistry, Section A*. 2025; 8(8): 1431-1441, DOI: <https://doi.org/10.48309/ajca.2025.501455.1771>
12. Dionisius, Rianto., Prananda, Surya Airlangga., Prihatma, Kriswidyatomo., Aquaporin-4 (AQP-4) Plasma Expression in NaCl 3% and Mannitol 20% on Tumor Craniotomy, *Journal of Medicinal and Chemical Sciences*. 2025; 8(2): 223-227. DOI: <https://doi.org/10.26655/JMCHEMSCI.2025.2.9>
13. McCarthy DB, Propp K, Cohen A, Sabharwal R, Schachter AA, Rein AL. Learning from health information exchange technical architecture and implementation in seven beacon communities. *EGEMS (Wash DC)*. 2014; 2(1):1060. doi: 10.13063/2327-9214.1060.
14. Jilani MH, Javed Z, Yahya T, Valero-Elizondo J, Khan SU, Kash B, Blankstein R, Virani SS, Blaha MJ, Dubey P, Hyder AA. Social determinants of health and cardiovascular disease: current state and future directions towards healthcare equity. *Current atherosclerosis reports*. 2021; 23:1-1. DOI: 10.1007/s11883-021-00949-w
15. Wenger NK, Lloyd-Jones DM, Elkind MS, Fonarow GC, Warner JJ, Alger HM, Cheng S, Kinzy C, Hall JL, Roger VL, American Heart Association. Call to action for cardiovascular disease in women: epidemiology, awareness, access, and delivery of equitable health care: a presidential advisory from the American Heart Association. *Circulation*. 2022; 7: 145(23):e1059-71. DOI: 10.1161/CIR.0000000000001071
16. Javed Z, Haisum Maqsood M, Yahya T, Amin Z, Acquah I, Valero-Elizondo J, Andrieni J, Dubey P, Jackson RK, Daffin MA, Cainzos-Achirica M. Race, racism, and cardiovascular health: applying a social determinants of health framework to racial/ethnic disparities in cardiovascular disease. *Circulation: Cardiovascular Quality and Outcomes*. 2022; 15(1):e007917. DOI: 10.1161/CIRCOUTCOMES.121.007917
17. Lockhart PB, Sun YP. Diseases of the cardiovascular system. *Burket's Oral Medicine*. 2021; 30:505-52. DOI: 10.1002/9781119597797.ch14
18. Andryanto S, Marjono DW, Asdi W. KI-67 expression as a prognostic marker of disease-free interval in basal cell carcinoma, *Journal of Medicinal and Pharmaceutical Chemistry Research*. 2025; 7(10): 2161-2170. DOI: <https://doi.org/10.48309/jmpcr.2025.493003.1537>
19. Seymour J. The Impact of Public Health Awareness Campaigns on the Awareness and Quality of Palliative Care. *J Palliat Med*. 2018; 21(S1):S30-S36. doi: 10.1089/jpm.2017.0391.
20. Molina-Mula J, Gallo-Estrada J. Impact of nurse-patient relationship on quality of care and patient autonomy in decision-making. *International Journal of Environmental Research and Public Health*. 2020;17(3):835. doi:10.3390/ijerph17030835. Donabedian A. Evaluating the quality of medical care. 1966. *Milbank Q*. 2005;83(4):691-729. doi: 10.1111/j.

21. . McCarthy DB, Propp K, Cohen A, Sabharwal R, Schachter AA, Rein AL. Learning from health information exchange technical architecture and implementation in seven Beacon Communities. *eGEMs (Generating Evidence & Methods to improve patient outcomes)*. 2014;2(1):1060. doi:10.13063/2327-9214.1060.
22. Ferrucci L, Cooper R, Shardell M, Simonsick EM, Schrack JA, Kuh D. Age-Related Change in Mobility: Perspectives From Life Course Epidemiology and Geroscience. *J Gerontol A Biol Sci Med Sci*. 2016 Sep; 71(9):1184-94. doi: 10.1093/gerona/glw043.